



DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

for
THEMEDA PV
on

Portion 7 of the Farm Elandsfontein 34

In terms of the
National Environmental Management Act (Act No. 107 of 1998, as
amended) & 2014 Environmental Impact Regulations

Prepared for Applicant: Themeda PV (Pty) Ltd

Date: 15 August 2022

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PURPOSE OF THIS REPORT:

I&AP review and comment

APPLICANT:

Euphoria PV (Pty) Ltd

CAPE EAPRAC REFERENCE NO:

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EMPR LEGISLATIVE REQUIREMENTS

Appendix 4 of Regulation 982 of the 2014 EIA Regulations contains the required contents of an Environmental Management Programme (EMPr). The checklist below serves as a summary of how these requirements were incorporated into this EMPr.

Requirement	Description
<p>Details of the EAP who prepared the EMPr; and;</p> <p>The expertise of the EAP to prepare an EMPr, including a curriculum vitae.</p>	<p>This EMPr was prepared by Dale Holder of Cape EAPrac who has more than 18 years' experience as an Environmental Assessment Practitioner. The CV of the EAP is attached in appendix M.</p>
<p>A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.</p>	<p>This EMP covers all aspects of the project as currently proposed for the Themeda PV.</p> <ul style="list-style-type: none"> • PV modules and mounting structures; • Inverters and transformers; • Cabling; • Battery Energy Storage System (BESS); • Site and internal access roads (up to 8 m wide); • Auxiliary buildings (33 kV switch room, gatehouse and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.); • Perimeter fencing and security infrastructure; • Rainwater tanks; • Temporary and permanent laydown areas; • Facility substation.
<p>A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers</p>	<p>The Site Layout Plan (SLP) attached in Appendix A, includes the sensitive features identified by participating specialists and indicates how these have been incorporated.</p> <p>The "exclusion areas" identified on this SLP as well as all areas outside of the perimeter fencing of the facility are considered as no go areas for construction activities.</p>
<p>A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all the phases of the development including –</p> <ul style="list-style-type: none"> (i) Planning and design; (ii) Pre-construction activities; (iii) Construction activities; (iv) Rehabilitation of the environment after construction and where applicable post closure; and (v) Where relevant, operation activities. 	<p>Sections 1.3</p>

Requirement	Description
A description and identification of impact management outcomes required for the aspects contemplated above.	Sections 4 -11
<p>A description of the proposed impact management actions, identifying the way the impact management objectives and outcomes contemplated above will be achieved and must, where applicable include actions to –</p> <ul style="list-style-type: none"> (i) Avoid, modify, remedy control or stop any action, activity or process which causes pollution or environmental degradation; (ii) Comply with any prescribed environmental management standards or practises; (iii) Comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable. 	Sections 4 – 11
The method of monitoring the implantation of the impact management actions contemplated above.	Sections 4 – 11 and section 14
The frequency of monitoring the implementation of the impact management actions contemplated above.	Sections 4 – 11 and section 14
An indication of the persons who will be responsible for the implementation of the impact management actions.	Sections 4 – 11
The time periods within which the impact management actions must be implemented.	Sections 4 – 11 and section 14
The mechanism for monitoring compliance with the impact management actions.	Section 2 and 4-11
A program for reporting on compliance, considering the requirements as prescribed in the Regulations.	Section 2
<p>An environmental awareness plan describing the way –</p> <ul style="list-style-type: none"> (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) Risks must be dealt with to avoid pollution or the degradation of the environment. 	Section 5.2
Any specific information that may be required by the competent authority.	None.

DFFE COMMENT ON EMPr

The competent authority will be provided with an opportunity to comment on this EMPr. This comment will be considered and the EMPr updated accordingly.

ENVIRONMENTAL MANAGEMENT PROGRAMME – THEMEDA PV

in terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended & Environmental Impact
Regulations 2014

THEMEDA PV

Portion 7 of the Farm Elandsfontein 34.

