Van Zyl Environmental Consultants cc

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ENVIRONMENTAL MANAGEMENT PROGRAMME (EMP)

for the

PRECONSTRUCTION, CONSTRUCTION AND OPERATIONAL PHASES

of the

PROPOSED KWARTELSPAN PHOTOVOLTAIC POWER STATION I OF UP TO 15 MWp

at

REMAINING EXTENT OF THE FARM KWARTELSPAN No. 25

Siyancuma Local Municipality
Northern Cape Province

OCTOBER 2012

NEAS REF No: DEA/EIA/0001020/2012
DEA REF No: 14/12/16/3/3/1/484

Applicant:

suntrace

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DEFINITIONS

Alien species – Plants and animals which do not arrive naturally in an area - they are brought in by humans. Alien plants often force indigenous species out of the area. Mesquite is a good example of an alien species in the Northern Cape.

Alternative – A possible course of action, in place of another, that would meet the same purpose and need defined by the development proposal. Alternatives considered in the EIA process can include location and/or routing alternatives, layout alternatives, process and/or design alternatives, scheduling alternatives or input alternatives.

Aspect – Element of an organisation's activities, products or services that can interact with the environment.

Auditing – A systematic, documented, periodic and objective evaluation of how well the Environmental Management Programme is performing. Auditing aims to help safeguard the environment by facilitating management control, including compliance with regulatory requirements. Results of the audit help the organisation to improve its environmental policies and management systems.

Biodiversity – The rich variety of plants and animals that live in their own environment. The Succulent Karoo is a good example of rich biodiversity in the Northern Cape.

Built environment – Physical surroundings created by human activity, e.g. buildings, houses, roads, bridges and harbours.

Conservation – Protecting, saving and using resources wisely, especially the biodiversity found in an area.

Contamination – Polluting something or making it impure.

Corrective (or remedial) action – Response required to address an environmental problem that is in conflict with the requirements of the EMP. The need for corrective action may be determined through monitoring, audits or management review.

Degradation – The lowering of the quality of the environment through human activities, e.g. river degradation and soil degradation.

Ecology – The scientific study of the relationship between living things (animals, plants and humans) and their environment.

Ecosystem – The relationship and interaction between plants, animals and the non-living environment.

Environment – Our surroundings, including living and non-living elements, e.g. land, soil, plants, animals, air, water and humans. The environment also refers to our social and economic surroundings, and our effect on our surroundings.

Environmental Impact Assessment (EIA) – An Environmental Impact Assessment (EIA) refers to the process of identifying, predicting and assessing the potential positive and negative social, economic and biophysical impacts of a proposed development. The EIA includes an evaluation of alternatives, recommendations for appropriate management actions for minimising or avoiding negative impacts and for enhancing positive impacts, and proposed monitoring measures.

Environmental Management System (EMS) – Environmental Management Systems (EMS) provide guidance on how to manage the environmental impacts of activities, products and services. They detail the organisational structure, responsibilities, practices, procedures, processes and resources for environmental management. The ISO14001 EMS standard has been developed by the International Standards Organisation.

Environmental policy – Statement of intent and principles in relation to overall environmental performance, providing a framework for the setting of objectives and targets.

Force Majeure – An Event of Force Majeure means any circumstance which is beyond the control of the aggrieved party and is not reasonably foreseeable by the same, such as but not limited to: acts of God, orders of the authority, change of laws, etc.

1. An Event of Force Majeure can be:
(a) drought, hail, heavy or torrential rain meaning precipitation of more than 40 mm per hour, floods, tornados, fires, landslides or other adverse natural phenomena except lightning strikes, which prevent the Contractor to perform the Works, get access to the Site or otherwise perform any of its obligations under this Agreement;
(b) epidemics, quarantine restrictions, war or civil conflicts,
(c) national, territorial or sector strikes (other than strikes limited to the Contractor's or its subcontractors' business);

(d) sabotage, terrorism, acts of vandalism, embargoes;
(e) explosions, archaeological finds;
(f) changes in applicable legislation, the revocation or suspension of any authorisation, permit or license or any other decision or act of any authority which cannot be ascribed to the party affected by the force majeure event;
(g) climate conditions that exceed those for which the plant was designed and that are detailed in the respective technical specifications of the plant;
(h) climate or meteorological conditions that, according to health and safety laws and regulations, make the access to the site and/or the execution of the works unsafe or, otherwise, unviable.

2. For the sake of clarity, lightning strikes do not constitute an Event of Force Majeure.

Habitat – The physical environment that is home to plants and animals in an area, where they live, feed and reproduce.

Hazardous waste – Waste, even in small amounts, that can cause damage to plants, animals, their habitat and the well-being of human beings, e.g. waste from factories, detergents, pesticides, hydrocarbons, etc.

Impact – A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.

Indigenous species – Plants and animals that are naturally found in an area.

Infrastructure – The network of facilities and services that are needed for economic activities, e.g. roads, electricity, water, sewerage.

Integrated – Mixing or combining all useful information and factors into a joint or unified whole. See Integrated Environmental Management.

Integrated Environmental Management (IEM) – A way of managing the environment by including environmental factors in all stages of development. This includes thinking about physical, social, cultural and economic factors and consulting with all the people affected by the proposed developments.

Land use – The use of land for human activities, e.g. residential, commercial, industrial use.

Mitigation – Measures designed to avoid, reduce or remedy adverse impacts

Natural environment – Our physical surroundings, including plants and animals, when they are unspoiled by human activities.

Over-utilisation – Over-using resources - this affects their future use as well as the environment.

Policy – A set of aims, guidelines and procedures to assist in the decision-making and management of an organisation or structure. Policies are based on people's values and goals.

Process – Development usually happens through a process – a number of planned steps or stages.

Proponent – Developer. Entity applying for environmental approval and ultimately accountable for compliance with conditions stipulated in the Environmental Authorisation (EA) and requirements of the EMP.

Recycling – Collecting, cleaning and reusing materials.

Resources – Parts of our natural environment that we use and protect, e.g. land, forests, water, wildlife, and minerals.

Scoping Report – A report presenting the findings of the scoping phase of the EIA. This report is primarily aimed at reaching closure on the issues and alternatives to be addressed in the EIA (in the case of a full EIA process).

Stakeholders – A subgroup of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term includes the proponent, authorities and all interested and affected parties.

Storm water management – Strategies implemented to control the surface flow of storm water in such a way as to mitigate erosion, sedimentation and pollution of surface and groundwater resources in the immediate and surrounding environments. This is specifically important during the construction and decommissioning phases of a project.

Sustainable development – Development that is planned to meet the needs of present and future generations, e.g. the need for basic environmental, social and economic services. Sustainable development includes using and maintaining resources responsibly.

Sustainability – Being able to meet the needs of present and future generations.

Waste Management – Classifying, recycling, treatment and disposal of waste generated during construction and decommissioning activities.

Wetlands – An area of land with water mostly at or near the surface, resulting in a waterlogged habitat containing characteristic vegetation species and soil types e.g. vleis, swamps.

Zoning – The control of land use by only allowing a specific type of development in fixed areas or zones

ABBREVIATIONS

DAFF	Department of Agriculture, Forestry and Fisheries
DENC	Department of Tourism, Environment and Conservation
DEA	Department of Environmental Affairs
DR&PW	Department of Roads and Public Works
DWA	Department of Water Affairs
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Program
EO	Environmental Officer
ESO	Environmental Site Officer
I&AP	Interested and Affected Parties
O&M	Operations and Maintenance
PPE	Personal Protective Equipment
SMMEs	Small, Medium and Micro Enterprises
RE	Residential Engineer
CE	Consulting Engineer

REFERENCES

DEAT (1992) Integrated Environmental Management Guideline Series, Volumes 1-6, Department of Environmental Affairs, Pretoria.

DEAT (2004a) Environmental Management Plans, Integrated Environmental Management, Information Series 12, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

CITY OF CAPE TOWN: ENVIRONMENTAL MANAGEMENT PROGRAMME (2002) Specification EM – 02/07: ENVIRONMENTAL MANAGEMENT, Ver 5 (03/2002)

Lochner, P. 2005.Guideline for Environmental Management Plans. CSIR Report No ENV-S-C 2005-053 H. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

National Environmental Management Act 107 of 1998 (NEMA)

SECTION 1: INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

This document is compiled in accordance with the Integrated Environmental Management (IEM) philosophy, which aims to achieve a desirable balance between conservation and development (DEAT, 1992). IEM is a key instrument of the National Environmental Management Act [NEMA] (Act No. 107 of 1998). NEMA promotes the integration of environmental management to activities that may have a significant effect on the environment, while IEM prescribes a methodology for ensuring that environmental management principles are fully integrated into all stages of the development process. It advocates the use of several environmental and management tools that are appropriate for the various levels of decision-making. One of these tools is an Environmental Management Programme (EMP).

The IEM guidelines intend to encourage a pro-active approach to sourcing, collating and presenting information in a manner that can be interpreted at all levels. The basic principles underpinning IEM are that there be:

- informed decision-making;
- accountability for information on which decisions are taken;
- accountability for decisions taken;
- a broad meaning given to the term environment (i.e. one that includes physical, biological, social, economic, cultural, historical and political components);
- an open, participatory approach in the planning of proposals;
- consultation with interested and affected parties;
- due consideration of alternative options;
- an attempt to mitigate negative impacts and enhance positive aspects of proposals;
- an attempt to ensure that the 'social costs' of development proposals (those borne by society, rather than the developers) be outweighed by the 'social benefits' (benefits to society as a result of the actions of the developers);
- democratic regard for individual rights and obligations;
- compliance with these principles during all stages of the planning, implementation and decommissioning of the proposals (i.e. from 'cradle to grave'), and
- the opportunity for public and specialist input in the decision-making process.

These principles are in line with NEMA and are focused primarily on cooperative governance, public participation and sustainable development. The Environmental Impact Assessment Regulations, which took effect in August 2010, regulate the procedures and criteria for the submission, processing, consideration and decision on applications for environmental authorisation of listed activities.

1.2 SCOPE AND TERMS OF REFERENCE

The general principles contained within this document apply to all **PRE-CONSTRUCTION AS WELL AS CONSTRUCTION AND OPERATIONAL PHASE** activities.

1.2.1 Principles of this EMP

This EMP is compiled using the following concepts and implementation requirements so that the higher principles of sustainable development are realised:

- ***Continuous improvement:*** The project proponent (or implementing organisation) must be committed to review and to continually improve environmental management, with the objective of improving overall environmental performance.
- ***Broad level of commitment:*** A broad level of commitment will be required from all levels of management as well as the workforce in order for the development and implementation of this EMP to be successful and effective.
- ***Flexible and responsive:*** The implementation of the EMP must be responsive to new and changing circumstances, i.e. rapid short-term responses to problems or incidents. The EMP is a dynamic "living" document and thus regular planned review and revision of the EMP must be carried out.
- ***Integration across operations:*** This EMP is integrated across existing line functions and operational units such as health, safety and environmental departments in a company/project. This is done to change the redundant mindset of seeing environmental management as a single domain unit.
- ***Legislation:*** It is understood that any development project during its construction and operational phases is a dynamic activity within a dynamic environment. The Developer, Engineer, Contractor and subcontractors, and O&M Manager must therefore be aware that certain activities conducted during construction and operational

phases may require further licensing or environmental approval, e.g. river or stream diversions, bulk fuel storage, waste disposal, etc. The Contractor must consult with the RE, EO and ECO, and the O&M Manager must consult with the EAP and CE on a regular basis in this regard.

1.2.2 Site-Specific Information

1.2.2.1 Proposed activity and local context

This section was addressed sufficiently in the Basic Environmental Impact Assessment Report (EIA Report).

1.2.2.2 Summary of impacts associated with the proposed activity

This section was addressed sufficiently in the Basic EIA Report.

1.2.2.3 Proponent's environmental management policy and commitments

In order to ensure that the construction and operation of the proposed PV power station will not be to the detriment of the environment, the proponent shall provide an environmental management policy and commitments to the EAP or ECO prior to commencement of the construction activities.

1.2.3 Interpretations

The implementation of the EMP is not an additional or "add-on" requirement. The EMP is legally binding through NEMA and the relevant EA. The proponent is to ensure that through the project tender process the EMP forms part of the Project Construction Contract Document to be incorporated in line with:

a) general project specifications; and
b) SANS 1200 A or SANS 1200 AA, as applicable.

1.2.4 Project Phase

This EMP is specifically compiled for all the stages of the project, including the period of time prior to commencement of construction, the construction phase of the proposed activity as well as the management and maintenance activities during the operational phase.

1.2.5 Role Players and Responsibility Matrix

In order for the EMP to be successfully implemented, all the role players involved in the project need to cooperate. For this to happen, role players must have a clear understanding of their roles and responsibilities in the project, be professional, form respectful and transparent relationships, and maintain open lines of communication. The EMP therefore clearly defines the role players involved and indicates their roles in the implementation of the EMP.

Typically, these role players or the project team may include the Main Authority (A), Other Authorities (OA), Developer/Proponent (D), Consulting Engineers (CE), Resident Engineer (RE), Environmental Officers (EO), Environmental Site Officer (ESO), Environmental Control Officer (ECO), Project Manager (PM), Contractor (C), Environmental Assessment Practitioner (EAP). Landowners, interested and affected parties and the relevant environmental and project specialists are also important role players.

Table 1 gives an indication of the functions and responsibilities of the project team.

Table 1: Project Team Responsibility Matrix

KEY	FUNCTION	RESPONSIBILITY
D	**Developer**	Proponent ultimately accountable for ensuring compliance with the EMP and conditions contained in the Environmental Authorisation (EA). The ECO must be contracted by the developer (full-time or part-time, depending on the size of the project) as an independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of Environmental Authorisations (EAs), and the EMP for the project. The developer is further responsible for providing and giving mandate to enable the ECO to perform responsibilities. The developer must ensure that the ECO is integrated as part of the project team.
CE	**Consulting Engineer**	Contracted by the developer to design and specify the project engineering aspects. Generally the engineer runs the works contract. The CE may also fulfil the role of Project Manager on the developer's behalf (See PM) management requirements are met.
PM	**Project Manager**	The Project Manager has over-all responsibility for managing the project, contractors, and consultants and for ensuring that the environmental management requirements are met (The CE may also act as the PM). All decisions regarding environmental procedures must be approved by the PM. The PM has the authority to stop any construction activity in contravention of the EMP in accordance with an agreed warning procedure.
RE	**Resident Engineer**	The Consulting Engineer's representative on site. Has the power/mandate to issue site instructions and in some instances, variation orders to the Contractor, following request by the EO or ECO. The RE oversees site works as well as liaison with the Contractor and ECO.
EO/ EM	**Environmental Officer /Environmental manager**	Appointed by the Consulting Engineers as their environmental representative on site. The EO is not independent but must rather act on behalf of the Consulting Engineers with the mandate to enforce compliance under the project contract, which must include the EMP. The EO has the directive to issue non-conformance and hazard certificates. Furthermore, in terms of accepted industry practice the EO could issue the equivalent of a "cease works" instruction only in exceptional circumstances where serious environmental harm has been or is about to be caused i.e. in cases of extreme urgency and then only when the RE is absent. The EO must form part of the project team and be involved in all aspects of project planning that can influence environmental conditions on the site. On certain types of projects, such as linear developments (fences, pipelines, etc), the EO must also be the liaison between the Contractor and landowners. The EO must attend relevant project meetings, conduct daily inspections to monitor compliance with the EMP, and is responsible for providing reports and feedback on potential environmental problems associated with the development to the project team and ECO. The EO shall convey the contents of this EMP to the Contractor's site team and discuss the contents in detail with the Contractor, and undertake to conduct an induction and an environmental awareness training session prior to site handover to all contractors and their workforce. The EO must be suitably experienced with the relevant qualifications and preferably competent in construction-related methods and practices.
ECO	**Environmental Control Officer**	An independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of Environmental Authorisations (EAs), and the EMP for the project. The ECO must be on site prior to any site establishment and must endeavour to form an integral part of the project team. The ECO must be proactive and have access to specialist expertise, including botanists, ecologists etc., as and when required. Furthermore, the ECO must have access to expertise such as game capture, snake catching, etc. The ECO must conduct audits on compliance with relevant environmental legislation, conditions of EAs, and the EMP for the project. The size and sensitivity of the development, based on the EIA, would determine the frequency with which the ECO would be required to conduct audits. (A minimum of one site inspection must be undertaken each month). The ECO shall be the liaison between the relevant authorities and the project team. The ECO must communicate and inform the Developer and Consulting Engineers of any changes to legislation and/or permit conditions as required by relevant authorities. The ECO must ensure that the registration and updating of all relevant EMP documentation is carried out. The ECO must be suitably experienced with the relevant environmental management qualifications and preferably competent in construction-related methods and practices. The ECO must handle information received from whistle blowers as confidential and must address and report these incidences to the relevant authority as soon as possible. On small projects, where no EO is appointed, the ECO shall convey the contents of this EMP to the Contractor's site team and discuss the contents in detail with the Contractor. The ECO shall also undertake to conduct an induction and an environmental awareness training session prior to site handover to all contractors and their workforce.

KEY	FUNCTION	RESPONSIBILITY
C	**Contractor**	The principle contractor, hereafter known as the 'Contractor', is responsible for implementation and compliance with the requirements of the EMP and conditions of the EAs, contract and relevant environmental legislation. The Contractor must ensure that all subcontractors have a copy of and are fully aware of the content and requirements of this EMP. The Contractor will be required, where specified, to provide Method Statements setting out in detail how the management actions contained in the EMP will be implemented.
ESO	**Environmental Site Officer**	The ESO is employed by the Contractor as his/her environmental representative to monitor, review and verify the Contractor's compliance with the EMP. This is not an independent appointment; rather the ESO must be a respected member of the Contractor's management team. Dependent on the size of the development the ESO must be on site one week prior to the commencement of construction. The ESO must ensure that he/she is involved at **all phases** of the construction (from site clearance to rehabilitation).
A	**Lead Authority**	The Lead Authority is the relevant environmental department that has issued the Environmental Authorisation. The authorities are responsible for ensuring that the monitoring of the EMP and other authorisation documentation is carried out. This would be achieved by reviewing audit reports submitted by the ECO and conducting regular site visits.
OA	**Other Authority**	Other authorities are those that may be involved in the approval process of an EMP. Their involvement may include reviewing EMPs to ensure the accuracy of the information relevant to their specific mandate. Other authorities may be involved in the development, review or implementation of an EMP. For example, if a specific development requires a Water Use Licence from the relevant national authority, then that authority should review the particular section pertaining to that mandate and comment on its content.
EAP	**Environmental Assessment Practitioner**	The definition of an Environmental Assessment Practitioner in Section 1 of NEMA is "the individual responsible for the planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instruments introduced through regulations".

