



**FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME &
REHABILITATION PLAN**

**PROPOSED PORTION 2 OF FARM ROODE PAN 150, HOPETOWN RD,
ORANIA,
NORTHERN CAPE PROVINCE**



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Prepared by:



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LIST OF ABBREVIATIONS

CE	Consulting Engineers
C	Contractor
CM	Contract Manager
NEMA	National Environmental Management Act (Dedicated Person)
EA	Environmental Authorisation
ECO	Environmental Control Officer
EMPr	Environmental Management Programme
DEA	Department of Environmental Affairs
SABS	South African Bureau of Standards
SAHRA	South African Heritage Resource Agency
SAMOAC	South African Manual for Outdoor Advertising Control
SS	Site Supervisor

A. SECTION 1: GENERAL INFORMATION

1. Introduction

Eco-compliance Pty Ltd was appointed by Solar Capital Pty Ltd (Solar Capital) to undertake the appropriate environmental process for the proposed development of a 20MW PV solar energy facility and its associated infrastructure located on **Portion 2 of Farm Roode Pan 150, Hopetown RD in Orania**, Northern Cape Province.

As per the EIA Regulations, a draft Environmental Management Programme (EMPr) is required to accompany a Basic Assessment Report (BAR) for any development that does not have an EMPr in place already. This draft EMPr will be submitted to the competent authority for consideration and approval.

2. Background

It is widely accepted that any development can pose various risks to the environment as well as the inhabitants in the surrounding areas. These possible risks should be taken into account during both the construction and operational phase of the development. The purpose of this document is to provide management responses that will ensure impacts resulting from the development are minimised. This EMPr is, therefore, a stand-alone document, which must be used onsite during each phase of the development (construction and operation).

This document should be flexible, so as to allow the contractor and Solar Capital to conform to the management commitments without being prescriptive. The management commitments should ensure that the anticipated risks on the environment will be minimised if they are consistently and effectively adhered to. The onus to undertake the requirements set out in the EMPr rests with Solar Capital. Any party responsible for transgression of the underlying management measures outlined in this document will be held liable for non-compliances and will be dealt with accordingly.

The process that was followed in compiling the EMPr is in compliance with Regulation 34 in terms of Chapter 5 of the National Environmental Management Act (Act 107 of 1998) of Environmental Impact Assessment Regulation, 2006 promulgated on the 21 April 2006. The purpose of this EMPr is to formulate mitigation measures that should be made binding on all contractors during the construction phase as well as measures that should be implemented during the operational phase.

3. Phases Of The Project

The point of departure for this EMPr is to take a pro-active route by addressing potential problems before they occur. This should limit corrective measures required during the construction and operational phases of the development. Additional

mitigation will be included throughout the project's various phases, as required and if necessary. In particular, this EMPr deals with the following phases as detailed below:

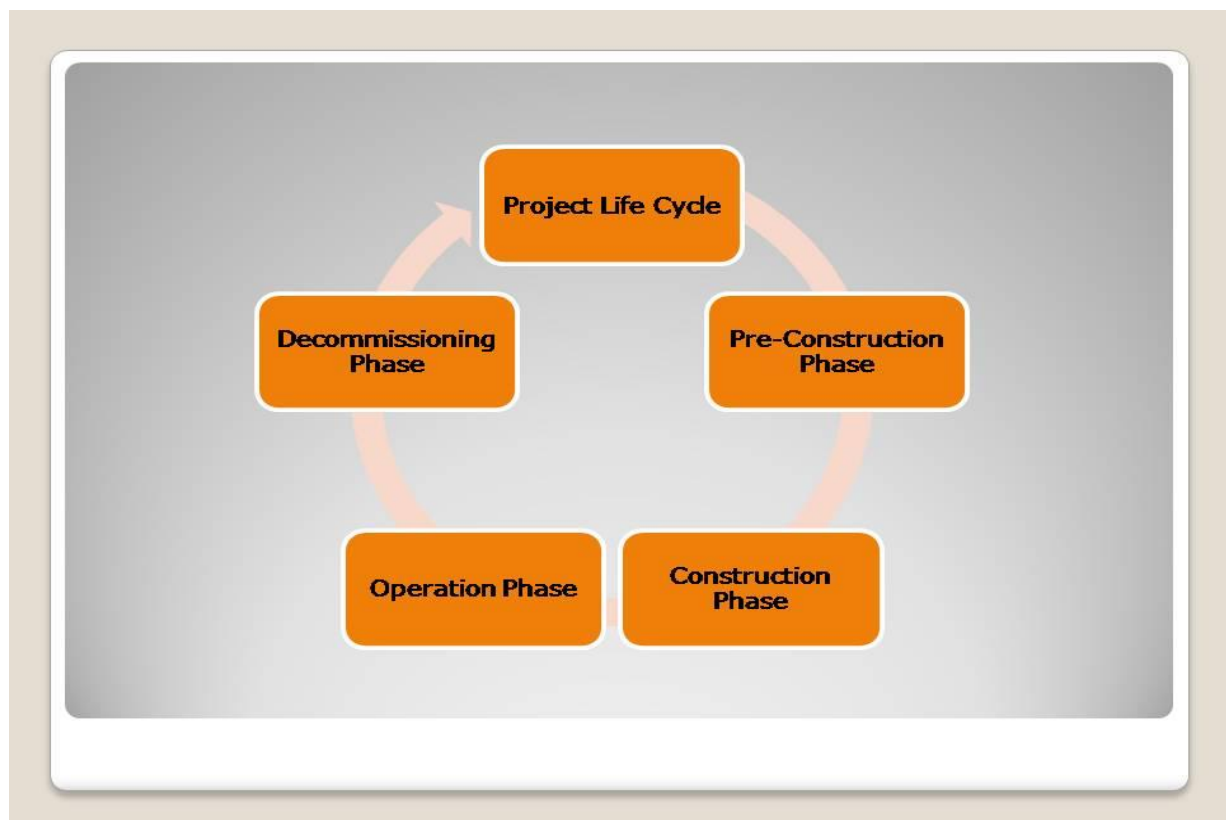
Construction Phase

Because the construction Environmental Management Programme is required in this case, therefore the planning stage is not necessary. The bulk of the impacts during this phase will have immediate effect. If the site is monitored on a continual basis during this phase, it is possible to identify these impacts as they occur. These impacts will then be mitigated accordingly in conjunction with a commitment to sound environmental management from the Solar Capital team.

Operational Phase

By taking pro-active measures during the construction phases, potential environmental impacts emanating during the operational phase will be minimised. This, in turn, will minimise the risk and reduce the monitoring effort, but it does not make monitoring obsolete.

Project Life Cycle



4. Objectives of the EMPr

The objective of this EMPr is to ensure that:

- Environmental management conditions and requirements are implemented from the start of the project,
- Precautions against environmental damage and claims arising from such damage are taken timeously;
- The completion date of the contract is not delayed due to environmental problems with the landowner, grid staff, communities or regulatory authorities arising during the course of the project execution;
- Solar Capital takes into consideration the landowner special conditions in regards to the proposed development area.
- Environmental conditions stipulated in the Environmental Authorisation (EA) are implemented;
- Environmental conditions stipulated in other applicable permits, such as the Water Use License, Flora Clearance Permit, etc, are implemented.
- Resolve problems and claims arising from damaged immediately to ensure a smooth flow of operations;
- Implementation of this EMPr for the benefit of all involved; and
- Preservation of the natural environment by limiting destructive activities on site.

5. Legal Framework

Depending on the type of development that is being proposed, certain legislation applies, either as a framework to guide the development process or as permit or approval requirements. This EMPr has been undertaken in accordance with provisions of the Environmental Authorisation issued by the DEA and in accordance with the provision of the Constitution and principles of Integrated Environmental Management.

All legislation applicable to the development must be strictly enforced both during the construction and operational phases. The contractor must be acquainted with the relevant environmental legislation, including provincial and local government regulations, which are in place to ensure the protection of the environment. The environmental legislation applicable to the project includes, but is not limited to, the following:

- The Constitution of the Republic of South Africa, 1996;
- National Environmental management Act, 1998 (Act No. 107 of 1998 as amended) (NEMA);

- National Water Act, 1998 (Act No. 36 of 1998 as amended);
- National Environmental Management: Biodiversity Act (Act 10 of 2004);
- Fencing Act(No. 31 of 1963 (as amended by act 108 of 1991));
- Occupational Health and Safety Amendment Act (Act No. 181 of 1998);
- Hazardous Substances Act, 1973 (Act No. 15 of 1973);
- National Heritage Resource Act, 1999 (Act No. 25 Of 1999);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
- National Environmental Management: Waste Act (Act No. 59 of 2008).

The Constitution of the Republic of South Africa

The Constitution of South Africa states that everyone has the right to an environment that is not harmful to his or her health or well-being and to have the environment protected for the benefit of present and future generations.

The Act implies that measures must be implemented to:

1. Prevent pollution and ecological degradation;
2. Promote conservation, and
3. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

The National Environmental Management Act

There are various elements within the National Environmental Management Act that are relevant to the construction and operational phases of the project. The 'polluter pays' concept is enforced to ensure that any party or parties, which undertakes any activity that may cause, causes or caused any pollution, must prevent, mitigate or remedy the effects.

Section 2 of Chapter 1 of the National Environmental Management provides details of the environmental management principles that should be adhere to during both the construction and operational phase of the development. The consideration of various factors must be brought into focus:

- Avoidance/minimisation of the loss of biodiversity,
- Avoidance/minimisation of the disturbance of ecosystems,
- Avoidance/minimisation of pollution,
- Avoidance/minimisation of cultural and heritage sites,
- Avoidance/minimisation/recycling of waste,

- Responsible and equitable use of renewable and non-renewable resources, and
- Avoidance/minimisation/mitigation of adverse impacts.

The National Water Act

The National Water Act (NWA) is the main legislative piece that controls both private and public water use within South Africa. According to section 19(1) of the National Water Act 'an owner of land, a person in control of land or a person who occupies or uses land on which any activity or process is or was performed or undertaken or any other situation exists, which causes, has caused or is likely to cause pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.'

In accordance with Section 21 of the National Water Act the following are considered as water uses and therefore need to be licensed:

- Taking water from a water resource.
- Storing water.
- Impending or diverting the flow of water in a watercourse.
- Engaging in a stream flow reduction activity.
- Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1).
- Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit.
- "Disposing of waste in a manner which may detrimentally impact on a water resource.
- Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process.
- Altering the beds, banks, course or characteristics of a watercourse.
- Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.
- Using water for recreational purposes.