Submitted for:

Stakeholder Review & Comment

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ORDER OF REPORT

Environmental Management Programme – Main Report

- Appendix A** : Site Layout Plan – Themeda PV (See Draft EIR)
- Appendix B** : DFFE Generic EMPr for sub-station infrastructure (DFFE, 2019)
- Appendix C** : Stormwater Management Plan (Sivest, 2022) (See Draft EIR)
- Appendix D** : Transportation and Traffic Management Plan (Sivest, 2022) (See Draft EIR)
- Appendix E** : Construction Method Statements (to be appended once approved by the ECO)
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EMPR THEMEDA PV

1. INTRODUCTION

Cape EAPrac has been appointed by the Applicant, Euphorbia PV (Pty) Ltd, as the independent **Environmental Assessment Practitioner (EAP)** responsible for compilation of the **Draft Environmental Management Programme (EMPr)** for the proposed Euphorbia PV.

The key purpose of this EMPr is to ensure that the remedial and mitigation requirements identified during the Basic Assessment Report are implemented during the lifespan of the project (design to decommissioning). The EMPr is thus a management tool used to minimise and mitigate the potential environmental impacts, while maximising the benefits.

A detailed description of the proposed project and a description of the affected environment are provided in the Environmental Impact Report (EIR) which should be referred to where necessary.

It is important that this EMPr be read in conjunction with the Generic EMPr for substation infrastructure included in Appendix B.

1.1 APPROACH TO THE EMPr

This EMPr addresses the environmental management of the four key phases of the project, namely:

- The design and pre-construction phase;
- The construction phase;
- The operation phase; and
- The closure and decommissioning phase.

1.1.1 Pre-construction Phase

The pre-construction phase of the development refers to the final layout design considerations and the site preparation (fine-scale design and placement, survey of development site and associated infrastructure, demarcation of no-go areas, establishment of site camp and laydown area, vegetation clearing for establishment of internal road network¹).

1.1.2 Construction Phase

The construction phase of the development refers to the earthworks and the actual construction of the civil works (installation of the PV panel arrays, construction of internal roads, stormwater structures and auxiliary buildings and on-site substation), as well as the external infrastructure such as MV cabling, access roads and gate house. The construction phase will start with the perimeter fencing of the facility and will end with final landscaping and re-vegetation / rehabilitation of the site and surrounding areas.

1.1.3 Operation Phase

The operational phase commences once the facility starts providing power into the electrical network (i.e., at Contractual Operation Date). There may be a stage where both construction and operation activities overlap i.e., occur on site at the same time. The operation phase included the monitoring and maintenance activities required for the efficient functioning of the facility (e.g., cleaning and repair of solar arrays, brush-cutting of vegetation etc.), as well as health and integrity of the surrounding environment (e.g., removal alien vegetation, management of erosion etc.).

• ¹ This activity is considered to form both part of the pre-construction and the construction phase

1.1.4 Closure and Decommissioning Phase

Closure and decommissioning refers to the decommissioning of the panel arrays at the end of their operational lifespan or at the end of the term of the Power Purchase Agreement (PPA). For this report, three possible scenarios are considered, namely:

- Continuation of operations under an extended PPA
- The re-use, repair &/ upgrade of the facility for alternative power generation;
- The total decommissioning of the solar facility.

1.2 PURPOSE

This EMPr is relevant to the Themeda PV renewable energy project, and all listed and specified activities necessary for the realisation of this project.

1.3 OBJECTIVE

The objective of this EMPr is to prescribe project specific and generally accepted impact management outcomes and impact management actions associated with the development of the Themeda PV and its associated infrastructure.

- To ensure the least possible impact to:
 - Existing infrastructure on and adjacent to the site;
 - Indigenous flora and fauna (biophysical environment); and
 - Water quality of surface and groundwater on and surrounding the site. Particularly the water quality exiting the site.
- To ensure that construction and development are undertaken with consideration to all environmental factors; and
- Where such damage occurs, provision is made for re-instatement and rehabilitation.