Important Notes on Table 1

- The EO is NOT independent but should rather act on behalf of the consulting engineers with the mandate to ENFORCE compliance under the project contract in which the EMP is included.
- The ECO **MUST** be an independent appointment (appointed by the Developer, since the Developer in most cases will be the Applicant to whom DEA has issued the EA and on whom the Conditions of Authorisation are binding), in order to objectively audit and report on the implementation of the EMP, conditions of the RoD and relevant environmental legislation.
- In the past, contractors have been given the responsibility for appointing an ESO to monitor and enforce the requirements of an EMP. Whilst this should not be discouraged, past experience has shown that these appointments do not hold any environmental experience or competence and should therefore, in the terms of the EMP and the project contract, not be given the directive to issue instructions or recommendations unless in consultation with the RE, EO or ECO.

1.2.6 Enforcement, Monitoring and Auditing

In environmentally sensitive environments, containing protected/rare plant and animal species, or on large projects the ECO and full-time EO would oversee the implementation of the EMP. On smaller projects or impacted environments the EO (full- or part-time) and the full-time ESO must oversee the implementation of the EMP.

On projects approved under NEMA, the independent ECO is responsible for regular audits on compliance with relevant environmental legislation, conditions of the Environmental Authorisation (EA), and the EMP for the project.

The ECO shall conduct, at a frequency as determined by the Department and stipulated in the relevant Environmental Authorisation (EA) for the project, independent environmental audits. The audits are to verify the project's compliance with the EMP and conditions of the Environmental Authorisation (EA).

Before any construction activities commence, the ECO must compile, for the approval by the Department, an audit checklist based on the contents of this EMP and conditions of the Environmental Authorisation (EA). The ECO shall at the request of the Department forward audit reports to the Department at a frequency that shall be determined by the Department and stipulated in the Environmental Authorisation (EA).

Evidence of the following as **key performance indicators,** must be included in the audit reports where required:

1. complaints received from landowners and actions taken;
2. environmental incidents, such as oil spills, concrete spills, etc. and actions taken (litigation excluded);
3. incidents leading to litigation and legal contraventions; and
4. environmental damage that necessitates rehabilitation measures.

A copy of all ECO and EO monitoring reports, contractor method statements and pro forma documentation (see 1.2.11 & 1.2.12) must be held by the ESO and/or the EO on site and be made available to the Department and/or the ECO upon request.

1.2.7 Tolerances

Fines

An Environmental Performance Guarantee of 1% of Contract Value to a maximum of R 2 000 000.00 shall be deposited by the Contractor with the Consulting Engineer (CE). This fund shall be used in the event of fines or rehabilitation costs for non-conformance or contraventions of the EMP. The balance shall be given back to the Contractor at contract closure.

Failure by the Contractor to adhere to the specifications and principles of this EMP will result in fines being issued by and at the discretion of the CE and ECO. Fines may be issued per incident and in addition to any remedial costs incurred as a result of non-compliance with the requirements of the EMP.

For each subsequent similar or repetitive offence the fine may, at the discretion of the CE and ECO, be doubled in value to a maximum value of **R50 000.00.**

Where the Contractor inflicts irreparable damage upon the environment or fails to comply with any part of the EMP, he shall be liable to pay a penalty fine over and above any other contractual consequence. {*In terms of the Conventional Penalties Act (1962) a creditor is not entitled to recover both the penalty and damages. Accordingly, where a Contractor causes damage, the Employer can either enforce a penalty or make the Contractor make good the damage, but not both.*}

The Contractor is deemed NOT to have complied with the EMP if:

a. within the boundaries of the site, site extensions and haul/access roads there is evidence of contravention of the EMP;
b. environmental damage ensues due to non-compliance of EMP requirements;
c. the Contractor fails to comply with corrective or other instructions issued by the Engineer within a specific time; and
d. the Contractor fails to respond adequately to relevant and reasonable complaints from the public excluding events of force majeure.

1.2.8 Measurement and Payment

It is understood that environmental requirements included in the EMP will entail costs over and above those of the civil requirements.

These include provision for:

- mitigation and enhancement actions;
- training and environmental awareness requirements;
- monitoring;
- auditing; and
- corrective actions.

The proponent shall recognise this and make provision for it in the tender. Costing for management action should be done with inputs and advice from appropriate technical members of the project team and relevant EAP who have knowledge of the management actions being recommended as well as practical experience in implementing similar measures and techniques.

A lump sum must be allocated for the management of Environmental Specifications where it is not possible to cost requirements of the EMP.

1.2.9 General Guidelines

The following measures provide guideline solutions to frequently anticipated issues on most development activities.

- The prevention of any site degradation due to non-compliance, administrative or financial problems, and inactivity during the construction phase, illegal activities, delays caused by archaeological finds etc. is ultimately the responsibility of the applicant/developer. Section 28, National Environmental Management Act [NEMA] (Act No. 107 of 1998)
- Landowners are not comfortable when strangers come onto their properties. It is to be ensured that the land owner(s) be informed regarding any activities that is taking place on the property/ies to prevent delays in the process that can be very costly to the Contractor.
- The Contractors must adhere to agreed and approved access points and haul roads.
- No camping shall be allowed on any private property.
- Damage to private or public property such as fences, gates and other infrastructure may occur at any time. All damage must be repaired immediately and to the satisfaction of the owner.
- On linear projects a physical access plan along servitudes shall be compiled and the Contractor shall adhere to this programme at all times. When the physical access plan is drawn up by the EO in conjunction with the Contractor, proper planning shall be necessary to ensure access to servitudes. All servitude gates on sections of servitudes shall be completely installed before any construction activities are undertaken.
- Relevant landowners and businesses must be informed of the starting date of construction as well as the phases in which the construction shall take place.
- The Contractor must adhere to all conditions of contract including this EMP.
- The construction process must be planned properly to allow for disruptions due to rain and very wet conditions.
- Where existing private roads that are to be utilised as access are in a bad state of repair, the condition of such roads shall be documented thoroughly and photographs shall be taken before they are used for construction purposes. Repairs must be done to prevent damage to equipment and plant if necessary.
- All private and public manmade structures near the project site shall be protected against damage at all times and any damage shall be rectified immediately.
- The site must be managed properly and site works monitored regularly.
- All complaints and actions taken must be properly documented and records must be kept.
- Site inspections must be conducted regularly and good control must be exercised over the construction process throughout the construction period.
- A positive attitude towards Environmental Management must be maintained by all site personnel.
- An ESO is to be appointed to implement this EMP on behalf of the Contractor. The EO, and not the Contractor or his/her ESO, is to deal with any landowner-related matters.
- Environmental Audits are to be carried out during and upon completion of construction.

1.2.10 Awareness Training

The EO or ESO, or ECO on small projects where an EO and or ESO are not appointed, is responsible for ensuring that everyone on site is given an environmental awareness induction session. This session should not only clearly define what the environment is and describe specific characteristics detailing the local environment, but also outline the requirements of the EMP as a management tool to protect the environment.

Refresher courses must be offered as and when required. The EO or ESO must ensure daily toolbox talks include alerting the workforce to particular environmental concerns associated with the tasks for that day or the area/habitat in which they are working. Awareness posters and a hand-out must be produced to create awareness throughout the site.

Special effort should be made to include basic identification of protected plant species expected to be found on site with all personnel but specifically with machine operators that would be involved in activities that could cause significant damage such as during vegetation clearing and implementation of infrastructure.

1.2.11 Contractor Environmental Method Statements

Method Statements are written submissions to the Engineer by the Contractor, in collaboration with his/her ESO, in response to a request by the EO and/or Engineer. The method statements set out the plant, materials, labour and method that the Contractor proposes to use in order to carry out an activity identified by the EO and/or Engineer. The method statements contain appropriate detail enabling the EO and Engineer to assess whether the Contractor's proposal is in accordance with the requirements of the EMP. The Contractor must sign each method statement along with the EO and Engineer in order to formalise the approved method statement.

All method statements including those that may be required as *ad hoc* or emergency construction method statements must be submitted to the Engineer for approval prior to the commencement of the activity.

Any changes to the method of works must be reflected by amendments to the original approved method statement. Any changes in this regard must be approved by the EO and Engineer if such changes are environmentally acceptable and in line with the requirements of this EMP.

The attached pro forma method statements must be used and method statements for the following activities must be submitted to the EO, ECO and Engineer for approval before construction commences.

- Solid waste management
- Crew camps and construction laydown areas
- Workshop and maintenance/cleaning of plant
- Cement and concrete batching
- Dust control
- Hydrocarbon and emergency spills procedures
- Diesel tanks and refuelling procedures
- Sourcing, excavating, transporting and dumping of fill and spoil material
- Topsoil management
- Fire
- Rehabilitation of crew camp and other disturbed areas.

1.2.12 Site Documentation

The following documentation must be kept on site and must be made available to the ECO and/or DEA on request.

- Access negotiations and physical access plan
- Site daily diary/instruction book
- Records of all remediation/rehabilitation activities
- Copies of EO reports (management and monitoring)
- Environmental Management Programme (EMP)
- Complaints register
- Method statements

1.2.13 Pro Forma Documentation

1.2.13.1 Prior to the commencement of construction activities

The pro forma documents listed below are attached and must be filled out prior to the commencement of construction. These documents, which are binding to the EMP and project contract, include but are not limited to:

- Declaration of Understanding by the Developer
- Declaration of Understanding by the Engineer
- Declaration of Understanding by the Contractor
- Method statements
- ECO/Engineer approval for method statements
- Access negotiations and physical access plan

1.2.13.2 During construction activities

The pro forma documents listed below are attached and must be filled out and maintained throughout the construction phase. These documents, which are binding to the EMP and project contract, include but are not limited to:

- amended method statements;
- ECO/Engineer approval for amended method statements;
- New method statements;
- environmental incidents; and
- records of remediation/rehabilitation activities.

1.2.14 National and Provincial Acts and Guidelines

The common list of legislative references contained herein is by no means exhaustive but is applicable to the general principles of this document.

Advertising on Roads and Ribbon Development Act No. 24 of 1940
Regulates the display of adverts at places visible from public roads. Also controls the depositing of machinery or refuse, and the construction or laying of structures, near public roads.
Provincial Authorities

Animals Protection Act No. 71 of 1962
Provides for the protection of animals.

Conservation of Agricultural Resources Act No. 43 of 1983
Control of the utilisation and protection of wetlands, soil conservation, control and prevention of veld fires, control of weeds and invader plants.
Department of Agriculture

Fencing Act No. 31 of 1963
Clearing of bushes for border fencing, Access to property for fencing.
Department of Agriculture

Hazardous Substances Act No. 15 of 1973
Provides for the control of substances, which may cause injury or ill health to, or the death of human beings.
National Department of Health. Local Authorities may be authorized

Health Act No. 63 of 1977
Control of solid, liquid and gaseous wastes that may pose a health hazard.
Department of Health and Local Authorities

Minerals and Petroleum Resources Development Act No. 28 of 2002
Department of Mineral Resources

National Building Regulations and Standards Act 103 of 1977 (SABS 0400)

National Environmental Management: Air Quality Act No. 39 of 2004
Control of noxious and offensive gases, smoke, dust and vehicular emissions.
DEA: Regional Air Pollution Control Office

National Environmental Management Act No. 107 of 1998
Environment Conservation Act No. 73 of 1989
Control/prevention of pollution; combating of noise; activities which may have a detrimental effect on the environment, preparation and contents of environmental impact reports.
Department of Environmental Affairs, Department of Water Affairs, Department of Agriculture, Forestry and Fisheries, Department of Environment and Nature Conservation, Local Authorities

National Environmental Management: Biodiversity Act No. 10 of 2004
National Environmental Management: Protected Areas Act No 57 of 2003
DEA, DENC, Northern Cape Nature Conservation

National Environmental Management: Waste Act No. 59 of 2008
Management of Waste
DEA, DENC, Local Authorities

National Forests Act, Act No. 84 of 1998
National Veld and Forest Fires Act, Act 101 of 1998
Control over encroaching, protection of trees on private land, prevention and extinction of fire hazards.
Fire Protection Associations. Building of fire breaks.
Department of Agriculture, Forestry and Fisheries

National Heritage Resources Act No. 25 of 1999
Northern Cape Heritage Resources Agency
South African Heritage Resources Agency

National Road Traffic Act No. 93 of 1996
Provides for road traffic matters which apply uniformly throughout South Africa.
Department of Transport.

National Water Act No. 36 of 1998
Water Services Act No. 108 of 1997
Diversion or impoundment of rivers. Conservation and use of water. Treatment and disposal of waste, wastewater and effluent. Pollution and pollution emergencies. Water Users & Associations.
Dam safety. Registration of boreholes.
Department of Water Affairs and Forestry, Local Authorities

Northern Cape Nature Conservation Act, Act 9 of 2009
Northern Cape Department of Environment and Nature Conservation

Occupational Health and Safety Act No. 85 of 1993
Controls the exposure of employees and the public to dangerous and toxic substances or activities.
Department of Labour

Road Transportation Act No. 74 of 1977
Department of Transport

World Heritage Resource Act No 49 of 1999
Conservation of national heritage and archaeological material.
South African Heritage Resources Agency.
National Council for Heritage

SECTION 2: CONSTRUCTION & OPERATIONAL PHASE EMP – IMPLEMENTATION

2.1 PREAMBLE

The point of departure for this EMP is to empower a pro-active rather than reactive approach to environmental performance by addressing potential problems before they occur. This would limit corrective measures needed during the construction and operational phases of the project. The purpose of the EMP is therefore to provide management measures that must be implemented by the Developers, Engineers and Contractors alike to ensure that the potential impacts of a proposed development are minimised. It must also be ensured that the EMP is maintained and upheld as a dynamic document in order for the project team to add or improve on issues that might be considered left out or not relevant to the project. In such instances the DEA may authorise the ECO to make such changes.

The following tables (see page 11) form the core mitigation measures appropriate to the preconstruction, construction and operational phases. The tables present the objectives to be achieved and the management actions that need to be implemented in order to mitigate the negative impacts and enhance the benefits of the project. Associated responsibilities, criteria/targets and timeframes are clearly specified.

The ***Preconstruction*** section of this EMP applies to the period of time prior and leading up to commencement of construction activities. This section is included to ensure pro-active environmental management measures with the goal of identifying avoidable environmental damage at the outset and sustaining optimal environmental performance throughout the construction phase. Most impacts would occur during the construction phase and must be mitigated through the contingency plans identified in the preconstruction phase.

The bulk of environmental impacts would have immediate effect during the ***Construction and Operational*** phases (e.g. noise, dust, and water pollution). If the site is monitored continuously it would be possible to identify these impacts as they occur. These impacts would then be mitigated through the measures outlined in this section, together with a commitment to sound environmental management from the project team.

The ***Construction and Operational*** sections refer to all construction and its operation-related activities and the operational activities that would occur within the approved area and access roads during and after completion of the construction phase. This section is divided into three functional areas, namely “materials”; “plant”; and “construction, operations & maintenance”. Each of these functional areas within the EMP contains specific mitigation requirements. Method statements by the Contractor and PV power station management are stipulated where required.

2.2 STRUCTURE AND CONTENTS OF THE TABLES

The table consists of the following seven parts:

Phase of Development – This row identifies the phase, namely preconstruction (planning), construction or operational phase.
Impact/Issue – This row identifies the issue being addressed, e.g. materials, site demarcation, heritage, etc.
Mitigation Measure – This column contains all the necessary mitigation measures for each impact/issue.
Management Objectives – This column indicates the management objectives to be achieved for each mitigation measure.
Measurable Targets – This column indicates what evidence must be used as an indication of whether or not the Management Objectives have been implemented and achieved.
Responsible Party – This column provides information as to which role player, e.g. ECO, RE, etc., is responsible for the implementation and/or management of each mitigation measure.
Frequency of Action – This column provides time guidelines by which the Responsible Party is to execute or manage the required mitigation.

SPECIALIST RECOMMENDATIONS

The last part of the table provides space for the EAP to add specialist recommendations that need to be addressed during the preconstruction and construction phases (See page 44).