National Environmental Management: Biodiversity Act

The Biodiversity Act provides for the management and conservation of South Africa's biodiversity within the framework of NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was established. The Biodiversity Act further requires landowners to manage and conserve South Africa's biodiversity for current and future generations. The National Spatial Biodiversity Assessment classifies areas as worthy of protection based on their biophysical characteristics, which are ranked according to priority levels.

Fencing Act

The Act regulates matters with regard to boundary fences of farms and makes provisions for the erection, alteration, maintenance, damage and repair of. It also spells rights of owners or lease holders where the land is subject to certain servitudes and outlines procedures for settling of disputes due to wilful actions including leaving gates opened and unauthorised entry to private land.

Occupational Health and Safety Amendment Act

The Act makes provision for the health and safety of persons at work and persons that are not employees against any hazards that may arise out of or in connection with the work related activities. The act has provisions regarding the maintenance and operation of plant and machinery, working conditions to the use of protective clothing and equipment. The Act therefore informs the EMPPr on measures and procedures to be incorporated regarding the safety and health of the persons on site.

Hazardous Substances Act

The main objectives of the Hazardous Substances Act is to provide measures, norms and standards for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure. The Hazardous Substances Act also aims to provide for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and products.

The National Heritage Resources Act

The Act aims to promote an integrated system for the identification, assessment, and management of the heritage resources of South Africa. Section 35(4) of this above-mentioned Act states that no person may, without a permit issued by the responsible heritage resources authority; destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site or any meteorite.

This Act is concerned with the protection of the archaeological or paleontological sites or meteorites. Furthermore, Section 36(3) of the National Heritage Resources Act states that no person may, without a permit issued by the relevant heritage resources authority handle any human remains. Human remains can only be handled by a registered undertaker or an institution given the authority to do so under the Human Tissues Act (Act 65 of 1983 as amended).

Conservation of Agricultural Resources Act

The Act provides for control over the utilisation of the natural agricultural resources in the Republic of South Africa in order to promote the conservation of soil, the water resources, vegetation and the combating of weeds and invader plants.

The National Environmental Management: Waste Act

The National Environmental Management: Waste Act is the main legislative piece that aims to consolidate waste management within South Africa. Part 2 of the Waste Act details the general duty in respect to the management of waste by the holder of the waste. In accordance to Section 16(1) of the Waste act, 'a holder of waste must, within the holder's power, take all reasonable measures to:

- a) avoid the generation of waste and where such generation cannot be avoided to minimise the toxicity and amounts of waste that are generated;
- b) reduce, re-use, recycle and recover waste;
- c) where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;
- d) manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;
- e) prevent any employee or any person under his or her supervision from contravening this Act; and
- f) prevent the waste from being used for an unauthorised purpose.'

6. Environmental Monitoring and Auditing

To measure and ensure compliance to this EMPr it is imperative that a monitoring and auditing programs be established, in which compliance reports are submitted to DEA to indicate the level of compliance. In addition, potential risks to the project will have to be identified. Where the ECO identifies a transgression or blatant disregard to the EMPr it should be reported to DEA immediately and rectification steps undertaken.

Bearing in mind that this document is a living document, it may be updated from time to time. The ECO, in consultation with the proponent (Solar Capital) can make recommendations to the competent authority for certain EMPr amendments. The proponent should then officially apply to DEA for the approval of the proposed amendments to the EMPr. The amended EMPr becomes valid once the authority (DEA) approves it in writing.

B. SECTION 2: ENVIRONMENTAL MANANGEMENT PROGRAM

1. Background

Environmental aspects that are generic and specific for the construction and operation stages for the project are identified and mitigation procedures are described.

During the construction phase and maintenance of the proposed development, some habitat destruction and alteration inevitably takes place. Habitat destruction and alteration will result from the construction of access roads connecting various

sections of the solar facility, the removal of vegetation within the pylon footprints and the clearing of servitudes. Servitudes have to be cleared of excess vegetation at regular intervals in order to allow access to the line for maintenance, to prevent vegetation from intruding into the legal prescribed clearance gap between the ground and the conductors and to minimise the risk of fire under the line, which can result in the electrical flashover. However, certain sections of the proposed project falls within an existing maintained Eskom corridor; therefore, existing access roads will be used for gaining access to the site. Certain roads may need to be formalised but no tarring will occur. Although the construction of powerlines and substation will be subject to a different EIA process, it is equally important that their impacts be anticipated in a bigger scheme of the project.

Whilst the indirect impact of the solar facility on avifauna through habitat destruction and disturbance can be mitigated by generic means, the impact of bird collision from the power lines is highly specialised and sites specific. Therefore, the impact of bird collision requires its own mitigation at each tower and span. These impacts cannot be separated from the proposed development.

Where it is anticipated that ecological qualities of the landscape are going to be particularly altered by the proposed development and supporting infrastructure, whether it to be the position or the result of erection and construction requirements, it is necessary to identify those locations and to describe what mitigations are required. In this way the specific ecological mitigation relates to an identified condition that will result in short term or long term ecological impacts. If this is not addressed in time and in a particular manner, persistent and irreversible long-term ecological impacts will occur.