1.4 SCOPE

The scope of this EMPr applies to all pre-construction, construction, operation and decommissioning requirements for the Themeda PV. This EMPr applies to all listed and specified activities authorised in the EA and amendments thereto that are necessary for the realisation of this project.

1.5 EMPR APPROVAL AND REVISIONS

This EMPr, once approved, is a legally binding document and contravention with this document constitutes a contravention with the Environmental Authorisation.

The supplementary plans annexed to this EMPr must be read in conjunction with this EMPr.

The EMPr may however require amendment at certain stages through the lifespan of the project. The incidences which may require the amendment of this document include:

- Changes in environmental legislation;
- Results of post-construction monitoring and audit;
- Per instruction from the competent authority; and
- Changes in technology and best practice principles.

It must be noted that any amendments to the EMPr actions that do not change the impact management outcomes or objectives may be immediately affected by the holder of the EA and submitted in the next environmental audit report submitted in terms of the regulations. Any amendments to the impact management outcomes need to be formally approved by the competent authority before they can be effected.

1.6 CONTRACTUAL OBLIGATIONS

This EMPr must be included in ALL tender and contract documentation associated with this project. It must be noted that this EMPr is relevant and binding not only on the activities associated with the construction of the PV project, but also for all associated infrastructure authorised as part of the EA and any amendments thereto.

1.7 ORGANISATIONAL STRUCTURE AND RESPONSIBILITIES.

To ensure effective implementation of the EMPr, it is necessary to identify and define the organisational structure for the implementation of this document.

The proposed organisational structure during **construction** is as follows:

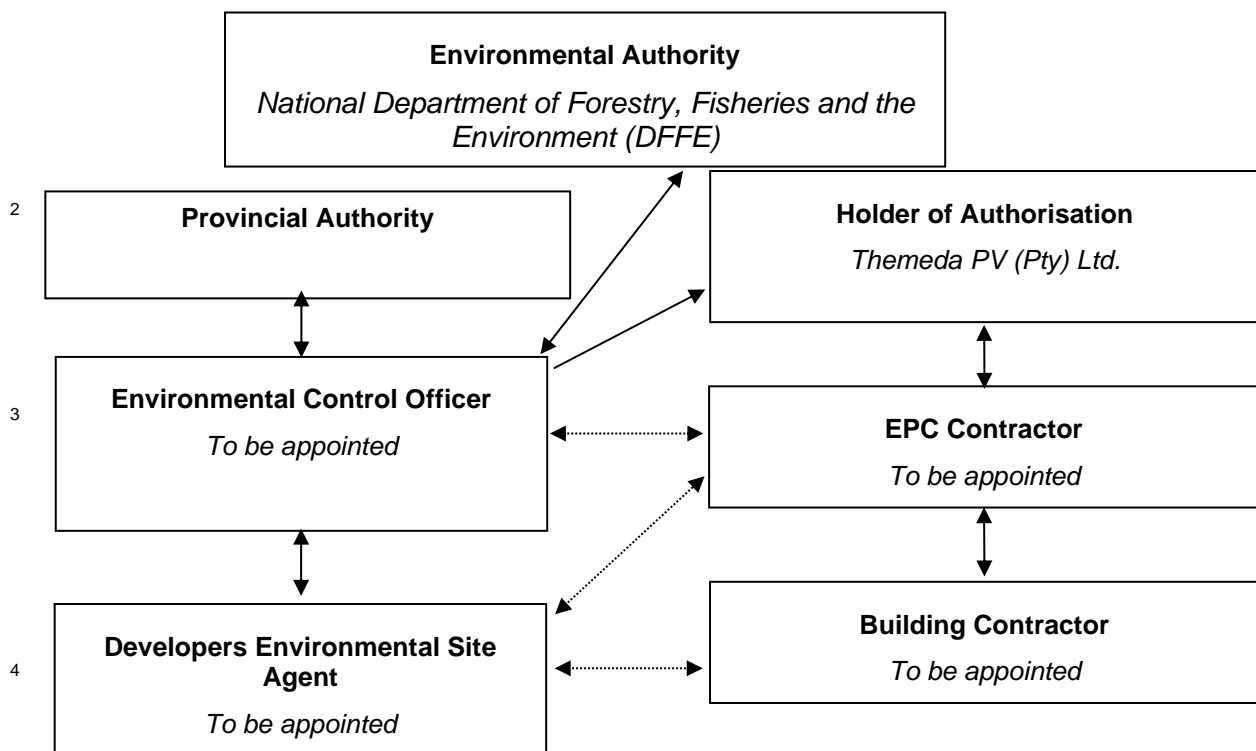


Figure 1: EMPr organisational structure during the construction phase

- ² North West Department of Economic Development, Environment, Conservation and Tourism
- ³ This refers to the Independent Environmental Control Officer.
- ⁴ This refers to the Developers Environmental Site Agent who is not necessarily independent of the EPC.

The proposed organisational structure during the **operation** of the facility is as follows:

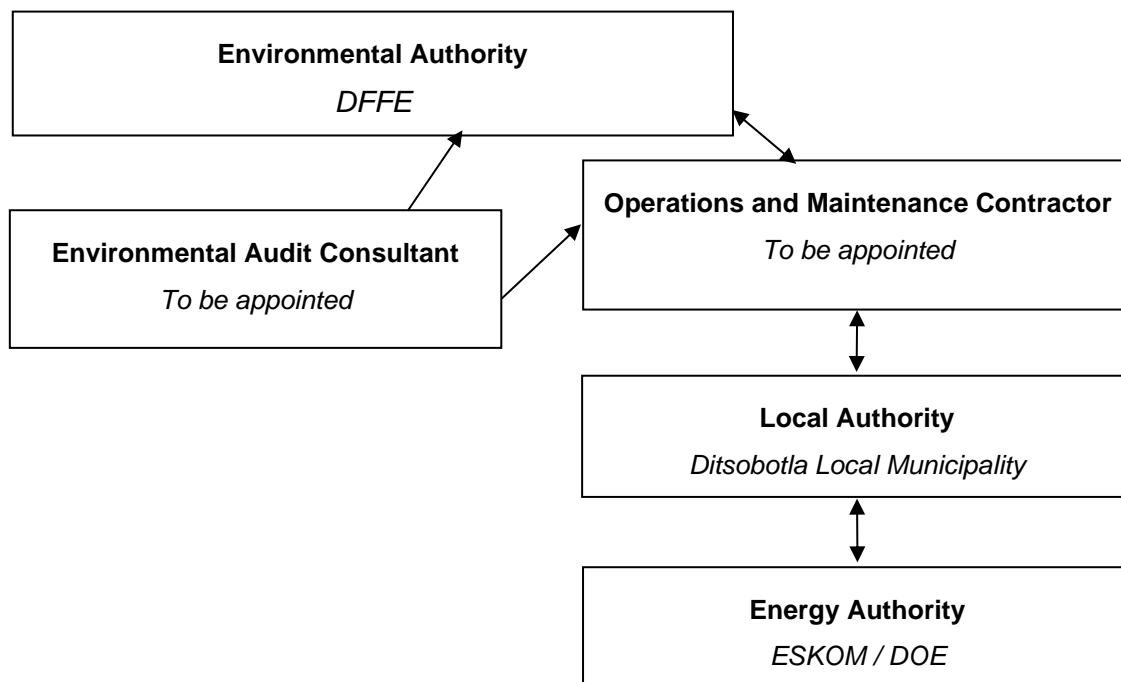


Figure 2: EMPr organisational structure during the operation phase.

Details regarding the roles and responsibilities of the various parties in these organisational structures are included in the table below.