Phase of Development	A	PRE-CONSTRUCTION (PLANNING)
Impact/Issue	1	GENERAL

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
1.1	**PROJECT CONTRACT AND PROGRAMME** The EMP shall be included as part of the tender documentation, thereby making it part of the enquiry document. The recommendations and constraints, as set out in this document, shall therefore be enforceable under the general conditions of contract. A copy of this EMP must be available on site. The Contractor shall ensure that all the personnel on site, subcontractors and their teams, suppliers, etc. are familiar with and understand the specifications contained in the EMP.	• Contingency plans for minimising negative impacts anticipated to occur during the construction phase • Ensure environmental awareness and formalise environmental responsibilities and implementation	• Contract records • Signed pro forma declarations	Project team	-
1.2	**APPOINTMENTS AND DUTIES OF PROJECT TEAM** The contact details of the ECO, RE, EO, Contractor and ESO shall be completed on the attached form and a copy kept on site. This document must be made available to the DEA on request. Before construction activities commence, role players must have a clear indication of their role in the implementation of this EMP as indicated in 1.2.5 Table 1. Subcontractor contracts with the Contractor must contain a clause to the effect that the subcontractor in question is responsible for the removal of all construction-generated refuse/waste to an officially approved or municipal waste disposal site and that the subcontractors are bound to the management activities stipulated in this EMP.	• Contingency plans for minimising negative impacts anticipated to occur during the construction phase	• Contract records • Signed pro forma declarations	Project team	-
1.3	**METHOD STATEMENTS** The method statements required in 1.2.11 must be provided by the Contractor. All activities that require method statements may only commence once the method statements have been approved by the engineer and ECO. Where applicable, the Contractor shall provide job-specific training on an ad hoc basis when workers are engaged in activities that require method statements.	• Contingency plans for minimising negative impacts anticipated to occur during the construction phase	• Approved method statements and relevant pro forma documents • Training records	CE Contractor	At onset of pre-construction phase As and when required
1.4	**PLANNING OF LAYOUT** The layout of all infrastructure within the site shall be planned in such a way as to minimise the impacted area, as well as the impacts on environmental features. Unnecessary clearing of vegetation, excavation, placement and compaction of soil shall be avoided. Environmental limitations and opportunities must be balanced with technical and financial requirements.	• Minimise overall environmental impact • Adapt planning to incorporate site-specific environmental features	• Minimal changes to environmental features	CE	-
1.5	**SITE DEMARCATION AND DEVELOPMENT** The surveys for the overall project area and construction footprint as approved in the Environmental Authorisation (EA) must be complete and clearly demarcated and/or fenced before the Contractor sets up his crew camps or begin construction. (App A) "No-go" areas such as sensitive areas identified during the EIA process, rocky outcrops, land not to be developed, topsoil stockpiles, wetlands, drainage areas etc. must be clearly demarcated and/or fenced prior to the commencement of construction activities. Detailed onsite surveys and delineation must be conducted by a suitably qualified land surveyor. The surveys and delineation must include an assessment of the site-specific topography as well as the micrositing footprint of the PV panel supporting structures and all associated infrastructure. This will be done in collaboration with a suitably qualified ecologist who must	• Contingency plans for minimising negative impacts anticipated to occur during the construction phase	• Demarcated areas • Ecological specialist findings	EAP ECO Specialist CE Contractor	As and when required

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
	ensure that any environmentally sensitive aspects identified during the EIA investigation are taken into consideration. A representative of the DAFF, DEA and DENC should also be invited to partake in this activity. As mentioned, preference should be given to exclude larger trees from the microfootprint of the development. Where protected plant species cannot be avoided, permits/licenses for the removal and disposal of these species should be obtained from the Forestry and/or Nature Conservation Permitting Department in time (authorisation should be obtained during the preconstruction phase or even prior to that as permitting may take up to four months). If a license or permit be issued, it would be subject to conditions determined by the Forestry and/or Nature Conservation Permitting Department. All access roads must be properly planned. Scattered protected plants and/or trees should be taken into consideration and it should be endeavored not to disturb it. All relevant general and specific conditions contained in the Environmental Authorisation (EA) must be indicated in the space provided below and included in this EMP when the Declaration of Understanding is signed by the Developer, Engineer and Contractor. The Developer is to sign the space provided on the relevant page of the EMP.				
~~1.6~~	~~**BIODIVERSITY OFFSET AGREEMENTS**~~ ~~The developer might be required to implement a greening project in previously disadvantaged communities or other areas, the extent and position to be agreed with the particular competent authority. From the ecology report it is evident that protected trees are not situated within the core study area. A biodiversity offset agreement would not be requested by the relevant authority in this case. Should greening be requested, consultation should then take place between the applicant, and other relevant stakeholders.~~	~~• Conservation of the particular vegetation type, protected trees and plants.~~	~~• Agreement between developer and particular government department on type of offset/greening that is to be implemented.~~	~~Project Team ECO DWA/DEA/ DENC~~	~~Monthly or more regular meetings until an agreement are reached and thereafter monthly compliance monitoring by the ECO.~~
1.7	**EMERGENCIES, NON-COMPLIANCE AND COMMUNICATION** The Contractor must provide method statements on the protocols to be followed, and contingency plans to be put in place for the following potential incidents before construction may begin: 1. contamination of natural water resources through spills, 2. contamination of soils through spills, and 3. fire. The Contractor understands that failure to adhere to the requirements of the EMP would result in fines as stipulated in 1.2.7 Tolerances, over and above the costs incurred for any remediation required as a result of the specific non-compliance.	• Contingency plans for minimising negative impacts anticipated to occur during the construction phase	• Method statements	CE Contractor	• Pre-construction • As and when required
1.8	**APPOINTMENT OF AND MONITORING BY ENVIRONMENTAL CONTROL OFFICER** An Environmental Control Officer (ECO) shall be appointed by the Developer. The ECO shall be required to visit the site as needed during the pre-construction phase and then weekly from the onset of the construction phase. Thereafter biweekly/monthly site visits shall be conducted. Compliance monitoring shall be conducted monthly to assess compliance with the conditions of the EMP and Environmental Authorisation	• Ensure compliance with EMP and EA	• 100% rating on ECO's score sheet	Developer ECO	Prior to Pre-Construction Weekly site visits: preconstruction phase and onset of construction phase. Thereafter biweekly/monthly site visits. Compliance monitoring: monthly

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
1.9	**COMMUNICATION WITH STAKEHOLDERS AND I&APS** The details of contractors, size and movement of the workforce, employment opportunities for members of the local community and construction schedule shall be communicated to the DEA, Siyancuma Municipality, community leaders, community-based organisations, landowners and neighbouring landowners before commencement of construction. A respected member of the community shall be identified in collaboration with the Siyancuma Municipality and appointed full-time as community liaison officer (CLO). The CLO shall act as facilitator between the Contractor and the community and attend all monthly coordination and management site meetings. These meetings shall be attended by the main stakeholders such as the developer, including the resident engineer/project manager, the Contractor, the ESO (representing the Contractor), the independent ECO, the independent OHS compliance officer, etc. Emergency procedures shall be compiled after consultation with Siyancuma Municipality, landowner and neighbouring landowners. Expected traffic impacts shall be communicated to the Department of Roads and Public Works (DR&PW) before commencement of construction and throughout the project.	• Sensitise local community to the development and associated impacts • Facilitate employment of members of local community • Decrease safety and security risks to local community • Accommodate DR&PW requirements in planning of traffic impacts	• I&APs aware of project • No complaints from I&APs • Employment given to members of local community • DR&PW requirements met in terms of traffic impacts	Contractor ESO EO ECO CLO	At onset of contract i.e. when Contractor is appointed. Thereafter monthly meetings. As and when required
1.10	**WATER USE – CONSTRUCTION PHASE** The Siyancuma LM, a water services provider, has been consulted by the developer for possible water supply during the construction and operational phases and an application for water is in process. Water would be needed for activities such as concrete batching, dust control, potable use etc. Should groundwater be considered at any stage, a water use authorisation should be obtained from the Department of Water Affairs (DWA). An application for this license should be submitted well in advance (6-12 months before commencement of the construction phase). The quaternary drainage region F40A is excluded from General Authorisations (GA) for taking of water from a [ground] water resource [as extended under Notice 837 in the Government Gazette of 23 September 2010]. Note that energy developments are not part of small industrial users and as such cannot be entitled to the water use allowance set aside for small industrial users as determined by the GA.	• Ensure that water is obtained legally and that all authorisations have been obtained prior to commencement of construction activities	• Authorisation letter	Developer	-
1.11	**VISUAL IMPACTS (LIGHTING)** Pro-active design, planning and specification of lighting of facility. Placement of light fixtures shall comply with mitigation measures proposed in the Visual Impact Assessment. Potential sensitive observers in the vicinity of the construction camp shall be taken into account when determining the placement of laydown areas and temporary construction camps, in order to prevent negative future perception of the PV power station.	• Contingency plans for minimising negative visual impacts anticipated to occur during the construction and operational phases	• Effective containment of light	Developer RE Contractor.	-
1.12	**Telkom**: Telkom Ref: SR002/804 Application is approved in terms of Section 22 of the Electronic Communications Act No. 36 of 2005. The approval is for a period of 6 months only, after which re-application must be made if the work has not been completed. Telkom SA overhead plant will be affected by this proposal. Damages that occur during construction will be repaired at the customer's account. Telkom SA overhead route is marked in PINK on sketches attached to the comments in Appendix G 2-1f. It contains a **very important cable** and subscribers' infrastructure. A repayable project would be required to re-locate this existing infrastructure. The relocation and or alteration would be to the account of the developer. Mr Bennie Pienaar must be contacted at 053 839 3486/081 411 2515 before any commencement of work.	Mr Bennie Pienaar should be contacted at the onset of pre-construction phase to ensure that he is involved during the construction phase.	Involvement of stakeholder	The developer and ECO	At onset of pre-construction phase

Phase of Development	B	CONSTRUCTION
Impact/Issue	1	SOCIAL

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
1.1	**COGNISANCE OF OTHER DEVELOPMENTS** The developer shall take cognisance of other developments occurring in the area.	Prevention/mitigation of cumulative impacts as well as control of labour force.	• Obtain list of all developments surrounding Douglas from the Siyancuma LM.	Project Manager	Monthly
1.2	**EMPLOYMENT OPPORTUNITIES FOR LOCAL COMMUNITIES** Guidelines for the involvement of local labour, entrepreneurs, SMMEs and businesses shall be included in the tender documentation. Temporary and permanent employment opportunities shall be awarded to local community members where feasible. An equitable employment process shall be followed and previously disadvantaged individuals shall be taken into consideration. Conditions conducive for the involvement of local entrepreneurs, SMMEs and other businesses shall be created as far as possible. The recruitment and contracting processes shall be clearly communicated to the local community. No unrealistic employment expectations shall be created within the local community.	• Alleviation of unemployment in the area • Investment in local economy • Promotion of positive disposition towards development in local community • Control of pressure on local infrastructure due to influx of workers from outside the area • Control of possible conflict between local communities and outsiders	• Local labour is employed as far as possible • Local businesses are involved where possible • Minimum of outside workers present in the area due to the development	Contractor	As necessary
1.3	**CAPACITY BUILDING IN LOCAL COMMUNITIES** If the relevant skills for a position are not readily available locally, training shall be provided to equip willing members of the local community for this position if this is feasible. Capacity building initiatives shall be coordinated with the planning of Siyancuma LM, as well as other such initiatives in the renewable energy and housing sectors, where possible.	• Alleviation of unemployment in the area • Skills investment in local community • Promotion of positive disposition towards development in local community • Control of pressure on local infrastructure due to workers from outside the area • Control of possible conflict between local communities and outsiders	• Local labour capabilities are expanded • Minimum of outside workers present in the area due to the development	Contractor	Daily
1.4	**HIV/AIDS EDUCATION** HIV/Aids education shall be conducted by an independent contractor and further sensitisation shall be done by the independent OHS officer.	• Comply with Developer's obligation to provide HIV/Aids education according to Department of Labour requirements.	• Proof of training to be provided to the Dept of Labour and Siyancuma LM	Project Manager Contractor OHS Consultant	Monthly feedback

Phase of Development	B	CONSTRUCTION
Impact/Issue	2	MATERIALS

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
2.1	**HANDLING STOCKPILES** All stockpiled material must be easily accessible without any environmental damage. All temporarily stockpiled material must be stockpiled in such a way that the spread of materials are minimised. The stockpiles may only be placed within the demarcated areas, the location of which must be approved by the RE, EO or ECO. The Contractor must avoid vegetated areas that will not be cleared. Storm water runoff from the stockpile sites and other related areas must be directed into the storm water system with the necessary pollution prevention measures such as silt traps and may not run freely into the surrounding areas. Stockpiles are to be stabilised if signs of erosion are visible. Soils from different horizons must not be stockpiled in a way that would cause topsoil stockpiles to get contaminated by subsoil material. Topsoil stockpiles must be monitored for invasive exotic vegetation growth. Contractors must remediate as and when required in consultation with the EO, RE and ECO. No plant, workforce or any construction-related activities may be allowed onto the topsoil stockpiles. Topsoil stockpiles must be clearly demarcated as no-go areas. Stockpiles must not be higher than 2 m in order to avoid compaction, and thereby maintain the soil integrity and chemical composition.	• Minimise scarring of the soil surface and land features • Minimise disturbance and loss of soil • Minimise construction footprint • Minimise sedimentation of nearby drainage lines • Maintain the integrity of topsoil for landscaping and rehabilitation • Contain invasive plant growth • Minimise contamination of storm water runoff	• No visible erosion scars once construction is completed • The footprint has not exceeded the agreed site in terms of EA etc. • Minimal invasive weed growth • No signs of sedimentation and erosion	Contractor	Daily
2.2	**OILS AND CHEMICALS** The Contractor must provide method statements for the handling and storage of oils and chemicals, fire, and emergency spills procedures. These substances must be confined to specific and secured areas within the contractors' camp in a way that would not pose a danger of pollution even during times of high rainfall. These areas must be imperviously bunded with adequate containment (at least 1.5 times the volume of the fuel) for potential spills or leaks. Drip trays (minimum of 10 cm deep) must be placed under all vehicles that stand for more than 24 hours. Vehicles suspected of leaking must not be left unattended; drip trays must be utilised. The surface area of the drip tray would depend on the vehicle and must be large enough to catch any hydrocarbons that may leak from the vehicle while standing. The appropriate depth for the drip tray must be determined considering the total volume of oil in the vehicle. The drip tray must be of sufficient capacity to contain the total volume of oil in the vehicle. **Spill kits** must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site. Spill kits must be made up of materials/products that are in line with environmental best practice (Sunsorb is a recommended product that is environmentally friendly). All spilled hazardous substances, contaminated soils and drenched spill kit material must be contained in impermeable containers for removal to a licensed hazardous waste site. If a complaint is made or a potential or actual leak or spill is identified, corrective action must be taken immediately. Corrective actions include stopping the contaminant from escaping further, cleaning the affected environment as far as possible and preventing recurrence.	• Prevention of pollution of the environment • Minimise chances of transgression of the acts controlling pollution	• No pollution of the environment • No litigation due to transgression of pollution control acts • No complaints from I&APs • Method statements	Contractor	Daily

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
2.3	**CEMENT AND CONCRETE BATCHING** The Contractor must provide and maintain a method statement for cement and concrete batching. The method statement must provide information on proposed storage, washing and disposal of cement, packaging, tools and plant. The mixing of concrete shall only be done at specially selected sites on mortar boards or similar structures to prevent runoff into soils, rocky outcrops, streams and natural vegetation. Cleaning of cement mixing and handling equipment shall be done using proper cleaning trays. All empty containers must be stored in a dedicated area and later removed from the site for appropriate disposal at a licensed commercial facility. Any spillage that may occur must be investigated and immediate remedial action must be taken. The visible remains of concrete, whether solid or from washings, shall be physically removed immediately and disposed of as waste at a registered landfill site. Cement and concrete batching areas must be located in consultation with the RE, EO or ECO in order to ensure that residues are contained and that the proposed location does not fall within 100 m from sensitive areas such as drainage lines, storm water channels, etc.	• Minimise the possibility of cement residue entering into the surrounding environment • Minimise pollution of soil, surface and groundwater resources	• Method Statement (MS) • Conformance to MS • No evidence of contaminated soil on the construction site • No evidence of contaminated water resources	Contractor ESO	Monitor daily
2.4 **2.4.1**	**DANGEROUS AND TOXIC MATERIALS** **Provision of Storage Facilities** Materials such as fuel, oil, paint, herbicide and insecticides must be sealed and stored in bermed areas under lock and key, as appropriate, in well-ventilated areas. Storage areas for such materials shall be inspected regularly. Sufficient care must be taken when handling these materials to prevent pollution. Training on the handling of dangerous and toxic materials must be provided to all staff prior to the commencement of construction. In the case of pollution of any surface or groundwater, the Regional Representative of the **Department of Water Affairs** (DWA) must be informed immediately. Storage areas shall display the required safety signs depicting “No Smoking”, No Naked Lights” and “Danger”. Containers shall be clearly marked to indicate contents as well as safety requirements. The Contractor shall supply a **method statement** for the storage of hazardous materials at **tender** stage. **Material Safety Data Sheets** (MSDS) must be prepared for all hazardous substances on site and supplied by the supplier where relevant. These sheets must be updated as required. Storage and disposal permits/approvals shall be obtained if required. All permit/approval conditions shall be complied with. Transportation of hazardous substances shall be conducted in accordance with the relevant legislation and regulations.	• Prevention of pollution of soil, surface and groundwater resources in the immediate and surrounding environments • Minimise chances of transgression of the acts controlling pollution	• No visible signs of pollution • No litigation due to transgression of pollution control acts	Contractor	Monitor daily

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
2.4.2	**Bulk Storage of Fuels and Oils** The Contractor must provide and maintain a method statement for diesel tanks and refuelling procedures. Bulk fuel storage tanks on the site shall be bunded and stored on an impervious surface. Bunding shall be of sufficient capacity to contain at least 150% of the volume of the tanks. The filler tap must be inside the bunded area where possible and the bund wall must not have a tap or valve. A Flammable Liquid License must be obtained for diesel volumes greater than 200 ℓ. Environmental Authorisation is required for volumes greater than 80 000 ℓ and 30 000 ℓ depending on the area where construction is situated. Bulk fuel storage tanks shall be located in a portion of the construction camp where they do not pose a high risk in terms of water pollution (i.e. they must be located away from water courses). Bulk fuel storage tanks shall be placed so that they are out of the way of traffic, in order to minimise the risk of the tanks being ruptured or damaged by vehicles. Bulk fuel storage should be covered during the rainy season in high rainfall regions.	• Prevention of pollution of soil, surface and groundwater resources in the immediate and surrounding environments • Minimise chances of transgression of the acts controlling pollution	• No visible signs of pollution • No litigation due to transgression of pollution control acts • Method statement	Contractor	Once off, as required
2.4.3	**Use of Dangerous and Toxic Materials** The Contractor shall keep the materials and equipment necessary for dealing with spills/fire of the materials present, on site as stipulated by the health and safety legislation. The Contractor shall set up a procedure for dealing with spills/fires, which would include notifying the ECO and the relevant authorities **prior** to commencing with construction. These procedures must be developed in consultation with and with the approval of the appointed EO. In the event of a major spill or leak of contaminants, the administering authority shall be notified immediately. A record must be kept of all spills and the corrective actions taken.	• Prevention of pollution of soil, surface and groundwater resources in the immediate and surrounding environments • Minimise chances of transgression of the acts controlling pollution	• No pollution of the environment • No litigation due to transgression of pollution control acts	Contractor	As required