2. *Project Scope*

The proponent is constructing a 20MW PV solar energy project in **Orania** for generation of electricity which will ultimately be connected to the national grid. The EIA process for the solar energy project is still und. .

Infrastructure associated with the facility will include, *inter alia*:

- Photovoltaic solar panels with a generating capacity of 20MW
- Foundations to support the PV panels;
- An on-site substation, with a direct link to the existing Orania Substation via an overhead powerline (subject to a separate EIA process)
- Cabling between the project components, to be laid underground where practical;
- Internal access roads; and
- Workshop area for maintenance and storage.

3. *Environmental Matrix*

Function	Name / Cell No	Responsibility
Project Manager (PM) Solar Capital		Overall management of project and EMPr implementation
Site Supervisor/ Contract Manager (CM) Solar Capital		Oversees site works, liaison with Contractor, PM and ECO
Environmental Control Officer (ECO)		Implementation of EMPr and liaison between Solar Capital, Contractor and Landowners; environmental control of site actions, re-mediation and rehabilitation work.
Contractor (C)		Implementation and compliance with recommendations and conditions of the EMPr

4. *Responsibility of the Role Players*

Solar Capital Pty Limited

- The Solar Capital Team remains ultimately responsible for ensuring that the development is implemented according to the requirements of the EMPr and all project permits.
- Although the Solar Capital Team appoints specific role players to perform functions on their behalf, this responsibility is delegated. The Solar Capital Team is responsible for ensuring that sufficient resources are available to the other role players to efficiently perform their tasks in terms of the EMPr.
- The Solar Capital Team is liable for restoring the environment in the event of negligence leading to damage to the environment.
- The Solar Capital Team must ensure that the EMPr is included in all the tender documentation so that the contractor who is appointed is bound to the conditions of the EMPr.
- The Solar Capital Team must appoint an independent Environmental Control Officer (ECO) during the construction phase to oversee all the environmental aspects relating to the development.

Contractor

- The contractor, as the Solar Capital's agent on site, is bound to the EMPr conditions through its contract with Solar Capital, and is responsible for ensuring that it adheres to all the conditions of the EMPr.
- The contractor must be thoroughly familiarised with the EMPr requirements before coming onto site and must request clarification on any aspect of these documents, should they be unclear.
- The contractor must ensure they have provided sufficient budget for complying with all EMPr conditions at the tender stage.
- The contractor must comply with all orders (whether verbal or written) given by the ECO, project manager or site engineer in terms of the EMPr.

Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) is appointed by the Solar Capital as an independent monitor of the implementation of the EMPr and monitor project compliance. The ECO must form part of the project team and be involved in all aspects of project planning that can influence environmental conditions on the site. The ECO must attend relevant project meetings, conduct inspections to assess compliance with the EMPr and be responsible for providing feedback on potential environmental problems associated with the development. In addition, the ECO is responsible for:

- Liaison with relevant authorities;
- Liaison with contractors regarding environmental management;
- Undertaking routine monitoring and identifying a competent person/institution to be responsible for specialist monitoring, if necessary; and
- The ECO has the right to enter the site and undertake monitoring and auditing at any time, subject to compliance with health and safety requirements applicable to the site (e.g. wearing of safety boots and protective head gear).

Liaison with Authorities

- The ECO will be responsible for liaising with the National Department of Environment (DEA).
- The ECO must compile monthly monitoring reports which will be made available to the authority upon request. These environmental and audit reports must contain information on the contractor and Solar Capital's levels of compliance with the EMPr.
- The audit report must also include a description of the general state of the site, with specific reference to non-compliance.
- The ECO is to recommend corrective action measures to eliminate the occurrence of the non-compliance incidents. In order to keep a record of any impacts, an Environmental Log Sheet (refer to **Appendix 1**) should be kept on a continual basis.

Liaison with Contractors

The contract manager is responsible for informing the contractors of any decisions that are taken concerning environmental management during the construction phase. This would also include informing the contractors with the necessary corrective action to be taken.

5. Method Statement

A Contractor shall submit a written method statement to the ECO for review and recommendations, covering these activities, which are identified (in this document and/or by the ECO), as being potential harmful to the environment. Method statements indicate how compliance with the Environmental Specification will be achieved. The approval of the method statements will be undertaken by the ECO.

The Method Statement shall state clearly:

- Timing of activities;
- Materials to be used;
- Equipment and staffing requirements;
- Proposed construction procedure designed to implement the relevant environmental specifications;
- The system to be implemented to ensure compliance with the above; and
- Other information deemed necessary by the ECO.

The method statement shall be submitted at least 14 working days prior to projected commencement of work on an activity, to allow the ECO time to review and provide recommendations on the method statement. The Contractor shall not commence work on that activity until such time as the method statement has been approved in writing by ECO, which shall be done within seven working days of receipt.

Due to changing circumstances, it may be necessary to modify method statements. In such cases, the proposed modifications must be indicated and agreed upon in writing between Solar Capital, the ECO and the Contractor.

The ECO and SS must retain records of any amendments and ensure that the most current version of any method statement is being used.