The effective implementation of this EMPr is dependent on established and clear roles, responsibilities and reporting lines. This table below gives guidance to the various environmental roles and reporting lines,

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

Responsible Person(s)	Role and Responsibilities
Holder of the EA ⁵	<p><u>Role</u> The holder of the EA is ultimately accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority. An Independent environmental control officer (ECO) must be contracted by the Holder of the EA to independently and objectively monitor the implementation of the EMPr according to relevant environmental legislation, and the conditions of the EA. The holder of the EA is further responsible for providing and giving mandate to enable the ECO to perform responsibilities and must ensure that the ECO is integrated as part of the project team while remaining independent.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - Be fully conversant with the conditions of the EA; - Ensure that all stipulations within the EMPr are communicated and adhered to by the EPC; - Issuing of site instructions to the EPC for corrective actions required;

• ⁵ In some cases the Holder of the EA and the EPC contractor may be the same entity, in which case this party will be responsible for the requirements outlined on both roles.

Responsible Person(s)	Role and Responsibilities
	<ul style="list-style-type: none"> - Monitor the implementation of the EMPr throughout the project by means of site inspections and meetings. Overall management of the project and EMPr implementation; and - Ensure that periodic environmental audits are undertaken on the project implementation.
Independent Environmental Control Officer (ECO)	<p>Role</p> <p>The Holder of the EA must appoint an ECO.</p> <p>The ECO must be independent of the holder of the EA and the EPC and have appropriate training and experience in the implementation of environmental management specifications. The primary role of the ECO is to act as an independent quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts. In this respect, the ECO is to conduct monthly site inspections, attend regular site meetings, pre-empt problems and suggest mitigation and be available to advise on incidental issues that arise.</p> <p>The ECO is also required to prepare internal compliance audits (in the form of the monthly environmental control report), verifying the weekly environmental checklists submitted by the ESA.</p> <p>The ECO provides feedback to the Holder of the EA and the competent authority regarding all environmental matters. The EPC and the holder of the EA are answerable to the Environmental Control Officer for non-compliance with the Specifications as set out in the EA and EMPr.</p> <p>The ECO provides feedback to the holder of the EA, who in turn reports back to the EPC, as required. Issues of non-compliance raised by the ECO must be taken up by the holder of the EA and resolved with the Contractor as per the conditions of their contract.</p> <p>Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e., those that are deemed to be a variation, not allowed for in the EMPr specification) must be endorsed by the Holder of the EA.</p> <p>Responsibilities</p> <p>The responsibilities of the ECO will include the following:</p> <ul style="list-style-type: none"> - Be aware of the findings and conclusions of all EA conditions related to the development; - Be familiar with the recommendations and mitigation measures of this EMPr; - Manage and review all reporting undertaken by the ESA. - Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them; - Undertake regular (at least monthly) and comprehensive site inspections / audits of the construction site according to the generic EMPr and applicable licenses in order to monitor compliance as required; - Compilation and administration of Environmental control reports to ensure that the environmental management measures are implemented and are effective; - Monitoring the performance of the Contractors and ensuring compliance with the EMPr and associated Method Statements; - In consultation with the holder of the EA order the removal of person(s) and/or equipment which are in contravention of the specifications of the EMPr and/or environmental licenses; - Liaison between the Holder of the EA, EPC contractor, authorities and other lead stakeholders on all environmental concerns; - Compile a monthly environmental control report highlighting any non-compliance issues as well as satisfactory or exceptional compliance with the EMPr; - Validating the weekly environmental checklists, which are to be prepared by the ESA; - Checking the ESA's record of environmental incidents (spills, impacts, legal transgressions etc.) as well as corrective and preventive actions taken; - Checking the EPC's public complaints register in which all complaints are recorded, as well as action taken; - Assisting in the resolution of conflicts;