Phase of Development	B	CONSTRUCTION
Impact/Issue	3	Plant

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
3.1	**EATING AREAS AND CAMP FOLLOWERS** The Contractor must provide and maintain a method statement for crew camps and construction laydown areas. The Contractor shall, in conjunction with the EO, designate restricted eating areas for eating during normal working hours. Adequate closed refuse bins shall be provided and cleaned on a weekly basis. No fires are to be lit outside of facilities designed to contain fires. The adequacy and positioning of these structures must be determined in consultation with the EO and ECO. The feeding, or leaving of food, for stray or other animals in the area is strictly prohibited. Camp followers/informal traders must not be allowed to congregate on pavements or outside the construction site. However, at the Contractor's discretion facilities can be made available within the designated eating area. Litter (even if originating outside the camp) and cement bags etc. must be picked up daily and put into suitably closed bins.	• Control potential influx of vermin and flies • Maintain neat workplace and hygienic environment • Minimise negative social impacts to local residents and businesses	• No visual sign of vermin and flies • No complaints from I&APs	Contractor EO	Once off MS, review monthly, monitor daily
3.2	**TOILETS AND ABLUTION FACILITIES** The Contractor shall be responsible for providing all sanitary arrangements for his own workforce as well as those of the subcontractors. A minimum of one chemical toilet shall be provided per 15 persons. Sanitary arrangements shall be to the satisfaction of the ECO and the local authority. Toilets shall be of the chemical type. The Contractor shall keep the toilets in a clean, neat and hygienic condition. The Contractor shall supply toilet paper at all toilets at all times. Toilet paper dispensers shall be provided in all toilets. Toilets provided by the Contractor must be easily accessible and within walking distance from the works area to ensure that they are utilised. The positions of all toilets outside the contractors' camp must first be approved by the RE, EO or ECO. Toilets shall not be located within 100 m from a 1:100 year flood line or a water course. The Contractor shall be responsible for the cleaning, maintenance and servicing of the toilets. The Contractor, through the contracted toilet-servicing company, shall ensure that all toilets are cleaned and emptied before the builders' or other public holidays. It is recommended that a reputable toilet service company be appointed to provide this service. Sewage shall be disposed of at a municipal wastewater treatment facility. Toilets out on site must be secured to the ground and have a sufficient locking mechanism operational at all times.	• Ensure proper sanitation is provided, thereby encouraging the workforce to utilise toilets rather than the surrounding natural environment • Minimise potential of diseases on site • Minimise potential pollution of soils, water resources and natural habitats	• Workforce use toilets provided • No complaints received from I&APs and workforce • No visible or measurable signs of pollution of the environment (soils, groundwater and surface water)	Contractor RE or EO	As and when required

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
3.3	**WASTE MANAGEMENT** The Contractor must provide and maintain a method statement for solid waste management. The method statement must provide information on a proposed licensed facility to be utilised and details of proposed recordkeeping for auditing purposes. Waste shall be divided into recyclable and non-recyclable waste, and shall be separated as follows: 1. Hazardous waste, including (but not limited to) old oil, paint, etc; 2. General waste, including (but not limited to) construction rubble; 3. Reusable construction material; and 4. Recyclable waste. Hazardous waste shall be stored in sealed containers within an appropriately bunded area. Recyclable waste shall preferably be deposited in separate bins. The Contractor is advised that Collect-a-Can collects tins, including paint tins, chemical tins, etc. and Consol collects glass for recycling. Any illegal discarding and/or burial of waste shall not be tolerated. This action would result in a fine and further legal action could be taken if required. This aspect will be closely monitored and reported on. Proof of legal waste disposal must be available on request. Bins must be clearly marked for ease of management. A lid must be secured to each refuse bin in order to prevent animals from gaining access. The waste must be stored in dedicated areas and where baboons are prevalent, baboon-proof lids must be fitted. Closed containers of sufficient number and volume must be strategically located around the construction site to contain all waste generated on the site. Subcontractor contracts must contain a clause to the effect that the subcontractor in question is responsible for the disposal of all the refuse/waste generated by his construction activities at an officially approved disposal site and that the subcontractors are bound to the management activities stipulated in this EMP. Proof of this undertaking must be provided to the ECO. Waste and surplus dangerous goods shall be kept to a minimum. All solid and chemical wastes that are generated must be removed and disposed of at a accordingly rated licensed waste disposal site. The Contractor is to provide proof of this to the EO and ECO. Chemical containers and packaging brought onto the site must be removed for disposal at a suitable graded and authorised site. A skip, with a cover, must be used to contain refuse from campsite bins, rubble and other construction waste. Records shall be kept of all regulated waste, detailing at least the quantity, type and fate of the waste in question. These records must be available for review at all times.	• Sustainable management of waste by recycling • To keep the site neat and tidy • Minimise litigation and complaints by I&APs • Reduce visual impact • Control potential influx of vermin and flies and thereby minimise the potential of diseases on site and in the surrounding environment • Minimise potential pollution of soils, water resources and natural habitats	• Method statement • Disposal of rubble and refuse in an appropriate manner with no rubble and refuse lying on site • Site is neat and tidy • No complaints from surrounding residents and businesses • Sufficient containers available on site • No visible or measurable signs of pollution of the environment (soils, groundwater and surface water)	Contractor EO	Daily

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
3.4	**DUST** The contractors must provide and maintain a method statement for dust control. The method statement must provide information on the proposed source of water to be utilised and the details of the licenses acquired for such usage. **Potable water should preferably not be used as a means of dust suppression**; alternative measures must be sourced. The use of 'grey' water must be investigated as an alternative. The Contractor will be responsible to source this water and obtain the required approvals to utilise this water for the purpose of dust suppression. The construction camp shall be watered during dry and windy conditions to control dust fallout. Dust production must be controlled by regular watering of the roads and works area, should the need arise. (**NB:** Concrete and cement dusts are toxic and damage soil properties. Watering for prevention of dust spread must therefore not be done where concrete dust has fallen, as it would infiltrate the soil. Cement bags must not be allowed to blow around the site and spread cement dust.) In addition to the standard dust suppression measures, main access roads and site camps, as well as other areas where the standard measures are not sufficient, must be surfaced with a temporary surface such as gravel to assist with dust suppression. At the end of construction, the site camp must be fully rehabilitated by removing the temporary surface and ripping the area to loosen the soil, after which the area must be revegetated with locally indigenous vegetation only, according to the landscape development plan for the project. All vehicles transporting material that could be blown off (e.g. soil, rubble etc.) must be covered with a tarpaulin, and speed limits of 20 km/h within the site must be adhered to. Excessive dust conditions shall be reported to the ECO. Regular monitoring of dust fallout must be carried out where needed and the records kept on site. All forms of dust pollution must be managed in terms of the NEM: Air Quality Act (Act No. 39 of 2004)	• Reduce dust fallout • Reduce visual impact • Minimise loss of valuable soil	• Method statement • No visible signs of dust • No complaints from I&APs • No incidences reported to ECO • No visible evidence of dust contamination in the surrounding environment • Baseline targets not exceeded during regular monitoring of dust counts should it be conducted.	RE Contractor EO	Monitored daily

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
3.5	**WORKSHOP EQUIPMENT, MAINTENANCE AND STORAGE** The Contractor must provide and maintain a method statement for workshop maintenance and cleaning of plant. Construction machinery shall be stored in an appropriately sealed area. All maintenance and washing of vehicles and equipment shall take place in the workshop area, which would be equipped with a bund wall and grease trap oil separator. During servicing of vehicles or equipment, a suitable drip tray shall be used to prevent spills onto the soil, especially where emergency repairs are done outside the workshop area. Leaking equipment shall be repaired immediately or be removed from site to be repaired elsewhere. All potentially hazardous and non-degradable waste shall be collected and removed to a registered waste site. Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and remediated to the satisfaction of the EO or RE. Cleaning and remediation must be done with products that are in line with best environmental practice, e.g. Sunsorb. ***Method statements will be required from all contractors tendering for the project to show procedures for dealing with possible emergencies that could occur, such as fire and accidental leaks and spillage.*** The Contractor shall be in possession of an emergency spill kit that must be complete and available on site at all times. The Contractor must ensure that senior and other relevant members of the workforce are trained in dealing with spills by using emergency spill kits. The following shall apply: All contaminated soil/yard stones shall be removed and disposed of as hazardous waste at a registered facility or placed in containers to be taken to one central point where bioremediation can be done. A specialist contractor shall be consulted for the bioremediation of contaminated soil if the required remediation materials and expertise are not available on site. All spills of hazardous substances must be reported to the ESO, EO, RE or ECO. The Contractor must comply with the regulations of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).	• Prevent pollution of the environment • Minimise the chance of transgression of the acts controlling pollution • Disposal of hazardous substances in an appropriate manner	• Method statement • No pollution of the environment • No litigation due to transgression of pollution control acts	RE Contractor EO	Monitor daily
3.6	**NOISE** Site camps, concrete batching plants and other noisy fixed facilities must be located as far away from noise sensitive areas as possible. Areas where noise levels exceed 75 dB shall be declared Noise Control Zones and employees working in these areas shall wear the appropriate PPE. **The OHS official shall be responsible for enforcing this condition.** All construction vehicles shall be properly maintained and fitted with the required noise abatement equipment at all times in order to reduce possible noise pollution. Working hours during the construction phase shall be strictly enforced unless permission for extension of working hours is given. Permission shall not be granted without consultation with the local residents and businesses by the EO. Noise reduction is essential and the Contractor shall endeavour to limit unnecessary noise, especially loud talking, shouting or whistling, radios, sirens or hooters, motor revving, etc. The use of silent compressors is a specific requirement in noise sensitive areas. Noisy activities shall take place only during working hours. The EO must inform the occupants of houses and businesses adjacent to the development in writing 24 hours prior to any planned activities that would be unusually noisy or any other activities that could reasonably have an impact on the adjacent sites. These activities could include, but are not limited to, blasting, piling, use of pneumatic jack-hammers and compressors, bulk demolitions, etc.	• Maintain noise levels below "disturbing" as defined in the National Noise Regulations • Minimise the nuisance factor of the development	• No complaints from surrounding landowners or I&APs	Contractor EO	As and when required

Phase of development	B	CONSTRUCTION
Impact / issue	4	Construction

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
4.1	**CREW CAMPS** The contractors must provide and maintain a method statement for crew camps and construction laydown areas. Accommodation for members of the workforce will not be permitted on site unless authorisation has been given in terms of the Environmental Authorisation. Dedicated wash areas must be situated away from watercourses and areas of shallow groundwater. The contractor camp shall be monitored for dust fallout and dust suppression shall be applied as required. This may include the laying of gravel, and the use of grey water can be considered if the required permits have been acquired. The contractors' camp, offices and storage facilities shall be located within the site boundaries. No person shall be allowed to stay on neighbouring sites, unless it is cleared with the owners. In such an event all requirements contained herein for the contractors' camps will apply. The Contractor shall provide labourers to clean up the contractors' camp and construction site daily. These areas shall be inspected by the Contractor or his/her ESO to ensure compliance with this requirement. The Contractor shall be responsible for cleaning the contractor's camp and construction site of all structures, equipment, residual litter and building materials at the end of the construction period and restoring the topsoil in areas where landscaping is to take place.	• Minimise water pollution • Minimise dust fallout • Minimise unwarranted environmental damage outside the footprint • Maintain a clean and healthy working environment • Minimise impact to surrounding environment	• Method statements • No signs of water or soil pollution • No complaints from surrounding landowners or I&APs • No visible signs of litter	Contractor, EO, ESO	Monitor daily
4.2	**FIRES** The Contractor must provide and maintain a method statement for fires, clearly indicating where and for what purposes fires would be utilised, as well as details on the fuel to be utilised. Absolutely no burning of waste is permitted. Fires will only be allowed in **facilities especially constructed for this purpose** within fenced contractors' camps. Wood, charcoal or anthracite are the only fuels permitted to be used for fires. The Contractor must provide sufficient wood (fuel) for this purpose. Fires in the designated areas must be small in scale so as to prevent excessive smoke being released into the atmosphere. **NO** open fires shall be allowed on site under any circumstances (National Veld and Forest Fires Act, Act 101 of 1998). Heavy smoke may not be released into the air. No firewood is to be collected, chopped or felled from private or public property or from no-go or sensitive areas within the site and the surrounding natural vegetation. The Contractor shall have fire-fighting equipment available at crew camps and on all vehicles working on site, and fire-fighting training shall be given to selected construction staff. Procedures relating to fire shall be developed in consultation with Siyancuma LM and landowners in the vicinity of the development. Farmers/community members shall be compensated at full market value for any proven losses due to fires resulting from negligence or non-compliance. Fire breaks shall be implemented as per South African legislation.	• Minimise risk of veld fires • Minimise destruction of natural fauna and flora • Maintain safety on site	• Method statement • No veld fires started by the Contractor' s workforce • No claims from landowners for damages due to veld fires	Contractor EO ESO	Monitor daily

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
4.3	**EROSION AND SEDIMENTATION** The disturbance of steep slopes, for example by the removal of vegetation, may result in slope instability and erosion by rain and surface runoff. All slopes that are disturbed during construction shall immediately be stabilised to prevent erosion. Where revegetation of slopes is undertaken, this shall be done in consultation with the landscape architect (or appointed landscaper). To reduce the loss of material by erosion, the Contractor shall ensure that disturbance on site is kept to a minimum. The Contractor shall be responsible for rehabilitating all eroded areas in such a way that the erosion potential is minimised after construction has been completed. Disturbed areas that will require rehabilitation must be mulched to encourage vegetation regrowth where needed. Mulch used must be free from alien seed. These areas must be cordoned off in order to keep out vehicles and construction personnel. Denuded areas must be shaped along contour lines to provide for a gentle slope. Depending on the gradient, wooden logs will be placed at 90 degrees to the slope to slow down and/or limit runoff. These will be placed in parallel rows spaced 1 to 2 meters apart. The exposed soil surface will be sown with seeds of indigenous plant species. Hay bales can be worked into the soil at 1:25 m^2 to act as mulch. The hay bales will assist in slowing the water speed to allow for infiltration to occur, thereby decreasing surface runoff and increasing the chance of seedling germination, where possible slopes should be limited to a gradient of 1:2. Rehabilitation shall be done immediately after construction has ceased in an area in order to stabilise the landscape. In the event of a storm occurring before vegetation has been re-established in the construction area, stones or other suitable material shall be packed in denuded areas, especially along the edges of structures, to stem the flow of storm water.	• Minimise erosion damage • Minimise impeding of the natural flow of water • Minimise scarring of the soil surface and land features • Minimise disturbance and loss of topsoil • Regrowth of disturbed areas.	• No erosion scars • No loss of topsoil • No interference with the natural flow of water • No visible erosion scars once construction is completed • The footprint does not exceed the agreed boundaries • All damaged areas successfully rehabilitated	Contractor EO ESO	As and when required
4.4	**FAUNA** **All activities on site must comply with** the regulations of the Animals Protection Act, 1962 (Act No. 71 of 1962). All construction workers must be informed that the intentional killing of any animal is not permitted as faunal species are beneficial to humankind. Poaching is illegal and it must be a condition of employment that any employee caught poaching would be dismissed. Employees must be trained on how to deal with faunal species as intentional killing will not be tolerated. Training must also include instructions on how to avoid accidental killing of fauna during routine construction and maintenance activities. In the case of a problem animal, e.g. a large snake, a specialist must be called in to safely relocate the animal if the EO or ECO is not able to. The talk given to all workers on site during environmental induction training must include safety with wild animals. Focus on animals such as snakes and other reptiles that often generate fear by telling workers how to move away safely and to whom to report the sighting. Workers should also be informed where snakes most often hide so that they can be vigilant when lifting stones etc. All electrical infrastructure should be monitored weekly for bird mortalities (Wilson, 2010).	• Minimise disturbance to animals • Minimise interruption of breeding patterns of birds • Minimise destruction of habitat	• No complaints from the Department of Nature Conservation • No litigation concerning applicable animal protection acts • No measurable or visible signs of habitat destruction	RE Contractor EO ESO	Monitor daily