The following are typical Method Statement's which will be called for by the ECO:

- Location, layout and preparation of the construction camp(s) and materials storage areas;
- Location, layout and preparation of cement/concrete batching facilities including the methods employed for the mixing of concrete and the management of runoff water from such areas;
- Contaminated water management Program, including the containment of runoff and polluted water;
- Emergency construction Method Statements (including details of methods for fuel spills and clean up operations);

- Rehabilitation of disturbed areas and re-vegetation after construction is complete;
- Solid waste management and removal of waste from site; and
- Crossing of erosion trenches and drainage lines

The specific activities for which a method statement is required is indicated in the Table below, under general environmental specifications for the construction of the development by the following asterisk (*). Please note that wherever the * appears, the Contractor shall submit a method statement. Additional method statements may be required by the ECO during the course of works, depending on the nature of the construction works and the location thereof. The SS and ECO shall approve any deviation from a method statement.

6. *Generic Mitigation Measures*

The following tables form the core of this EMPr for the construction and operational phases of the development. These tables should be used as checklists on site, especially during the construction phase. Compliance with this EMPr must be audited weekly or monthly depending on duration during the construction phase and once immediately following completion of construction. This must be followed up with annual audits for a period of two years during the operational phase.

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
Appointment and Duties of ECO	The Solar Capital must appoint an independent Environmental Control Officer (ECO) who must monitor the contractor's compliance with the EMPr.	Proponent should appoint ECO for entire project	Solar Capital
	Solar Capital must provide the contractor and sub-contractors with a copy of the EMPr.	EMPr document should always be available on site and made available to all parties	Solar Capital
	The priority of the ECO is to maintain the integrity of the development conditions outlined in the EMPr.	Ensure compliance of EMPr	ECO, CM
	The ECO must form part of the project management team and where possible attend all relevant project meetings.	Ensure continuous communication on matters involving the project	ECO
	The contractor must ensure that the contractors and sub-contractors attend an environmental briefing and training session presented by the ECO prior to commencing activities on site.	Ensure understanding of the EMPr conditions	Contractor, ECO
EMPr	This EMPr must be made binding to the main contractor as well as individual sub-contractors and should be included in tender documentation for the construction contract.	EMPr should always be adhered to	Solar Capital, ECO
Environmental incidents	The contractor must take corrective action to mitigate an incident appropriate to the nature and scale of the incident and must also rehabilitate any residual environmental damage caused by the incident or by the mitigation measures themselves.	Corrective measures should be implemented and committed mistakes should be avoided	ECO, Contractor

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
Interaction with landowner	Maintain good relations with Landowners	No delays in the project due to Landowner interference	ECO, Contractor, CM
Emergency Preparedness	If chemicals in sufficient quantity and toxicity have the potential to be released on the construction sites, emergency contingency plans should be prepared as safety measures. These safety measures should be communicated to the relevant personnel on the construction site. All hazardous installations require a Risk Assessment in terms of the Occupational Health and Safety Act, (Act No.85 of 1993) for construction sites.	Ensure proper measures taken dealing with the hazardous material. Avoidance of fire or danger/accident based on negligence	CM, ECO, C
Gate installation and gate Control	Properly installed gate to allow access to the servitude, minimise damage to fences and limit access to Solar Capital and Contractor personnel with gate keys.	No transgressions of the fencing act and therefore no litigation, no damage to fences and subsequent complaints from landowners, all gates equipped with locks and kept locked at all times to limit access to key holders, all fences properly tied off to the gate posts, all gates properly and neatly installed according to specifications and no complaints about the gate	Contractor, ECO

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
Waste	All waste must be handled as per Municipality Waste Management Policy. Waste should be determined as per National Environmental Management Waste Act 2008(Act 59 of 2008).	Ensure correct separation of waste per their categories.	ECO, Contractor
General	No construction camps area allowed in urban areas and natural environment.	To avoid increment of negative impacts on natural environment	Contractor, ECO
	Prior to establishment of the site camp(s), the Contractor shall produce a plan showing the positions of all buildings, lay down yards, and other infrastructure for approval by the ECO.	To determine the impacts of the proposed camp site	Contractor, ECO
	On completion of Works, the Contractor shall clear away and remove from the site all construction paint, surplus materials, foundations, plumbing and other fixtures, rubbish and temporary works of every kind.	To ensure proper rehabilitation and reducing of residual impacts	Contractor, ECO

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
	<p>All persons employed by the Contractor and its subcontractors shall abide by the requirements of these General Environmental Protection Specifications. Any employees of the Contractor and its subcontractors found to be in breach of any of the General Environmental Protection Specifications may be ordered by the ECO to leave the site forthwith. The order may be given orally or in writing. Confirmation of an oral order will be given as soon as practicable but lack of confirmation in writing shall not be a cause for the offender to remain on site. No extension of time will be granted for any delay or impediment to the Contractor brought about by a person ordered to leave the site.</p>	<p>Ensure the compliance of safety guidelines to avoid unnecessary accident</p>	<p>Contractor, ECO</p>
	<p>No uncontrolled discharges from the site/working area. All discharge points will require approval. Discharges include concrete mixing, vehicle washing etc.</p>	<p>Avoidance of unnecessary spillages</p>	<p>Contractor, ECO</p>
<p>General</p>	<p>The Contractor shall not use the land forming the site of, or connected with, the works for any purpose whatsoever other than for the proper carrying out of the works under the contract and shall place any camps that may be required for him/herself and his/her employees and animals only on sites approved by the ECO and consulting engineer.</p>	<p>Compliance with set rules within the area</p>	<p>Contractor, ECO</p>