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
4.5	**FLORA** Trees and natural vegetation or any other natural features inside and outside the work area that will not be cleared for construction purposes, must be clearly demarcated and not be defaced, removed, painted or otherwise damaged, even for survey purposes. The latter may only be done if stipulated in the Environmental Authorisation and must be overseen by the EO and ECO. Any feature defaced by the Contractor shall be reinstated to the satisfaction of the ECO and penalties/fines may be imposed by the RE. Prior to vegetation removal, a qualified, experienced botanist or ecologist must identify and list all individuals of protected species within the delineated construction area. Listing should include the estimated height of each individual that is to be removed. The specialists involved should ideally be those who were/are involved with the EIA process. When the number of protected trees and/or plants that are to be removed is known, the necessary permits are to be obtained from the DAFF and/or DENC. A landscaping and rehabilitation plan must be developed to the satisfaction of the ECO during the construction phase and progressively implemented. The developer may implement a greening project in previously disadvantaged communities or other areas, the extent and position to be agreed with the relevant competent authority should it be requested. Any corridors to surrounding natural areas must be maintained and protected. These must be demarcated as no-go areas. Locally indigenous plants must be used in the landscaping of the site. Plants that are proclaimed as problem plants or noxious weeds must be excluded from the landscaping plan and these must be removed immediately, should they occur on site. These plants, as well as any other problem plants within a specific region as stipulated by a qualified and experienced botanist or ecologist, must be included in an alien management programme for the site. Eradication must occur every 6 months. The Contractor must rehabilitate the construction camp and any other disturbed areas immediately after construction activities are terminated. Compacted areas will be ripped and mulched in order to ensure recovery of the natural vegetation cover. A method statement must be provided and maintained by the Contractor. Once construction is complete, rehabilitation of unbuilt areas must be undertaken in order to restore the aesthetic and ecological value of the area as far as possible. It is recommended that a qualified landscape architect, qualified botanist and the ECO be consulted with regard to the most appropriate rehabilitation vegetation and structures if necessary. The unbuilt areas must be actively revegetated with locally indigenous vegetation under the supervision of the ECO if necessary. Special effort should be made to include basic identification of protected plant species expected to be found on site with all personnel but specifically with machine operators that would be involved in activities that could cause significant damage such as during vegetation clearing and implementation of infrastructure (Appendix G2-1d DAFF comments).	• Minimal disturbance to vegetation where such vegetation does not interfere with construction in terms of approvals from the relevant authority • Prevent litigation concerning removal of vegetation • Encourage natural habitat fauna • Minimise scarring of the soil surface and land features • Minimise disturbance and loss of topsoil • Minimise risk of veld fires • Minimise risk of fauna and flora destruction	• Method statement • No litigation due to removal of vegetation without necessary permission • No exotic plants used for landscaping • No visible erosion scars once construction is completed • Footprint not exceeding the agreed boundaries • All damaged areas successfully rehabilitated • No veld fires started by Contractor's work force • No claims from landowners for damages due to veld fires • Landscaping and Rehabilitation Plan • Alien management programme	Contractor EO ESO Landscape Architect	MS at start of construction As and when required
4.6	**HERITAGE** Should any archaeological and/or palaeontological features be exposed during construction activities, work on the area where the features were found shall cease immediately, the area shall be demarcated and the ECO shall be notified within 24 hours. The ECO will then arrange for the excavation to be examined by a suitably qualified archaeologist/palaeontologist. Under no circumstances shall artefacts be removed, destroyed or interfered with. Any archaeological/palaeontological sites exposed during demolition or construction activities must not be disturbed prior to authorisation by the South African Heritage Resources Agency or the appropriate provincial heritage resource agency.	• Limit the destruction of the country's heritage resources • The preservation and appropriate management of new archaeological finds should these be discovered during construction.	• No destruction of or damage to known archaeological features	Contractor EO RE ESO	Monitor Daily

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
4.7	**NO-GO/SENSITIVE AREAS** All construction and operational activities must remain within the boundaries of the development area, as demarcated at the start of construction. There must be no vehicular access to the drainage lines outside the development area. The construction footprint must be kept as small as possible by constructing boundaries and demarcating areas that are not to be disturbed, thus reducing the infringement of the development on natural habitat. No-go areas must be demarcated with fencing/warning tape and signs before any construction activities commence. These areas and the type of fencing/demarcation must be approved by the relevant specialist involved in the EIA process. The EO and ECO must be on site in order to make sure the correct areas are fully demarcated. Land that is close to the fenced "no-go" sensitive areas and is to be cleared must first be demarcated and screened for Red Data Species by the ECO and a relevant qualified specialist before construction commences.	• Minimise the potential for the spread of the of the construction footprint • Reduce loss of fauna and flora habitat • Minimise the potential for loss of protected and/or endangered fauna and flora species	• No sign of movement through "no-go" areas. • Containment of footprint	RE Contractor ESO EO	Monitor daily
4.8	**ACCESS ROUTE/HAUL ROADS** Existing roads and services must be utilised thus reducing the infringement of the development on natural habitat. No unauthorised access is permitted. Any authorised clearing for access roads must be done under the supervision of the ECO. Any damage or degradation would be investigated and fines would be issued. The affected areas must be rehabilitated immediately. Access roads for earthmoving equipment must be clearly delineated and be positioned as closely as possible to the proposed development site. No driving off the marked roads is permitted and designated parking areas must be identified and demarcated with applicable signage. Any work or access near or in a permanent drainage system may have implications in terms of the National Water Act, 1998 (Act No. 36 of 1998), and therefore may well require an application for a water use licence. Recreational activities, including but not limited to quad bikes, 4x4 vehicles and dirt bikes shall neither be allowed on the site nor on its access roads. Security personnel must be informed and ensure that this is enforced.	• Minimise loss of topsoil and enhancement of erosion • Minimise fauna and flora displacement by destruction of natural habitats	• No erosion on access roads after completion of construction • No loss of topsoil due to runoff water on access roads	Contractor RE or EO	As required, monitor daily
4.9	**TRAFFIC IMPACTS** Residents of nearby farms shall have access to these farms at all times. Movement of construction vehicles through the area shall be limited to off-peak times where possible. Signs, warning visitors about the movement of heavy machinery as well as other hazards on the construction site, shall be erected near the construction site. Vehicle safety standards shall be strictly adhered to. Construction vehicles shall not exceed the speed limit. Safe entry and exit shall be insured by creating a dedicated access point. Vehicles shall not deviate from internal access routes. Arrival and departure times of heavy vehicles shall be coordinated in order to minimise congestion. Traffic delays resulting from construction traffic shall be coordinated with the relevant authorities.	• Minimise traffic impacts	• No complaints from I&APs	Contractor EO	As required

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
4.10	**GEOTECHNICAL** Mechanical methods of rock-breaking will have noise and dust impacts that must be managed. Chemical breaking shall require a method statement by the RE.	• Minimise potential structural faults • Minimise trench collapse	• No visible signs of backfill deterioration or trench collapse	Geotechnical Engineer, Structural Engineer, Geologist, RE, Contractor	As and when required
4.11	**CRIME, SAFETY AND SECURITY** No site staff, other than security personnel, shall be housed on site unless otherwise stipulated in the Environmental Authorisation. Security personnel and staff shall be supplied with ablution facilities, water and refuse collection facilities, as well as facilities for cooking and heating so that open fires are not necessary. A boundary fence will serve to prevent public access to the site, for public safety and security reasons. The access to the site must be controlled so as to restrict unauthorised persons from entering the site. Workers on site must retain some means of identification. The Contractor are responsible for ensuring that only authorised personnel are on site at all times. Workers shall not be allowed to leave the demarcated construction area and enter the neighbouring private property. No livestock and/or game shall be allowed to enter the construction area during the construction phase. Security and other personnel shall be sensitised to the possibility of stock theft and poaching in the area and trained to recognise signs of these activities. If poaching or stock theft is suspected during the construction and/or operational phases, any worker could be searched for weapons and other signs of poaching or stock theft. It must be a condition of employment that these crimes shall warrant dismissal. The site and crew are to be managed in strict accordance with the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and the National Building Regulations. The Contractor shall ensure that all emergency procedures are in place prior to commencing work. Emergency procedures shall include but not be limited to procedures for fire, spills, contamination of the ground, employee accidents and use of hazardous substances and materials. The Contractor shall ensure that lists of all emergency telephone numbers/contact persons are kept up to date and that all numbers and names are posted at relevant locations throughout the construction site. The nearest emergency service provider, as well as its capacity and the magnitude of accidents it would be able to handle, must be identified during all phases of the project. The contact details of this emergency centre, as well as the police and ambulance services, must be available at prominent locations around the construction site and the construction crew camps.	• Reduce the risk of potential incidences • Minimise the potential impact on the environment	• No incidences reported	RE Contractor ESO EO	Monitor daily

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
4.12	**HYDROLOGY** Increased runoff during construction must be managed using berms and other suitable structures as required to ensure that flow velocities are reduced. This must be done in consultation with the RE and the ECO. Storm water, wherever possible, should be allowed to soak into the land in the area on which the water falls, e.g. by using retention ponds. In the event of pollution due to construction activities, the Contractor shall be responsible for all costs incurred by organisations called to assist in pollution control and/or to clean up polluted areas (Section 20 of the National Water Act, 1998, Act No. 36 of 1998). The Contractor shall ensure that excessive quantities of sand, silt and silt-laden water do not enter the storm water system or drainage areas. It is important to design the storm water drainage system in such a way as to prevent contamination of the natural drainage system. Appropriate measures, such as the erection of silt traps or the establishment of drainage retention areas, must be taken to prevent the ingress of silt and sand into drainage lines or watercourses. These measures must be reviewed and audited by the ECO. No wastewater may run freely into any of the surrounding naturally vegetated areas. Runoff containing high sediment loads must not be released into natural or municipal drainage systems or nearby watercourses. If this becomes a problem it is recommended that an attenuation pond be constructed to allow solids to settle out of runoff prior to leaving the site. Approval must be obtained from DWA for any activities that require authorisation in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) if necessary. A relevant specialist must be consulted prior to the demarcation of drainage lines and wetlands where needed. No vehicular access is allowed in permanently wet areas. No equipment that may cause irreparable damage to wet areas shall be used. The Contractor shall use alternative methods of construction in such areas. "**NO ENTRY**" signs must be strategically placed along rivers, streams and other natural or man-made drainage lines which are in close proximity to access routes. These lines and the vegetation occurring in them are sensitive to impacts during the construction phase and may not be polluted or damaged in any way. No roads shall be cut through river and stream banks, as this may lead to erosion causing siltation of streams and downstream dams in the event of excessive thunderstorms during the construction phase. Existing drifts and bridges must be used if the landowner gives his consent. Such structures shall be thoroughly examined for strength and durability before they are used. Ground drainage levels are required to direct surface runoff to drainage lines. These drainage lines must ensure that the water is gravity-fed from the work areas to areas with limited or no disturbance. This ensures that the water has the smallest potential of being contaminated before released into the environment. This also reduces the risk of erosive forces acting upon the channels through which the water flows.	• Minimise pollution of soil, surface and groundwater resources in the immediate and surrounding environments • Minimise impeding the natural flow of water • Minimise the impact on natural water flow dynamics • Minimise scarring of the soil surface and land features • Minimise damage to banks of rivers and streams • Minimise erosion of banks and subsequent siltation of rivers and streams • Minimise damage to riverine habitats • Provide adequate drainage and storm water control on site.	• No visible signs of pollution • No signs of siltation of water courses • No visible erosion scarring once construction is completed • Minimum loss of topsoil • No access roads through river and stream banks • No visible erosion scars on banks once construction is completed • No erosion or siltation downstream	RE Contractor EO	As and when required, monitor daily

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
4.12.1	**Water Use – Construction Phase** The Siyancuma LM, a water services provider, has been consulted by the developer for possible water supply during the construction and operational phases and an application for water is in process. Should groundwater be considered at any stage, a water use authorisation should be obtained from the Department of Water Affairs (DWA). An application for this license should be submitted well in advance (6-12 months before commencement of the construction phase). The quaternary drainage region F40A is excluded from General Authorisations (GA) for taking of water from a [ground] water resource [as extended under Notice 837 in the Government Gazette of 23 September 2010]. Note that energy developments are not part of small industrial users and as such cannot be entitled to the water use allowance set aside for small industrial users as determined by the GA.	Ensure that water is authorised and available at the commencement of the construction and operational phases.	Water use applications authorised at the onset of construction phase.	Suntrace Africa; Project Manager; EAP/ECO.	-
4.13	**SOIL** The Contractor must provide and maintain a method statement for management of topsoil. Topsoil must be stripped from all areas that are to be utilized during the construction period as well as all areas where permanent structures and access would be required. These areas include the permanent works, stockpiles, access roads, construction camps and laydown areas. Topsoil shall be stripped after clearing of woody vegetation and before excavation or construction commences. Topsoil removed for vegetation clearance must be stripped to a minimum depth of **150 mm** and stockpiled on the demarcated topsoil stockpile areas. All topsoil must be removed and stockpiled on the site. Topsoil must be deemed to be the top layer of soil containing organic material, nutrients and plant seeds. For this reason it is an extremely valuable resource for the rehabilitation and vegetation of disturbed areas. During rehabilitation, **ripping** shall be done to a depth of **250 mm** in two directions at right angles. Topsoil shall be placed in the same soil zone from which it had been stripped. However, rehabilitative use of topsoil contaminated by the seed of alien vegetation (e.g. *Prosopis* spp., etc.) must not be permitted unless a programme to germinate the seed and eradicate the seedlings is drawn up and approved, or some other mitigatory measure is found. This must be approved by the ECO. Single handling is recommended. Stock piles must not be higher than 2m to avoid compaction. Dust suppression through either water or a biodegradable chemical binding agent would be necessary for stockpiles older than a month. Backfill would require contouring to ensure that it blends in with the surrounding environment. Remediated slopes should be graded to preferably 1:2. Slopes can then be capped with topsoil. This requires a minimum layer of 100 mm in most areas. Disturbed surfaces to be rehabilitated must be ripped and the area must be backfilled with excavated material from the site.	• Minimise scarring of the soil surface and land features • Minimise disturbance and loss of soil • Minimise construction footprint • Minimise sedimentation of nearby drainage lines • Maintain the integrity of topsoil for future landscaping and rehabilitation • Contain invasive plant growth	• Method statement • No visible erosion scars once construction is completed • Footprint not exceeding the agreed site in terms of EA etc. • Minimal invasive weed growth • No signs of sedimentation and erosion	Contractor	Daily
4.14	**VISUAL IMPACT** All access roads must be properly constructed and maintained. The workshop shall be kept neat and tidy. Construction areas, including road servitudes, shall be appropriately rehabilitated after construction. Shade cloth must be utilised to conceal and minimise the visual impact of contractors' camps, laydown and storage areas in **sensitive** visual and aesthetical environs (such as within populated areas or within or near tourism areas). Rubble and litter must be removed every two weeks, or more often as the need arises, and be disposed of at a registered landfill site. The ECO and possibly a visual impact assessment specialist, if necessary, should comment on the visual impact as part of the ECO's monitoring requirements.	• Minimise visual impact • Eliminate risk of additional night-time visual impacts	• No complaints from I&APs • Good condition and correct functioning of the light fixtures • Effective containment of light on the site • Minimal usage of security and other lighting.	Contractor landscaping contractor ESO ECO	Monitor weekly

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
4.14.1	**Lighting** Specifications and placement of lighting and light fixtures shall be appropriate to the infrastructure in order to contain the impact. Other measures include: • Shield sources of light with physical barriers (walls, vegetation, or the structure itself). • Limit mounting heights of lighting fixtures. • Use footlights or bollard level lights. • Use minimum lumen/wattage in fixtures. • Use low pressure sodium lighting or other types of low impact lighting. • Use motion detectors on security lighting so that these lights would only be activated when movement is detected in a certain area. • Restrict construction activities to daylight hours.				

Phase of Development	C	OPERATION & MANAGEMENT
Impact/Issue	1	GENERAL

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
1.1	**PROJECT CONTRACT AND PROGRAMME** The EMP shall be included as part of the management documentation, thereby making it part of the O&M of the PV power station. The recommendations and constraints, as set out in this document, shall therefore be enforceable. A copy of this EMP must be available at the terrain office. The Manager shall ensure that all the personnel on site, contractors and their teams, suppliers, etc. are familiar with and understand the specifications contained in the EMP.	• Contingency plans for minimising negative impacts anticipated to occur during the O&M phase • Ensure environmental awareness and formalise environmental responsibilities and implementation	• Signed pro forma declarations by owner and manager	Management team	-
1.2	**APPOINTMENTS AND DUTIES OF MANAGEMENT TEAM** When management activities commence, role players must have a clear indication of their role in the implementation of this EMP in the daily operation and management of the pv power station. Contractor contracts must contain a clause to the effect that the contractor in question is responsible for the removal of all contractor-generated refuse/waste to an officially approved waste disposal site and that the contractors are bound to the management activities stipulated in this EMP.	• Contingency plans for minimising negative impacts anticipated to occur during the operational phase	• Contract records • Signed pro forma declarations	Management team	-
1.3	**METHOD STATEMENTS** Method statements would be required for operational and maintenance processes that will take place. This must be provided by the manager. These method statements and procedures shall comply with the principles of the ISO 14001 environmental management system. The manager shall provide environmental training at least monthly to personnel on site. Contractors and other people visiting the site shall receive environmental induction training/sessions sensitising them to the environmental aspects that need to be taken into consideration when working on the site.	• Contingency plans for minimising negative impacts anticipated to occur during the O&M phase	• Approved method statements and relevant pro forma documents • Training records	O&M Manager	Monthly
1.4	**SITE DEMARCATION AND DEVELOPMENT** "No-go" areas such as sensitive areas identified during the EIA process, rocky outcrops, land not to be developed, rehabilitated areas, wetlands, drainage areas etc. must be maintained and personnel informed accordingly. Should these areas degrade a suitably qualified person must be appointed to direct rehabilitation and the manager should ensure that it is implemented, executed and maintained. All access roads must be properly maintained. The Declaration of Understanding is to be signed by the Developer, Manager and Contractors.	• Contingency plans for minimising negative impacts anticipated to occur during the O&M phase	• Demarcated areas • Ecological specialist findings	Developer O&M Manager	At onset of operational phase and thereafter as and when required
1.5	**EMERGENCIES, NON-COMPLIANCE AND COMMUNICATION** The O&M Manager must provide method statements on the protocols to be followed, and contingency plans to be put in place for the following potential incidents before construction may begin: 1. contamination of natural water resources through spills, 2. contamination of soils through spills, and 3. fire.	• Contingency plans for minimising negative impacts anticipated to occur during the O&M phase	• Method statements	O&M Manager	• Onset of O&M Phase • As and when required

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
1.6	**COMMUNICATION WITH STAKEHOLDERS AND I&APS** The size of the O&M workforce, employment opportunities for members of the local community and maintenance schedule shall be communicated to the Siyancuma Municipality, community leaders, community-based organisations, landowners and neighbouring landowners before commencement of O&M and at intervals as needed during maintenance phases. Emergency procedures shall be compiled after consultation with Siyancuma LM, landowner and neighbouring landowners.	• Sensitise local community to the development and associated impacts • Facilitate employment of members of local community • Decrease safety and security risks to local community	• I&APs aware of project • No complaints from I&APs • Employment given to members of local community •	O&M Manager	At onset of O&M. Thereafter as and when required
1.7	**WATER USE – OPERATIONAL PHASE** The developer has commenced with an application process for water to the Siyancuma LM, a water services provider. Water would be needed for activities such as PV panel cleaning, dust control, potable use etc. Should groundwater be considered at any stage, a water use authorisation (license application) should be obtained from the Department of Water Affairs (DWA) prior to commencement of the activity.	• Ensure that water is obtained legally and that all authorisations have been obtained prior to commencement of the particular activities	• Authorisation letter	O&M Manager	-
1.8	**VISUAL IMPACTS (LIGHTING)** Pro-active design, planning and specification of lighting of facility. Placement of light fixtures shall comply with mitigation measures proposed in the Visual Impact Assessment. Potential sensitive observers in the vicinity of the PV power station shall be taken into account when determining the placement of lighting in order to prevent negative future perception of the PV power station.	• Contingency plans for minimising negative visual impacts anticipated to occur during the operational phase	• Effective containment of light	Developer O&M Manager Contractor.	At onset of Operation phase and during maintenance of lighting and security infrastructure