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
	<p>No trees or bushes shall be damaged or cut down by the Contractor or by any of his employees whether for use on the works or otherwise without the written consent of the Engineer or the Environmental Control Officer and then only where and in the manner as they may direct.</p> <p>For safety reason trees can be trimmed that are over hanging the road in attempt to avoid accidents due to the road being obscured by overhanging trees on the road.</p>	Avoid damage or loss to protected species	Contractor, ECO, Solar Capital
	Construction equipment may not move outside the area defined as the site.	Construction material to be confined to a designated areas	Contractor, ECO
	The site be responsibly managed to reduce risks to groundwater.		Contractor, ECO

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
Vegetation clearing	Minimise damage to vegetation, Keep servitude as natural looking as possible, Minimise interference by vegetation to flow of electricity, Minimise possibility of erosion due to removal of vegetation, Minimise removal of plant material on river and stream embankments, Eradication of alien invader species	Only 6m vegetation cleared along the centre of the servitude, No trees and vegetation removed unnecessarily, No vegetation interfering with structures and statutory distances upon completion of the contract, No de-stumping of vegetation on river and stream embankments, No visible erosion scars three months after completion of the contract due to vegetation removal, No visible damage to the vegetation along the servitude one year after completion of the contract due to herbicide use, No litigation due to unauthorised removal of vegetation All alien invaders eradicated the servitude	Contractor, ECO
Erosion, sedimentation and flooding	Storm water on site must be managed within the local authorities accepted regulations.	Avoid soil erosion	Contractor, ECO

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
Erosion, sedimentation and flooding	Construction equipment and machinery must be kept in a demarcated area. The loss of oils and fuel onto the ground must be limited and contained. Where oils have leaked onto the soil, this soil must be removed and disposed of at an approved dumping site at the end of the construction phase or as required by the ECO.	Ensure control of hazardous materials	Contractor, ECO
Work area	<p>Planning of access routes must be done in conjunction between the Contractor, Solar Capital, ECO and the Landowner. All agreements reached should be documented and no verbal agreements should be made. The access road shall properly be marked and the makers shall show the direction of travel as well as tower numbers to which the roads leads. Roads not to be used shall be marked with “NO ENTRY” sign.</p> <p>No storm water pipelines, drainage and system shall be constructed, the existing storm water within the area shall be used in an acceptable manner</p>	No claims from Landowners due to damage on existing access roads.	Contractor, Engineer, ECO, Landowner
Sanitation	Ensure that proper sanitation is achieved	No complaints received from Landowners regarding sanitation	Contractor
Destruction of heritage resources	Construction personnel must be alert and must inform the local Council should they come across any findings.	Ensure protection of heritage resources	Contractor, ECO

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
	Should any additional archaeological artefacts be exposed during excavation, work on the area where the artefacts were found, must cease immediately and the ECO must be notified as soon as possible.	Ensure protection of heritage resources	Contractor, ECO
	Upon receipt of such notification, the ECO must arrange for the excavation to be examined by an Archaeologist as soon as possible.	Ensure protection of heritage resources	Contractor, ECO
	Under no circumstances shall archaeological artefacts be removed, destroyed or interfered with.	No destruction of or damage to known archaeological sites and Management of existing sites and new discoveries in accordance with the recommendations of the Archaeologist	Contractor, ECO
	Any archaeological sites exposed during construction or operational phases may not be disturbed prior to authorisation by the South African Heritage Resources Agency. The removal, exhuming, destruction, altering or any other disturbances of heritage sites must be authorised by SAHRA in terms of the National Heritage Resources Act (Act No. 26 of 1999)	No destruction of or damage to known archaeological sites and Management of existing sites and new discoveries in accordance with the recommendations of the Archaeologist	Contractor, ECO
Monument and Historical Site	Protection of sites and land considered to be of cultural value, Protection of known sites against vandalism, destruction and theft and The preservation and appropriate management of new finds should these be discovered during construction	No destruction of or damage to known sites, Management of existing sites and new discoveries in accordance with legislation and No litigation due to destruction of sites	Contractor, ECO

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
Farm houses/Buildings	Control over actions and activities in close proximity to inhabited areas	No complaints from Landowners and No damage to private property	Contractor
Effects of construction camp	Rules and regulation should be formulated within the construction camp in order to facilitate control and order.	Proponent ensure that camp site is well protected and managed	Contractor, ECO
Prevent of diseases	Prevent litigation due to infestation of livestock	No complaints from Landowners and No litigation	Contractor
Littering Control	Neat workplace and site	No complaints from Landowners	Contractor
Traffic impact	Vehicular movement beyond the property boundaries should be limited during peak hour. Access to the site must follow current and established routes.	To avoid traffic congestion within the are due to the construction	CM, ECO, Contractor
	It must be ensured that a backlog of traffic does not develop at the access points during peak hours, through the implementation of an efficient and effective access control system.	To avoid traffic congestion within the are due to the construction and avoidance of disturbance to traffic flow	CM, ECO, Contractor
	Security fence is to be inspected daily to ensure no illegal entry points are created.	Safety ensured	CM, Contractor