Phase of Development	C	OPERATION & MANAGEMENT
Impact/Issue	2	SOCIAL

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
2.1	**COGNISANCE OF OTHER DEVELOPMENTS** The O&M Manager shall take cognisance of other developments occurring in the area.	Prevention/mitigation of cumulative impacts as well as control of labour force.	• At regular intervals obtain list of all developments surrounding Douglas from the Siyancuma LM.	O&M Manager	Quarterly
2.2	**EMPLOYMENT OPPORTUNITIES FOR LOCAL COMMUNITIES** Guidelines for the involvement of local labour, entrepreneurs, SMMEs and businesses shall be included in the O&M documentation. Temporary and permanent employment opportunities shall be awarded to local community members where feasible. An equitable employment process shall be followed and previously disadvantaged individuals shall be taken into consideration. Conditions conducive for the involvement of local entrepreneurs, SMMEs and other businesses shall be created as far as possible. The recruitment and contracting processes shall be clearly communicated to the local community. No unrealistic employment expectations shall be created within the local community.	• Alleviation of unemployment in the area • Investment in local economy • Promotion of positive disposition towards development in local community	• Local labour is employed as far as possible • Local businesses are involved where possible • Minimum of outside workers present in the area due to the development	O&M Manager	As necessary
2.3	**CAPACITY BUILDING IN LOCAL COMMUNITIES** If the relevant skills for a position are not readily available locally, training shall be provided to equip willing members of the local community for this position if this is feasible. Capacity building initiatives shall be coordinated with the planning of Siyancuma LM, as well as other such initiatives in the renewable energy and housing sectors, where possible.	• Alleviation of unemployment in the area • Skills investment in local community • Promotion of positive disposition towards development in local community	• Local labour capabilities are expanded • Minimum of outside workers present in the area due to the development	O&M Manager	As needed
2.4	**HIV/AIDS EDUCATION** HIV/Aids education shall be conducted by an independent contractor and further sensitisation shall be done by the independent OHS officer.	• Comply with Developer's obligation to provide HIV/Aids education according to Department of Labour requirements.	• Proof of training to be provided to the Dept of Labour and Siyancuma LM	O&M Manager	Monthly feedback

Phase of Development	C	OPERATION & MANAGEMENT
Impact/Issue	3	MATERIALS

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
3.1	**HANDLING STOCKPILES** All stockpiled material must be easily accessible without any environmental damage. All temporarily stockpiled material must be stockpiled in such a way that the spread of materials are minimised. The stockpiles may only be placed within the demarcated areas. The O&M Manager must avoid vegetated areas that will not be cleared. Storm water runoff from the stockpile sites and other related areas must be directed into the storm water system with the necessary pollution prevention measures such as silt traps and may not run freely into the surrounding areas. Stockpiles are to be stabilised if signs of erosion are visible. Soils from different horizons must not be stockpiled in a way that would cause topsoil stockpiles to get contaminated by subsoil material. Topsoil stockpiles must be monitored for invasive exotic vegetation growth. O&M Manager must remediate as and when required. Should any topsoil need to be stockpiled during the operation and maintenance of the PV power station no plant, workforce or any maintenance-related activities may be allowed onto the topsoil stockpiles. Topsoil stockpiles must be clearly demarcated as no-go areas. Stockpiles must not be higher than 2 m in order to avoid compaction, and thereby maintain the soil integrity and chemical composition.	• Minimise scarring of the soil surface and land features • Minimise disturbance and loss of soil • Minimise construction footprint • Minimise sedimentation of nearby drainage lines • Maintain the integrity of topsoil for landscaping and rehabilitation • Contain invasive plant growth • Minimise contamination of storm water runoff	• No visible erosion scars once construction is completed • The footprint has not exceeded the agreed site in terms of EA etc. • Minimal invasive weed growth • No signs of sedimentation and erosion	O&M Manager	When needed
3.2	**OILS AND CHEMICALS** The O&M Manager must provide method statements for the handling and storage of oils and chemicals, fire, and emergency spills procedures. These substances must be confined to specific and secured areas at the maintenance workshop in a way that would not pose a danger of pollution even during times of high rainfall. This area must be imperviously bunded with adequate containment (at least 1.5 times the volume of the fuel) for potential spills or leaks. Drip trays (minimum of 10 cm deep) must be placed under all vehicles that stand for more than 24 hours. Vehicles suspected of leaking must not be left unattended; drip trays must be utilised. The surface area of the drip tray would depend on the vehicle and must be large enough to catch any hydrocarbons that may leak from the vehicle while standing. The appropriate depth for the drip tray must be determined considering the total volume of oil in the vehicle. The drip tray must be of sufficient capacity to contain the total volume of oil in the vehicle. **Spill kits** must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site. Spill kits must be made up of materials/products that are in line with environmental best practice (Sunsorb is a recommended product that is environmentally friendly). All spilled hazardous substances, contaminated soils and drenched spill kit material must be contained in impermeable containers for removal to a licensed hazardous waste site. If a complaint is made or a potential or actual leak or spill is identified, corrective action must be taken immediately. Corrective actions include stopping the contaminant from escaping further, cleaning the affected environment as far as possible and preventing recurrence.	• Prevention of pollution of the environment • Minimise chances of transgression of the acts controlling pollution	• No pollution of the environment • No litigation due to transgression of pollution control acts • No complaints from I&APs • Method statements	O&M Manager	Daily

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
3.3	**CEMENT AND CONCRETE BATCHING** The O&M Manager must provide and maintain a method statement for cement and concrete batching during maintenance phases. The method statement must provide information on proposed storage, washing and disposal of cement, packaging, tools and plant. The mixing of concrete shall only be done at a specially selected site on mortar boards or similar structures to prevent runoff into soils, rocky outcrops, streams and natural vegetation. Cleaning of cement mixing and handling equipment shall be done using proper cleaning trays. All empty containers must be stored at a dedicated area at the workshop and later removed from the site for appropriate disposal at a licensed commercial facility. Any spillage that may occur must be investigated and immediate remedial action must be taken. The visible remains of concrete, whether solid or from washings, shall be physically removed immediately and disposed of as waste at a registered landfill site. Cement and concrete batching areas must be located in consultation with a suitably qualified person in order to ensure that residues are contained and that the proposed location does not fall within 100 m from sensitive areas such as drainage lines, storm water channels, etc.	• Minimise the possibility of cement residue entering into the surrounding environment • Minimise pollution of soil, surface and groundwater resources	• Method Statement (MS) • Conformance to MS • No evidence of contaminated soil at the batching site • No evidence of contaminated water resources	O&M Manager	Monitor daily during periods of batching.
3.4 **3.4.1**	**DANGEROUS AND TOXIC MATERIALS** **Provision of Storage Facilities** Materials such as fuel, oil, paint, herbicide and insecticides must be sealed and stored in bermed areas under lock and key, as appropriate, in well-ventilated areas at the workshop. Storage areas for such materials shall be inspected regularly. Sufficient care must be taken when handling these materials to prevent pollution. Training on the handling of dangerous and toxic materials must be provided to all staff working with these materials at regular intervals. In the case of pollution of any surface or groundwater, the Regional Representative of the **Department of Water Affairs** (DWA) must be informed immediately. Storage areas shall display the required safety signs depicting “No Smoking”, No Naked Lights” and “Danger”. Containers shall be clearly marked to indicate contents as well as safety requirements. The O&M Manager to maintain a **method statement** for the storage of hazardous materials. **Material Safety Data Sheets** (MSDS) must be prepared for all hazardous substances on site and supplied by the supplier where relevant. These sheets must be reviewed annually. Storage and disposal permits/approvals shall be obtained if required. All permit/approval conditions shall be complied with. Transportation of hazardous substances shall be conducted in accordance with the relevant legislation and regulations.	• Prevention of pollution of soil, surface and groundwater resources in the immediate and surrounding environments • Minimise chances of transgression of the acts controlling pollution	• No visible signs of pollution • No litigation due to transgression of pollution control acts	O&M Manager	Monitor monthly and review annually

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
3.4.2	**Bulk Storage of Fuels and Oils** The O&M Manager must provide and maintain a method statement for fuel tanks and refuelling procedures should any fuel bunking and dispensing facilities be implemented at the workshop. Fuel storage tanks shall be bunded and stored on an impervious surface. Bunding shall be of sufficient capacity to contain at least 150% of the volume of the tanks. The filler tap must be inside the bunded area where possible and the bund wall must not have a tap or valve. A Flammable Liquid License must be obtained for diesel volumes greater than 200 ℓ. Environmental Authorisation is required for volumes greater than 80 000 ℓ and 30 000 ℓ depending on the area where construction is situated. Fuel storage tanks shall be located in a portion of the site camp where they do not pose a high risk in terms of water pollution (i.e. they must be located away from water courses). Fuel storage tanks shall be placed so that they are out of the way of traffic, in order to minimise the risk of the tanks being ruptured or damaged by vehicles. Fuel storage should be covered during the rainy season in high rainfall regions.	• Prevention of pollution of soil, surface and groundwater resources in the immediate and surrounding environments • Minimise chances of transgression of the acts controlling pollution	• No visible signs of pollution • No litigation due to transgression of pollution control acts • Method statement	O&M Manager	At onset of operation phase. Annual review
3.4.3	**Use of Dangerous and Toxic Materials** The O&M Manager shall keep the materials and equipment necessary for dealing with spills/fire of the materials present, at the workshop on site as stipulated by the health and safety legislation. The O&M Manager shall set up a procedure for dealing with spills/fires. In the event of a major spill or leak of contaminants, the administering authority shall be notified immediately. A record must be kept of all spills and the corrective actions taken.	• Prevention of pollution of soil, surface and groundwater resources in the immediate and surrounding environments • Minimise chances of transgression of the acts controlling pollution	• No pollution of the environment • No litigation due to transgression of pollution control acts	O&M Manager	At onset of operation phase. Annual review

Phase of Development	C	OPERATION & MANAGEMENT
Impact/Issue	4	Terrain Office, Store Rooms, Workshops

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
4.1	**EATING AREAS** Adequate closed refuse bins shall be provided and cleaned on a weekly basis. No fires are to be lit outside of facilities designed to contain fires. The adequacy and positioning of these structures must be determined by the O&M Manager. The feeding, or leaving of food, for stray or other animals in the area is strictly prohibited. Litter (even if originating outside the site) and must be picked up daily and put into suitably closed bins.	• Control potential influx of vermin and flies • Maintain neat workplace and hygienic environment	• No visual sign of vermin and flies • No complaints from I&APs	O&M Manager	-
4.2	**TOILETS AND ABLUTION FACILITIES** The O&M Manager shall be responsible for providing all sanitary arrangements for personnel and contractors that would be working on site from time to time. Sanitary arrangements shall be to the satisfaction of the local authority. Toilets shall not be located within 100 m from a 1:100 year flood line or a water course. The O&M Manager shall be responsible for the cleaning, maintenance and servicing of the toilets. Enviro Loos are being considered for implementation during the operational phase and shall be operated strictly according to instructions in order to ensure its continued effective operation.	• Ensure proper sanitation is provided, thereby encouraging the workforce to utilise toilets rather than the surrounding natural environment • Minimise potential of diseases on site • Minimise potential pollution of soils, water resources and natural habitats	• Workforce use toilets provided • No complaints received from I&APs and workforce • No visible or measurable signs of pollution of the environment (soils, groundwater and surface water)	O&M Manager	Continuously
4.3	**WASTE MANAGEMENT** The O&M Manager must provide and maintain a method statement for solid waste management. The method statement must provide information on a proposed licensed facility to be utilised and details of proposed recordkeeping for auditing purposes. Waste shall be divided into recyclable and non-recyclable waste, and shall be separated as follows: 1. Hazardous waste, including (but not limited to) old oil, paint, etc; 2. General waste, including (but not limited to) construction rubble; 3. Reusable construction material; and 4. Recyclable waste. Hazardous waste shall be stored in sealed containers within an appropriately bunded area at the workshop. Recyclable waste shall preferably be deposited in separate bins. The O&M Manager is advised that Collect-a-Can collects tins, including paint tins, chemical tins, etc. and Consol collects glass for recycling. Any illegal discarding and/or burial of waste shall not be tolerated. This action would result in a fine and further legal action could be taken by authorities. Proof of legal waste disposal must be available on request of the authorities. Bins must be clearly marked for ease of management. A lid must be secured to each refuse bin in order to prevent animals from gaining access. The waste must be stored in dedicated areas and where baboons are prevalent, baboon-proof lids must be fitted. Closed containers of sufficient number and volume must be strategically located around the offices, store rooms and workshops to contain all waste generated on the site. Contractor contracts, conducting maintenance and other work on site, must contain a clause to the effect that the contractor in question is responsible for the disposal of all the refuse/waste generated by his activities at an officially approved disposal site and that the	• Sustainable management of waste by recycling • To keep the site neat and tidy • Minimise litigation and complaints by I&APs • Reduce visual impact • Control potential influx of vermin and flies and thereby minimise the potential of diseases on site and in the surrounding environment • Minimise potential pollution of soils, water resources and natural habitats	• Disposal of rubble and refuse in an appropriate manner with no rubble and refuse lying on site • Site is neat and tidy • No complaints from surrounding residents and businesses • Sufficient containers available on site • No visible or measurable signs of pollution of the environment (soils, groundwater and surface water) • Method statement	O&M Manager Contractor	Daily

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
	contractor are bound to the management activities stipulated in this EMP. Proof of this undertaking must be kept on file. Waste and surplus dangerous goods shall be kept to a minimum. All solid and chemical wastes that are generated must be removed and disposed of at a suitably licensed waste disposal site. The Contractor is to provide proof of this to the O&M Manager. Chemical containers and packaging brought onto the site must be removed for disposal at a suitable site. A skip, with a cover, must be used to contain refuse from campsite bins, rubble and other construction waste. Records shall be kept of all regulated waste, detailing at least the quantity, type and fate of the waste in question. These records must be available for review at all times.				
4.4	**DUST** The O&M Manager must provide and maintain a method statement for dust control should it be needed at any stage. The method statement must provide information on the proposed source of water to be utilised and the details of the licenses acquired for such usage. **Potable water should preferably not be used as a means of dust suppression**; alternative measures must be sourced. The use of 'grey' water must be investigated as an alternative. The O&M Manager will be responsible to source this water and obtain the required approvals to utilise this water for the purpose of dust suppression. Dust production must be controlled by regular watering of the roads and works area, should the need arise. (**NB:** Concrete and cement dusts are toxic and damage soil properties. Watering for prevention of dust spread must therefore not be done where concrete dust has fallen, as it would infiltrate the soil. Cement bags must not be allowed to blow around the site and spread cement dust.) In addition to the standard dust suppression measures, main access roads and office and workshop areas, as well as other areas where the standard measures are not sufficient, must be surfaced with a temporary surface such as gravel to assist with dust suppression. Rehabilitated areas are to be maintained to prevent regression of vegetation. All vehicles transporting material that could be blown off (e.g. soil, rubble etc.) must be covered with a tarpaulin, and speed limits of 20 km/h must be adhered to on site.	• Reduce dust fallout • Reduce visual impact • Minimise loss of valuable soil	• No visible signs of dust • No complaints from I&APs • No incidences reported • No visible evidence of dust contamination in the surrounding environment • Method statement	O&M Manager	At onset of operation phase When needed Rehabilitated areas to be monitored weekly until sufficient plant growth has established. Thereafter monthly monitoring
4.5	**WORKSHOP EQUIPMENT, MAINTENANCE AND STORAGE** The O&M Manager must provide and maintain a method statement for workshop maintenance and cleaning. Machinery shall be stored in an appropriately surfaced area. All maintenance and washing of vehicles and equipment shall take place in the workshop area, which would be equipped with a bund wall and grease trap oil separator. During servicing of vehicles or equipment, a suitable drip tray shall be used to prevent spills onto the soil, especially where emergency repairs are done outside the workshop area. Leaking equipment shall be repaired immediately or be removed from site to be repaired elsewhere. All potentially hazardous and non-degradable waste shall be collected and removed to a suitably registered waste site. Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and remediated according the method statement. Cleaning and remediation must be done with products that are in line with best environmental practice, e.g. Sunsorb. ***Method statements will be required from all contractors conducting maintenance and other activities on site to show procedures for dealing with possible emergencies that could occur, such as fire and accidental leaks and spillage.*** An emergency spill kit must be complete and available on site at all times. The O&M Manager must ensure that senior and other relevant members of the workforce are trained in dealing with spills by using emergency spill kits.	• Prevent pollution of the environment • Minimise chance of transgression of the acts controlling pollution • Disposal of hazardous substances in an appropriate manner	• No pollution of the environment • No litigation due to transgression of pollution control acts • Method statement	O&M Manager	Monitor daily