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
Servicing of Vehicles	Prevention of pollution of the environment and Minimise chances of transgression of the acts controlling pollution	No pollution of the environment, no litigation due to transgression of pollution control acts and No complaints from Landowners	CM, ECO, Contractor
Crime, safety and security	Illegal occupants on the property must be removed to ensure no uncontrolled fires, cutting down of vegetation and littering	Ensure compliance to the set rules and guidelines to reduce crime	Solar Capital, Contractor
	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.	Ensure compliance to the set rules and guidelines to reduce crime	Contractor
	Ensure the contacts details of the police or security company and ambulance services are available on the site.	Ensure compliance to the set rules and guidelines to reduce crime	Contractor, ECO
	Ensure that the handling of equipment and materials is supervised and adequately instructed.	Ensure the safety within the workplace	Contractor, ECO
	Do not allow the movement of public within the development site by posting notices at the entrance gates, and where necessary on the boundary fence.	Ensure compliance to the set rules and guidelines to reduce crime	Contractor, ECO
	Appropriate notification signs must be erected, warning the residents and visitors about the hazards around the construction site and presence of heavy vehicles	To ensure control of the dangerous areas as well indicating areas that have restrictions	Contractor, ECO

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
Noise pollution	The development must comply with the local by-laws regarding health and noise.	No pollution of the environment, no litigation due to transgression of pollution control acts and no complaints from Landowners	Contractor, ECO
	A written warning of two (2) days indicating the approximate time of blasting (if any) and/or drilling must be given to affected residents.	No pollution of the environment, no litigation due to transgression of pollution control acts and no complaints from Landowners	Contractor, ECO
	Institute noise control measures during construction for all applicable activities and maintain machinery in good working order.	No pollution of the environment, no litigation due to transgression of pollution control acts and no complaints from Landowners	Contractor
Atmospheric pollution	Dust production must be controlled by regular watering of roads and works area, should the need arise.	No pollution of the environment, no litigation due to transgression of pollution control acts and no complaints from Landowners	Contractor
	Points of ingress and egress onto the site must be regularly cleaned for dust and mud.	No pollution of the environment, no litigation due to transgression of pollution control acts and no complaints from Landowners	Contractor, ECO

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
Atmospheric pollution	No refuse wastes are burnt on the premises or on surrounding premises.	No pollution of the environment, no litigation due to transgression of pollution control acts and no complaints from Landowners	Contractor
	All vehicles transporting material that can be blown off (e.g. soil, rubble etc.) must be covered with a tarpaulin, and speed limits of 30 km/h must be adhered to.	No pollution of the environment, no litigation due to transgression of pollution control acts and no complaints from Landowners	Contractor
	Vehicles to be used during the construction phase are to be kept in good working condition so as not to be the source of excessive fumes and nuisance.	No pollution of the environment, no litigation due to transgression of pollution control acts and no complaints from Landowners	Contractor, ECO
Visual impact	Rubble and litter must be removed on a weekly basis and be disposed of at a suitably registered landfill.	No rubble and or refuse lying on site, no incidents of litigation, no complaints from landowners and no visible concrete spillage on the servitudes.	Contractor crew, ECO
	Advertising on site must be in accordance with South African Manual for Outdoor Advertising Control (SAMOAC).	To avoid visual intrusion within the area	CM

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
	The construction camp must be contained to prevent any visual intrusion and be kept in a clean and orderly state at all times.	To avoid visual intrusion within the area	Solar Capital
Waste (WDMP)	Rubble must be removed from the construction site frequently and disposed of at an approved dumping site as approved by the Council.	No rubble and or refuse lying on site, no incidents of litigation, no complaints from landowners and no visible concrete spillage on the servitudes.	Contractor, ECO
	Sufficient and covered containers must be on the construction site to handle the amount of litter, wastes, rubbish, debris and builders wastes generated on the site.	No pollution of the environment, no litigation due to transgression of pollution control acts and no complaints from Landowners	Contractor, ECO
	Containers must be emptied frequently to avoid rodents, insects or any other organisms accumulating on the site and becoming a health hazard to adjacent properties.	No pollution of the environment, no litigation due to transgression of pollution control acts and no complaints from Landowners	Contractor, ECO
	No wastes must remain on the construction site for more than the period stipulated in the Waste Management Plan	No pollution of the environment, no litigation due to transgression of pollution control acts and no complaints from Landowners	Contractor crew

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
Waste (WDMP)	All liquid effluent must be disposed of in a manner approved by the Local Authority	No pollution of the environment, no litigation due to transgression of pollution control acts and no complaints from Landowners	Contractor, ECO
Waste (WDMP)	All stakeholders will adhere to Solar Capital's waste management policy	No pollution of the environment, no litigation due to transgression of pollution control acts and no complaints from Landowners	Contractor, ECO
Adequacy of waste disposal facilities	All contracts with subcontractors should contain a clause to the effect that the disposal of all construction-generated refuse/waste to an officially approved dumping site is the responsibility of the subcontractor in question and that the subcontractors are bound to the management activities stipulated in this EMPr.	No pollution of the environment, no litigation due to transgression of pollution control acts and no complaints from Landowners	Solar Capital, Contractor, sub-contractors
	All solid and chemical wastes that are generated must be removed and disposed of at a licensed waste disposal site.	No pollution of the environment, no litigation due to transgression of pollution control acts and no complaints from Landowners	Contractor
	Chemical containers and packaging brought onto the site must be removed for disposal at a suitable site.	No pollution of the environment, no litigation due to transgression of pollution control acts and no complaints from Landowners	Contractor