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
	The following shall apply: All contaminated soil/yard stones shall be removed and disposed of as hazardous waste at a registered facility or placed in containers to be taken to one central point where bioremediation can be done. (Bioremediation should only be an option if an Environmental Authorisation has been issued) A specialist contractor shall be used for the bioremediation of contaminated soil if the required remediation materials and expertise are not available on site. All spills of hazardous substances must be registered. The O&M Manager must comply with the regulations of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).				
4.6	**NOISE** Areas where noise levels exceed 75 dB shall be declared Noise Control Zones and employees working in these areas shall wear the appropriate PPE. **The OHS official shall be responsible for enforcing this condition.** All vehicles shall be properly maintained and fitted with the required noise abatement equipment at all times in order to reduce possible noise pollution. Noisy activities shall take place only during working hours. The O&M Manager must inform the neighbours adjacent to the development in writing 24 hours prior to any planned activities that would be unusually noisy or any other activities that could reasonably have an impact on the adjacent sites. These activities could include, but are not limited to, blasting, piling, use of pneumatic jack-hammers and compressors, bulk demolitions, etc	• Maintain noise levels below "disturbing" as defined in the National Noise Regulations • Minimise the nuisance factor of the development	• No complaints from surrounding landowners or I&APs	O&M Manager	As and when required
4.7	**FIRES** The O&M Manager must provide and maintain a method statement for fires, clearly indicating where and for what purposes fires would be utilised, as well as details on the fuel to be utilised. Absolutely no burning of waste is permitted. Fires will only be allowed in **facilities especially constructed for this purpose** at the terrain office. Wood, charcoal or anthracite are the only fuels permitted to be used for fires. The O&M Manager must provide sufficient wood (fuel) for this purpose. Fires in the designated areas must be small in scale so as to prevent excessive smoke being released into the atmosphere. **NO** open fires shall be allowed on site under any circumstances (National Veld and Forest Fires Act, Act 101 of 1998). Heavy smoke may not be released into the air. No firewood is to be collected, chopped or felled from private or public property or from within the site and the surrounding natural vegetation. The O&M Managaer shall have fire-fighting equipment available at the terrain office and workshop and on all vehicles working on site, and fire-fighting training shall be given to personnel. Procedures relating to fire shall be developed in consultation with Siyancuma LM and landowners in the vicinity of the development. Farmers/community members shall be compensated at full market value for any proven losses due to fires resulting from negligence or non-compliance. The implemented fire break should be maintained according to legislation.	• Minimise risk of veld fires • Minimise destruction of natural fauna and flora • Maintain safety on site	• No veld fires started by the personnel • No claims from landowners for damages due to veld fires • Method statement	O&M Manager	Monitor daily
4.8	**EROSION AND SEDIMENTATION** The rehabilitated areas to be maintained and revegetated when needed. To reduce the loss of material by erosion, the O&M Manager shall ensure that disturbance on site is kept to a minimum. The O&M manager shall be responsible for rehabilitating all eroded areas in such a way that the erosion potential is minimised after construction has been completed.	• Minimise erosion damage • Minimise impeding of the natural flow of water • Minimise scarring of the soil surface and land features	• No erosion scars • No loss of topsoil • No interference with the natural flow of water	O&M Manager	As and when required

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
	Disturbed areas that will require rehabilitation must be mulched to encourage vegetation regrowth where needed. Mulch used must be free from alien seed. These areas must be cordoned off in order to keep vehicles and personnel out. The exposed soil surface will be sown with seeds of indigenous plant species. Hay bales can be worked into the soil at 1:25 m^2 to act as mulch. The hay bales will assist in slowing the water speed to allow for infiltration to occur, thereby decreasing surface runoff and increasing the chance of seedling germination, where possible slopes should be limited to a gradient of 1:2. Rehabilitation shall be done immediately after disturbance in an area or removal of vegetation in order to stabilise the soil. In the event of a storm occurring before vegetation has been re-established in the disturbed areas, stones or other suitable material shall be packed in denuded areas, especially along the edges of structures, to stem the flow of storm water.	• Minimise disturbance and loss of topsoil • Regrowth of disturbed areas. • Dust pollution	• No visible erosion scars once construction is completed • The footprint does not exceed the agreed boundaries • All damaged areas successfully rehabilitated • No dust pollution during windy periods		
4.9	**FAUNA** **All activities on site must comply with:** The regulations of the Animal Protection Act, 1962 (Act No. 71 of 1962). All personnel and contractors at the PV power station must be informed that the intentional killing of any animal is not permitted as faunal species are beneficial to humankind. Poaching is illegal and it must be a condition of employment that any employee caught poaching would be dismissed. Employees must be trained on how to deal with faunal species as intentional killing will not be tolerated. Training must also include instructions on how to avoid accidental killing of fauna during routine construction and maintenance activities. In the case of a problem animal, e.g. a large snake, a specialist must be called in to safely relocate the animal. The talk given to all personnel during environmental induction training and follow up must include safety with wild animals. Focus on animals such as snakes and other reptiles that often generate fear by telling workers how to move away safely and to whom to report the sighting. Personnel should also be informed where snakes most often hide so that they can be vigilant when lifting stones etc. All electrical infrastructure should be monitored weekly for bird mortalities (Wilson, 2010)	• Minimise disturbance to animals • Minimise interruption of breeding patterns of birds • Minimise destruction of habitat	• No complaints from Nature Conservation • No litigation concerning applicable animal protection acts • No measurable or visible signs of habitat destruction	O&M Manager	Monitor daily Monthly environmental sensitisation sessions
4.10	**FLORA** Trees and natural vegetation or any other natural features inside and outside the site shall not be defaced, removed, painted for benchmarks or otherwise damaged. Any feature defaced by personnel shall be reinstated. Not any protected trees and plants to be damaged or removed. Any corridors to surrounding natural areas must be maintained and protected. These are no-go areas. Plants that are proclaimed as problem plants or noxious weeds must be removed immediately, should they occur on site. These plants, as well as any other problem plants within a specific region as stipulated by a qualified and experienced botanist or ecologist, must be included in an alien management programme for the site. Eradication must occur every 6 months. All rehabilitated areas shall be maintained and vegetated to prevent erosion.	• Minimal disturbance to vegetation where such vegetation does not interfere with opertions • Prevent litigation concerning removal of vegetation • Encourage natural habitat flora and fauna • Minimise scarring of the soil surface and land features • Minimise disturbance and loss of topsoil • Minimise risk of veld fires • Minimise risk of fauna and flora destruction	• No litigation due to removal of vegetation without necessary permission • Removal of exotic plants • No visible erosion scars • Footprint not exceeding the agreed boundaries • All rehabilitated areas successfully maintained • No veld fires • No claims from landowners for damages due to veld fires • Method statement	O&M Manager	6 monthly

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
4.11	**HERITAGE** Should any archaeological and/or palaeontological features be exposed during operation, work on the area where the features were found shall cease immediately, the area shall be demarcated and the SAHRA shall be notified within 24 hours. Under no circumstances shall artefacts be removed, destroyed or interfered with. Any archaeological/palaeontological sites exposed must not be disturbed prior to authorisation by the South African Heritage Resources Agency or the appropriate provincial heritage resource agency.	• Limit the destruction of the country's heritage resources • The preservation and appropriate management of new archaeological finds should these be discovered.	• No destruction of or damage to known archaeological features	O&M Manager	Monitor Daily
4.12	**NO-GO/SENSITIVE AREAS** All operational activities must remain within the boundaries of the development area, as demarcated. There must be no vehicular access to the drainage lines outside the development area. No-go areas must be demarcated with fencing/warning tape and signs before any construction activities commence.	• Minimise the potential for the spread of the of the footprint • Reduce loss of fauna and flora habitat • Minimise the potential for loss of protected and/or endangered fauna and flora species	• No sign of movement through "no-go" areas. • Containment of footprint	O&M Manager	Monitor weekly
4.13	**ACCESS ROUTE/HAUL ROADS** Existing roads and services must be utilised thus reducing the infringement of the development on natural habitat. No unauthorised access is permitted. Any damage or degradation must be rehabilitated immediately. No driving off the marked roads is permitted and designated parking areas must be identified and demarcated with applicable signage. Any work or access near or in a permanent drainage system may have implications in terms of the National Water Act, 1998 (Act No. 36 of 1998), and therefore may well require an application for a water use licence. Recreational activities, including but not limited to quad bikes, 4x4 vehicles and dirt bikes shall neither be allowed on the site nor on its access roads. Security personnel must be informed and ensure that this is enforced.	• Minimise loss of topsoil and enhancement of erosion • Minimise fauna and flora displacement by destruction of natural habitats	• No erosion on access roads • No loss of topsoil due to runoff water on access roads	O&M Manager	As required, monitor daily
4.14	**TRAFFIC IMPACTS** Residents of nearby farms shall have access to these farms at all times. Vehicle safety standards shall be strictly adhered to. Construction vehicles shall not exceed the speed limit. Safe entry and exit shall be insured by creating a dedicated access point. Vehicles shall not deviate from internal access routes.	• Minimise traffic impacts	• No complaints from I&APs	O&M Manager	As required
4.15	**CRIME, SAFETY AND SECURITY** No site staff, other than security personnel, shall be housed on site. Security personnel and staff shall be supplied with ablution facilities, water and refuse collection facilities, as well as facilities for cooking and heating so that open fires are not necessary. A boundary fence will serve to prevent public access to the site, for public safety and security reasons. The access to the site must be controlled so as to restrict unauthorised persons from entering the site. Personnel and contractors working on site must retain some means of identification. O&M Manager are responsible for ensuring that only authorised personnel are on site at all times.	• Reduce the risk of potential incidences • Minimise the potential impact on the environment	• No incidences reported	O&M Manager	Monitor daily

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
	Personnel shall not be allowed to enter neighbouring private properties. Security and other personnel shall be sensitised to the possibility of stock theft and poaching in the area and trained to recognise signs of these activities. If poaching or stock theft is suspected, any worker could be searched for weapons and other signs of poaching or stock theft. It must be a condition of employment that these crimes shall warrant dismissal. The personnel are to be managed in strict accordance with the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). The O&M Manager shall ensure that all emergency procedures are in place. Emergency procedures shall include but not be limited to procedures for 1. fire, 2. spills, 3. contamination of the ground, 4. employee accidents, and 5. use of hazardous substances and materials. The O&M manager shall ensure that lists of all emergency telephone numbers/contact persons are kept up to date and that all numbers and names are posted at relevant locations throughout the terrain office, storage area and workshop. The nearest emergency service provider, as well as its capacity and the magnitude of accidents it would be able to handle, must be identified. The contact details of this emergency centre, as well as the police and ambulance services, must be available at prominent locations around the site.				
4.16	**HYDROLOGY** Excessive runoff during heavy rainfall periods must be managed to ensure that flow velocities are reduced. Storm water, wherever possible, should be allowed to soak into the land in the area on which the water falls. In the event of pollution the O&M Manager shall be responsible for all costs incurred by organisations called to assist in pollution control and/or to clean up polluted areas (Section 20 of the National Water Act, 1998, Act No. 36 of 1998). The O&M Manager shall ensure that excessive quantities of sand, silt and silt-laden water do not enter the storm water system or drainage areas. It is important to prevent contamination of the natural drainage system. Appropriate measures, such as the erection of silt traps or the establishment of drainage retention areas, must be taken to prevent the ingress of silt and sand into drainage lines or watercourses. No wastewater may run freely into any of the surrounding naturally vegetated areas. Runoff containing high sediment loads must not be released into natural or municipal drainage systems or nearby watercourses. If this becomes a problem it is recommended that an attenuation pond be constructed to allow solids to settle out of runoff prior to leaving the site. Approval must be obtained from DWA for any activities that require authorisation in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) if necessary. A relevant specialist must be consulted prior to the demarcation of drainage lines and wetlands where needed. No vehicular access is allowed in permanently wet areas. No equipment that may cause irreparable damage to wet areas shall be used. "**NO ENTRY**" signs must be strategically placed along rivers, streams and other natural or man-made drainage lines which are in close proximity to access routes. These lines and the vegetation occurring in them are sensitive to impacts during the operational phase and may not be polluted or damaged in any way. No roads shall be cut through river and stream banks, as this may lead to erosion causing siltation of streams and downstream dams in the event of excessive thunderstorms. Existing drifts and bridges must be used if the landowner gives his consent. Such structures shall be thoroughly examined for strength and durability before they are used.	• Minimise pollution of soil, surface and groundwater resources in the immediate and surrounding environments • Minimise impeding the natural flow of water • Minimise the impact on natural water flow dynamics • Minimise scarring of the soil surface and land features • Minimise damage to banks of rivers and streams • Minimise erosion of banks and subsequent siltation of rivers and streams • Minimise damage to riverine habitats • Provide adequate drainage and storm water control on site.	• No visible signs of pollution • No signs of siltation of water courses • No visible erosion scarring once construction is completed • Minimum loss of topsoil • No access roads through river and stream banks • No visible erosion scars on banks once construction is completed • No erosion or siltation downstream	O&M Manager	As and when required, monitor daily

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
	Ground drainage levels are required to direct surface runoff to drainage lines. These drainage lines must ensure that the water is gravity-fed from the workshop and office areas to areas with limited or no disturbance. This ensures that the water has the smallest potential of being contaminated before released into the environment. This also reduces the risk of erosive forces acting upon the channels through which the water flows.				
4.16.1	**Water Use – Operational Phase** The PV modules would have to be cleaned regularly. This could either be done by using a vehicle based compressor to wash the modules down with water or by mechanically cleaning the modules with squeegees. The latter option is labour intensive and would create general unskilled jobs. Approximately 820m^3 water/annum would be needed for a 15 MW power station, should it be cleaned thrice yearly. These numbers include the potable needs of personnel. The water could be obtained from existing/drilled boreholes or potable water could be transported by water truck from Douglas to the site. Water would probably be sourced from the Siyancuma LM during construction but during the development process the proposal of using borehole water for the operational phase would be reviewed. If it is deemed feasible SUNTRACE AFRICA will then conduct the needed studies and applications to DWA for water use licenses. If groundwater is to be used, the extent of the current groundwater usage in the area, the distance from boreholes to the planned development, the groundwater levels and the quality (chemical composition) of the water must be established. The sustainable yield rate of aquifers within the study area must be established to determine the amount of water that would be available for this development, taking into account other possible uses of these aquifers. The DWA manages water uses, and newly drilled boreholes or existing boreholes as well as their current and expected use should be registered with the DWA. Should borehole water be utilised, the sustainable yield rate of the boreholes/aquifers need to be managed and monitored closely to ensure sustainable use. If potable water is to be transported from the nearest settlement/municipal area to the site by water truck, a letter of assurance of water availability for the operational phase should be obtained from the relevant institution.	Ensure that water is authorised and available at the commencement of the operational phase.	Water use applications authorised at the onset of operations.	Suntrace Africa; Project Manager; O&M Manager.	At onset of operations or when water is needed. Yield rate of borehole water to be tested six monthly for the 1st year, thereafter yearly testing should be done (should the 1st year's test results indicate adequate ground water for use in the region).
4.17	**SOIL** Rehabilitated areas shall be maintained continuously during the operational phase.	• Minimise scarring of the soil surface and land features • Minimise disturbance and loss of soil • Remain within operation footprint • Minimise sedimentation of nearby drainage lines • Maintain the integrity of topsoil • Contain invasive plant growth	• No visible erosion scars once construction is completed • Footprint not exceeding the agreed site in terms of EA etc. • Minimal invasive weed growth • No signs of sedimentation and erosion • Method statement	O&M Manager	Weekly inspections Immediate action
4.18	**VISUAL IMPACT** All access roads must be properly maintained. The workshop shall be kept neat and tidy. Rehabilitated areas to be monitored and maintained during the operational phase. Rubble and litter must be removed every week, or more often as the need arises, and be	• Minimise visual impact • Eliminate risk of additional night-time visual impacts	• No complaints from I&APs • Good condition and correct	O&M Manager, DR&PW	Monitor weekly

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
	disposed of at a registered landfill site. In the event of glare from the development impacting negatively on motorists, the Department of Roads and Public Works shall be consulted and solutions found.		functioning of the light fixtures • Effective containment of light on the site • Minimal usage of security and other lighting.		
4.18.1	**Lighting** Specifications and placement of lighting and light fixtures shall be appropriate to the infrastructure in order to contain the impact. Other measures include: • Shield sources of light with physical barriers (walls, vegetation, or the structure itself). • Limit mounting heights of lighting fixtures. • Use footlights or bollard level lights. • Use minimum lumen/wattage in fixtures. • Use low pressure sodium lighting or other types of low impact lighting. • Use motion detectors on security lighting so that these lights would only be activated when movement is detected in a certain area.				