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
	Burning of waste is not allowed.		Contractor
Storm Water Management	Litter blocking storm water system must be removed.		Contractor
Fire Prevention	Minimise risk of veld fires and damaged to grazing.	No veld fires started by the Contractor's work force, no claims from Landowners for damages due to fires and no litigation	Contractor, ECO
Groundwater quality	Any damages to the sewage system must be repaired immediately.	All claims investigated and settled within one month, no litigation due to unsettled claims and landowners signing release form within six months after completion of the contract.	CM, Contractor, ECO
Terrain	Minimise scarring of the soil surface and land features, minimise disturbance and loss of top soil, Rehabilitate all disturbed areas along the servitude.	No visible erosion scars once construction is completed, minimised loss of top soil at any site, no barren areas visible three months after construction is completed and all damaged areas successfully rehabilitated.	ECO, Contractor

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
Tower positioning	Minimise damage to topsoil and environment at tower positions, Successful rehabilitation of all damaged areas and Prevention of erosion	No loss of topsoil due to construction activities, All disturbed areas successfully rehabilitated within three months of completion of the contract and No visible erosion scars three months after completion of the contract	Contractor, ECO
Wet areas	Avoid wet areas to prevent damage,	No damage to wet areas	ECO, Contractor
River crossings	Minimise damage to river crossing and stream embankments, minimise erosion of embankments and subsequent siltation of rivers and streams	No access roads through river and stream banks, no visible erosion scars on embankments once construction is completed.	ECO, Contractor
Erosion and Donga crossing	Minimise erosion damage on donga crossings, minimise impeding the nature flow of water and also minimise initial of erosion through donga embankments.	No disturbance to donga embankments, No erosion visible on donga embankments due to construction activities and no interference with the natural flow of water	ECO, Contractor

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
Access road	Minimise damage to existing access roads, minimise damage to environment due to construction of new access roads and minimise loss of topsoil and enhancement of erosion.	No claims from landowners due to damage on existing access roads, no erosion visible on access roads three month after completion of construction of new access road and no loss top soil due to runoff water on access roads	ECO, Contractor
Rubble and Refuse disposal	To keep the servitude neat and clean, disposal of rubble and refuse in an appropriate manner, minimise litigation and landowner complaints.	No rubble and or refuse lying on site, no incidents of litigation, no complaints from landowners and no visible concrete spillage on the servitudes.	ECO, Contractor
Fauna	Minimise disruption of farming activities, Minimise disturbance of animals and Minimise interruption of breeding patterns of birds	No stock losses where construction is underway, No complaints from Landowners or Nature Conservation and No litigation concerning stock losses and animal deaths	ECO, Contractor
Flow of information	All communication with the public is to be handled by Solar Capital's community relations department	To avoid confusion and misinterpretation of information. To define the responsibility among the responsibility structure	ECO, CM, C

Activity / issue	Action required/ Management Objectives	Measurable targets	Responsible Party
	<p>Site inspections are to be conducted by the Solar Capital Team and contractor on an ad hoc basis during the course of the works or as agreed by the parties involved. Operation inspections should occur annually.</p> <p>A two-week notice is to be issued prior to these inspections.</p> <p>A 48-hour notice period is required for any unplanned inspections.</p>	<p>To avoid confusion and misinterpretation of information. To define the responsibility among the responsibility structure of the Project team</p>	<p>Solar Capital, Contractor</p>
	<p>The inspections should refer to the implementation of the above-mentioned actions as well as any other matters of concern.</p> <p>Monthly audits, during the construction phase, should be undertaken to ensure that the EMPr is implemented and sound environmental management occurs in the operational phase. This should be done by the ECO.</p>	<p>To avoid confusion and misinterpretation of information. To define the responsibility among the responsibility structure of the project team</p>	<p>ELO, ECO, CM, Contractor</p>
	<p>Adjacent landowners should be informed one month in advance of construction activities commencing in vicinity of their properties</p>	<p>To avoid complications with land owners</p>	<p>CM</p>
<p>Construction Policy</p>	<p>All stakeholders will abide by Solar Capital Construction Policy</p>	<p>To ensure compliance on all parties involved.</p>	<p>ECO, CM, Contractors</p>

C. SECTION 3: CONCLUSIONS

This Environmental Management Programme should be used as an on-site reference document during all phases of this development, and auditing should take place in order to determine compliance with this EMP. Parties responsible for transgression of this EMP should be held responsible for any rehabilitation that may need to be undertaken. Parties responsible for environmental degradation through irresponsible behaviour / negligence should receive penalties.

The EIA process facilitated the identification of relevant and practical mitigation measures, which may be used by the construction team and Solar Capital to draw up and respond to Tender documentation. It is, therefore, key to this process that this document be included during tendering to allow all potential bidders for this work to seriously consider and cost for such mitigation. This will ensure that the document receives the necessary buy in that it requires from the outset of the project

In order to have records of environmental incidences and the handling thereof, it is suggested that incidence logs (refer to **Appendix 1**) be filled in by the Environmental Control Officer. The contract manager needs to be informed of such incidences and further actions need to be taken, should the need arise.

APPENDIX 1: INCIDENT AND ENVIRONMENTAL LOG

ENVIRONMENTAL INCIDENT LOG				
Date	<i>Env. Condition</i>	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)	<u>Signature</u>