Phase of development	D	PRECONSTRUCTION, CONSTRUCTION & OPERATION	EAP	
Impact / issue	1	Specialist Requirements	Proponent's Signature	

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
1.1	**ECOLOGICAL SPECIALIST RECOMMENDATIONS – Ekotrust CC** (Appendix D1b) *Access roads* The proposed Option 2 Access Road could be considered but should be relocated to start from the southeastern corner of the proposed 20 ha site and then follow the current camp fence eastwards and then follow the old farm road. This route will then pass the no-go small pan to the south. The connection with the R357 along this should be made before the slight hill and bend in the R357 to the east. (Access road Option 3: Appendix A2). *Power line* Along the proposed power line Option A there is a small population of the protected geophyte *Nerine laticoma* (NCNCA 2009) and they could be endangered by the development (Appendix A7b and A2). The exact route should take the position of this plant population in consideration. However, if necessary these plants could be transplanted to nearby similar habitat. The power line construction should take avifauna into account, and an important mitigation measure must include the installation of 'flappers' or other objects to make the power lines more visible to the birds and to prevent collisions. *Trees* It is recommended that the presence of tall and/or protected trees is assessed once a decision is made on the precise location of an access road and power line to the core site. The indigenous and endemic trees and shrubs should be protected as far as possible because they form important food sources and habitats for various fauna. *Alien plants* The alien invader *Prosopis glandulosa* should be controlled on site. Introduction of other alien plants during construction should be prevented. Alien plant control should be continued after the construction of the site. *Pan community* The small pan to the east of the core site should be avoided during and after development and considered a no-go site (Appendix A7b). The protected *Colchicum melanthoides* was recorded in the pan (NCNCA 2009). *Fauna* The core site is surrounded by similar habitat and displaced fauna should be able to move away from the development site. However, it is important that all power lines be clearly marked to prevent bird collisions.	• Minimise impacts on fauna and flora • Avoid additional disturbance of natural equilibrium by unnecessary creation of favourable conditions for specific species • Avoid killing of animals by electric fences • Avoid conflict with baboons or monkeys	• No unnecessary disturbance of vegetation • No artificial habitats • No animal mortalities due to electric fencing • No conflict with baboons or monkeys	Developer Contractor fence contractor ECO specialist	Once-off actions during delineation of the area by the land surveyor and planning of electric fencing.
1.2	**SPECIALIST RECOMMENDATIONS ON AVIFAUNA & CHIROPTERA – Ms. Beryl Wilson** (AppendixD2b) All electrical infrastructures should be monitored weekly for bird mortalities (collisions and electrocutions) Any bird-unsafe electrical pylon structures must be modified by Eskom to insulate dangerous live components, and a gap must be cut in the earth wire. Perch deterrents can also be installed to keep birds away from the dangerous areas on the structure. Bird collisions on newly constructed electrical features can be minimised with the standard anti-collision devices and diverters currently in use by Eskom. Preference and consideration should be given to underground cabling rather than new overhead structures. Nesting by birds should be discouraged, either by removing nests as they are built, or by supplying suitable alternative structures, and by avoiding infrastructure construction designs such as flat or trellised surfaces near key structures. Roosting bats should be discouraged by closing any roosting sites at night once the bats have left for foraging, and by avoiding infrastructures that encourage roosting.	• Minimise impacts on avifauna and Chiroptera • Monitor bird mortalities due to electrical infrastructure • Avoid nesting or roosting of birds and bats	• Minimal mortalities of birds and bats • Minimal contact/conflict between birds/bats and humans	Developer Contractor Eskom ECO	Once-off modifications to infrastructure. Weekly monitoring of mortalities and utilisation of infrastructure by birds and bats

	MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	RESPONSIBLE PARTY	FREQUENCY OF ACTION
1.3	**ARCHAEOLOGICAL SPECIALIST RECOMMENDATIONS – Dr Peter Nilssen** (Appendix D3b) Because archaeological resources at waypoints 251, 286, 363 and 367 (Appendix D3b) are considered to be representative of the archaeological record of the area, and in order to mitigate against potential future cumulative impacts, it is recommended that these localities be conserved by utilizing the access road "Option 2" rather than the other access road alternatives. (Access road Option 3: Appendix A2)	• Prevent impacts on heritage resources.	• No complaints or action from SAHRA or I&APs	Developer Contractor	Planning Phase
1.4	**AGRICULTURAL SPECIALIST RECOMMENDATIONS – Mr Chris Lubbe** (Appendix D6b) **Water and Wind erosion:** Should soil and vegetation be disturbed and vegetation removed during construction, soil should be compacted and the area re-vegetated. Windblown dust should be prevented by watering down the working areas. Maintenance of roads should be undertaken throughout the construction phase. Truck drivers and other operators of heavy machinery should be made aware of pedestrians, stray animals and stock herders on the roads. The proponent should refrain from employing farm labourers for construction purposes. It should be explained to such applicants that they would exchange permanent jobs for temporary ones.	• Minimise impacts on farming community • Maintain roads used for PV power station in good order • Avoid accidents due to construction/power generation activities in agricultural area • Avoid competition between construction and agricultural employers	• No notable degradation of roads due to PV power station • No accidents due to construction/power generation activities in agricultural area • No appointment of currently employed agricultural workers • No complaints from I&APs	Developer Contractor	As and when required
1.5	**VISUAL SPECIALIST RECOMMENDATIONS – Mr. Gerhard Griesel** (Appendix D5b) Sensitive positioning of the construction camps and laydown yards should take advantage of the natural screening capacity of the study area by locating the camps outside the views of sensitive visual receptors. Construction of the development should preferably commence during the off-peak tourism season if possible. All surface treatments shall be non-reflective. Roads around the perimeter of the site shall be minimised. Light trespass and glare originating from street and security lighting should be avoided. Full cut-off luminaires should be fitted to limit the amount of light trespass and to control light output and glare. When vertical structures or surfaces such as building facades or signs are lit, the light should be directed downwards if possible. If the only feasible alternative is to uplight the element, the correct luminaire must be fitted to avoid light spillage.	• Minimise visual impact • Eliminate risk of additional night-time visual impacts	• No complaints from I&APs • Effective containment of light on the site	Developer Contractor ESO	Monitor weekly

ANNEXURE 1

DECLARATION OF UNDERSTANDING BY THE DEVELOPER

I, _____

representing _____

declare that I have read and understood the contents of the Environmental Management Programme for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

ANNEXURE 2

DECLARATION OF UNDERSTANDING BY THE ENGINEER

I, _____

representing _____

declare that I have read and understood the contents of the Environmental Management Programme for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

ANNEXURE 3

DECLARATION OF UNDERSTANDING BY THE CONTRACTOR

I, _____

representing _____

declare that I have read and understood the contents of the Environmental Management Programme for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

ANNEXURE 4

DECLARATION OF UNDERSTANDING BY THE OPERATIONS AND MAINTENANCE MANAGER

I, _____

representing _____

declare that I have read and understood the contents of the Environmental Management Programme for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications at_____.
(Facility Name)

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

ANNEXURE 5

METHOD STATEMENT: _____

(NAME OF METHOD STATEMENT)

CONTRACT:…… **DATE**:……..

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:…….. **End Date:**…….

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated sketches and plans where possible): * Note: please attach extra pages if more space is required

DECLARATIONS for Method Statement: _____

1) CONTRACTOR

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement.

_____ _____

(Signed) (Print name)

Date: _____

2) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Date: _____

3) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Date: _____

ANNEXURE 6

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**

WASTE REGISTER											
S/No	**Date**	**Type of Waste**	**From What Activity?**	**Approx Amount**	**Hazard Rating**	**Disposal Strategy**		**Responsible Person Disposing Waste**		**Responsible Person Accepting Waste**	
						How	**Where**	**Print Name**	**Sign**	**Print Name**	**Sign**

INTERESTED AND AFFECTED PARTY COMPLAINT REGISTER											
S/No	Date	Complaint	Person Lodging Complaint	Contact Particulars of Complainant	How Addressed/ Actions Taken	Source of Problem	Significance of Problem	Person Receiving Complaint		Responsible Person Follow-Up	
								Print Name	Sign	Print Name	Sign

ANNEXURE 7: CONTACT INFORMATION

Name: _____

Appointment: _____

Telephone: _____

Fax: _____

Mobile: _____

Email: _____

Company: _____

Signature:_____

ANNEXURE 8: PENALTIES/FINES FOR NON-COMPLIANCE

The Contractor/subcontractors must contact the ECO at any stage if unsure about any matter, or if a pollution incident occurs, vegetation is damaged or animals harmed.

ECO = Environmental Control Officer
ESO = Environmental Site Officer

S No	Phase	Penalty for non-compliance	
A	**Preconstruction Phase**	**Bottom of Range**	**Top of Range ***
1	Construction area to be demarcated before construction starts		R 5 000.00
2	The demarcated area must be maintained throughout the construction phase	R 500.00	R 1 000.00
3	Site area for stockpiling of building material must be demarcated	R 500.00	R 5 000.00
4	Failure to stockpile material correctly	R 1 000.00	R 10 000.00
5	Site area for storing of waste material must be demarcated	R 500.00	R 5 000.00
6	Fencing of the construction site with wire mesh fencing of 1,8 m where necessary or other suitable material as agreed on by ECO	R 500.00	R 1 000.00
7	Siting of access road/s to be approved by ECO & demarcated with stakes before any construction starts (if applicable)		R 5 000.00
8	Temporary route for construction must be determined on site with ECO	R 1 000.00	R 5 000.00
9	Telecommunications & AC power routes must be determined with the ECO	R 1 000.00	R 5 000.00
10	Sensitive features that may be harmed must be clearly marked or demarcated.	R 500.00	R 2 000.00
11	Vegetation that may not be removed must be clearly marked or demarcated.	R 500.00	R 5 000.00
12	Contractor shall ensure that construction team and all subcontractors are aware of all environmental aspects that could lead to imposition of penalties.	R 100.00	R 5 000.00
13	Contractor to sign Declaration of Understanding (DOU) before construction starts.		R 5 000.00
14	Contractor to ensure that all subcontractors are informed and sign a DOU	R 1 000.00	R 5 000.00
15	Method statements shall be provided to the ECO. No work shall commence until the method statement is accepted by the ECO and engineer.	R 1 000.00	R 5 000.00

S No	Phase	Penalty for non-compliance	
B	**Construction Phase**	**Bottom of Range**	**Top of Range ***
B1	**Information**		
16	A copy of the CEMP & Record of Decision with all the conditions of approval and the relevant method statements shall be at site at all times.		
B2	**Construction Crew Behaviour**	R 200.00	R 5 000.00
17	Construction crews may not overnight on site		
18	No amplified music allowed on site	R 200.00	R 5 000.00
19	Construction crew shall stay within the demarcated construction area (applicable in sensitive areas)	R 100.00	R 200.00
20	Preparation and consumption of meals only allowed in demarcated area	R 50.00	R 500.00
21	Persons walking outside the demarcated boundaries of the site	R 50.00	R 500.00
22	No pets permitted on site	R 100.00	R 1 000.00
23	Any person, vehicle, item or plant, or anything related to the Contractor's operations causing a public nuisance.		R 100.00
24	Driving, parking and storing of machinery and vehicles are only allowed inside demarcated areas and existing roads	R 500.00	R 5 000.00
25	Machinery may only be used on the road and may not disturb the vegetation on the sides of the road except if cleared by the ECO. Machinery used shall be carefully considered to limit environmental damage.	R 1 000.00	R 5 000.00
26	No vegetation other than that agreed on may be damaged – i.e. no access to areas outside construction area ("no-go" areas).	R 500.00	R 5 000.00
27	No individual may cause unnecessary damage to flora and fauna on, around or near the construction site.	R 500.00	R 2 000.00
28	No littering allowed (incl. cigarette butts)	R 20.00	R 2 000.00
29	Damage to sensitive environments	R 50.00	R 500.00
30	Any vehicle driving in excess of designated speed limits	R 2 000.00	R 100 000.00
31	Any items, materials or machinery of the plant or operations situated or stored outside the demarcated boundaries of the site.	R 500.00	R 5 000.00
B3	**Excavations**		
32	No topsoil that was not specified and/or lies outside the demarcated area may be removed or altered.		R 2 000.00
33	Commercial sources of sand, rock and gravel to be cleared with the ECO	R 200.00	R 5 000.00
34	All surplus material to be removed from site shall be disposed of at approved site	R 500.00	R 5 000.00
B4	**Toilets**		
35	Failure to provide adequate sanitation		R 3000.00
36	Toilets to be secured to prevent them from falling or being blown over	R 100.00	R 1000.00
37	Toilets must be serviced regularly, (according to the manufacturer's instructions) and kept clean	R 100.00	R 1 000.00
38	Individuals not making use of the provided ablution facilities	R50.00	R 1 000.00
B5	**Fire Prevention**		
39	All mandatory fire-fighting equipment (as specified at startup) shall be on site at all times	R 500.00	R 4 000.00
40	Fire-fighting equipment to be in good working order and serviced	R 500.00	R 2 000.00
41	No fires, including cooking fires, allowed on site	R 1 000.00	R 5 000.00

S No	Phase	Penalty for non-compliance	
B	**Construction Phase**	**Bottom of Range**	**Top of Range ***
B6	**Hazardous Substances**		
42	Concrete and slurry batching may only be executed within the boundaries of the demarcated area and/or where agreed on by the ECO	R 500.00	R 5 000.00
43	All excess cement, concrete, bitumen and slurry mixes to be contained on construction site prior to disposal at an approved disposal site.	R 200.00	5 000.00
44	Any cement, concrete, bitumen or slurry product spillage to be cleaned up immediately	R 500.00	5 000.00
45	Mixing and storage areas must be appropriately located in demarcated area	R 500.00	
46	Oil spills	R 500.00	R 5 000.00
47	Persistent and unrepaired oil leaks from machinery and vehicles. The use of inappropriate methods for refuelling such as the use of a funnel rather than a pump	R 1 000.00	R 5 000.00
B7	**Dust Pollution Control**		
48	Ensure that loose building material is covered to prevent dust pollution when instructed by the ECO.	R 100.00	***R 1 000.00***
B8	**Water runoff**		
49	Contamination/pollution of water bodies, rivers, dams or wetlands (must be prevented at all cost)	R 500.00	R 5 000.00
50	Failure to control storm water runoff (rainwater from construction and building site/s must be channelled, contained and allowed to dry out, so as not to transport any pollutants into the surrounding area. Temporary trenches, straw stabilising, brush cutting can be used.)	R 500.00	R 5 000.00
B9	**Waste Control**		
51	Sufficient refuse bins shall be placed on site	R 500.00	R 5 000.00
52	Refuse bins shall be cleaned on a regular basis	R 100.00	R 2 000.00
53	General litter/building refuse shall be cleaned regularly from the site	R 500.00	R 1 000.00
54	Contaminated water, paint, oil, cement, slurries etc must be stored in watertight containers or as agreed with ECO	R 500.00	R 3 000.00
55	Store all refuse & waste material in wind and animal proof containers	R 100.00	R 5 000.00
56	Waste shall be disposed of at an appropriately licensed waste disposal site on a regular interval	R 500.00	R 5 000.00
57	The absence of or inadequate drip trays or bunding facilities	R 500.00	R 5 000.00
58	Failure to address oil/fuel leaks from onsite machinery	R 200.00	R 5 000.00
B10	**Herbicides**		
59	No herbicides or pesticides shall be used	R 200.00	R 5 000.00
B11	**Construction of Road**		
60	Access and internal service roads shall be maintained and upgraded to prevent degradation and erosion of the road and surrounds.	R 500.00	R 2 000.00
B12	**Power and Telecommunications Supply**		
61	Demarcate power supply route	R 500.00	R 5 000.00
62	No vehicles to drive through vegetation unless authorised by ECO	R 500.00	R 5 000.00
63	Working shall be done in phases to prevent trampling of vegetation.	N/A	R 5 000.00

S No	Phase	Penalty for non-compliance	
B	**Construction Phase**	**Bottom of Range**	**Top of Range ***
B13	**Use of generators and fuel powered equipment**		
64	A watertight cover shall be placed under the power generator equipment to prevent accidental spillage of fuel and oil seeping into the soil.	R 500.00	R 5 000.00
65	Drip tray shall have capacity for 120 % of fuel in generator.	R 500.00	R 5 000.00
66	All waste material generated from the use of this equipment shall be contained and removed from the site by supplier	R 500.00	R 5 000.00
67	Mobile fuel powered equipment shall be well-maintained and shall not have any fuel or oil leaks	R 200.00	R 5 000.00
B14	**Soil Stabilisation**		
68	Ensure that soil material for filling and stabilisation comes from a source that does not contain seeds alien to the area. The source shall be cleared with the ECO	R 500.00	R 5 000.00
69	Erosion	R 500.00	R 5 000.00
B15	**Cultural and Historical Artefacts**		
69	Damage to Cultural Sites	R 50 000.00	R 100 000.00
70	Damage to Historical Sites	R 50 000.00	R 100 000.00
B16	**Trees**		
71	Damage to indigenous trees and trees not declared as invader trees that are to be retained on site	R 500.00	R 5 000.00
72	Penalties to be paid for each protected tree removed without prior permission.		
73	Girth of trunk (1m above ground level)	Replacement value per tree	
	0-15 mm		R 100.00
	16-30 mm		R 200.00
	31-50 mm		R 500.00
	51-75 mm		R 1 000.00
	76-100 mm		R 2 500.00
	101-150 mm		R 5 000.00
	150-300 mm		R 10 000.00
	Larger than 300 mm		R15 000.00 to R100 000.00
B17	**Rehabilitation**		
74	Remove rocks and stones and stockpile in area recommended by ECO	R 500.00	R 5 000.00
75	Remove all plants that can be used for rehabilitation and store on- or offsite in appropriate manner as agreed with ECO	R 200.00	R 5 000.00
76	Removal of all old concrete, bitumen products, slurry and alien materials from site	R 500.00	R 5 000.00
77	Site shall be cleared of all waste and building material	R 500.00	R 5 000.00
78	Failure to reinstate disturbed areas within specified time period	R 500.00	R 5 000.00
79	Failure to rehabilitate disturbed areas within 3 months of completion	R 1 000.00	R 10 000.00

*- Large scale or repeated offence

1. Where the Contractor inflicts irreparable damage upon the environment or fails to comply with any of the environmental specifications, he shall be liable to pay a penalty fine over and above any other contractual consequence. *[In terms of the Conventional Penalties Act (1962) a creditor is not entitled to recover both the penalty and damages. Accordingly, where a Contractor causes damage, the Employer can either enforce a penalty or make the Contractor make good the damage, but not both.]*

2. The Contractor is deemed NOT to have complied with this specification if:

a. Within the boundaries of the site, site extensions and haul/access roads there is evidence of contravention of the specification;
b. Environmental damage ensues due to negligence;
c. The Contractor fails to comply with corrective or other instructions issued by the Engineer within a specific time; and
d. The Contractor fails to respond adequately to complaints from the public.

3. Payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

4. The Contractor shall act immediately after a notice of non-compliance is received, and correct the cause for the issuing of the notice. Application of a penalty clause will apply for incidents of non-compliance. The imposition of such a penalty shall not preclude the relevant provincial authority from applying an additional penalty in accordance with statutory powers.

5. Failure to redress the cause shall be reported to the relevant authority for them to deal with the transgression, as deemed fit. The polluter-pays principle applies.

The "polluter-pays" principle provides that "the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment. NEMA imposes a duty of care on every person who causes, has caused or may cause significant pollution or degradation of the environment to prevent such pollution or degradation from occurring, continuing or recurring. Insofar as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, NEMA requires that the pollution must be minimised and rectified.

Furthermore NEMA makes provision for damages to be awarded by the courts where loss or damage has occurred as a result of a contravention of certain environmental statutes. For example, offences under the National Water Act No. 36 of 1965 and the Environmental Conservation Act no. 73 of 1989 may result in penalties being imposed in terms of NEMA. Importantly, NEMA provides for the liability on conviction of employees, managers, agents and directors for any offences resulting from the failure to take all the reasonable steps that were necessary under the circumstances to prevent the commission of an offence.