Responsible Person(s)	Role and Responsibilities
	<ul style="list-style-type: none"> - In case of non-compliances, the ECO must first communicate this to the Senior Site Supervisor, who has the power to ensure this matter is addressed. Should no action or insufficient action be taken, the ECO may report this matter to the authorities as non-compliance; - Maintenance, update and review of the EMPr; - Communication of all modifications to the EMPr to the relevant stakeholders - Review and approval contractors' method statements.
<p>Developers Environmental Site Agent (ESA)</p>	<p><u>Role</u> The Holder of the EA or the EPC must appoint an independent ESA in terms of this EMPr. The ESA need not be independent of the holder of the EA and the EPC but must report to the ECO and have appropriate training and experience in the implementation of environmental management specifications. The primary role of the ESA is to act as a full-time independent quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts. In this respect, the ECO is to conduct daily site inspections, attend regular site meetings, pre-empt problems and suggest mitigation and be available to advise on incidental issues that arise. The ESA is also required to undertake internal compliance audits (in the form of the weekly environmental checklist) and submit these to the ECO and the EPC contractor. The ESA provides feedback to the ECO, who in turn communicates with the holder of the EA and the competent authority regarding all environmental matters. Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e., those that are deemed to be a variation, not allowed for in the EMPr specification) must be endorsed by the Holder of the EA.</p> <p><u>Responsibilities</u> The responsibilities of the ESA will include the following:</p> <ul style="list-style-type: none"> - Preparation of Environmental Method Statements; - Daily environmental monitoring; - Be aware of the findings and conclusions of all EA conditions related to the development; - Be familiar with the recommendations and mitigation measures of this EMPr; - Report to the ECO. - Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them; - Compilation and administration of weekly environmental checklists to ensure that the environmental management measures are implemented and are effective; - Monitoring the performance of the Contractors and ensuring compliance with the EMPr and associated Method Statements; - Environmental induction of all staff entering the site to perform duties; - Maintaining a record of environmental incidents (spills, impacts, legal transgressions etc.) as well as corrective and preventive actions taken; - Assisting in the resolution of conflicts; - Reporting non-compliances to the ECO; - Facilitate environmental training for all personnel on the site – this may range from carrying out the training, to reviewing the training programmes of the EPC contractor;
<p>EPC Contractor</p> <p>NB: All references to the EPC contractor will include all subcontractors responsible for any tasks in respect of the development. All Environmental Management Actions allocated to</p>	<p><u>Role</u> The EPC Contractor or any relevant subcontractor appoints their own dEO and has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract are in line with the EMPr and that Method Statements are implemented as described. External contractors must ensure compliance with this EMPr while performing the onsite activities as per their contract with the Project Developer. The contractors are required, where specified, to provide Method Statements setting out in detail how the impact management actions contained in the EMPr will be implemented during the development of this facility.</p>

Responsible Person(s)	Role and Responsibilities
the EPC contractor will apply equally to all sub-contractors responsible for any specific task.	<p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - project delivery and quality control for the development services as per appointment; - employ a suitably qualified person to monitor and report to the Project Developer's appointed person on the daily activities on-site during the construction period; - ensure that safe, environmentally acceptable working methods and practices are implemented, and that equipment is properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely; - attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones; - ensure that contractors' staff repair, at their own cost, any environmental damage because of a contravention of the specifications contained in EMPr, to the satisfaction of the ECO.

National Government, Provincial Government or Local Authorities must be granted access for the purposed of monitoring compliance with the EA or this EMPr.

1.8 PROPOSED ACTIVITY

The following components form part of the proposed Themeda PV.

- PV modules and mounting structures;
- Inverters and transformers;
- Cabling;
- Battery Energy Storage System (BESS);
- Site and internal access roads (up to 8 m wide);
- Auxiliary buildings (33 kV switch room, gatehouse and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.);
- Perimeter fencing and security infrastructure;
- Rainwater tanks;
- Temporary and permanent laydown areas;
- Facility substation.
- Own-build grid connection solution, including on site substation:

It is envisioned that all required services (water, sewerage and waste) will be provided by the local municipality.

The main physical activities (i.e., those activities that need to be managed from an environmental perspective) that will form part of the construction phase are:

- Removal of vegetation for the proposed infrastructure;
- Excavations for infrastructure and associated infrastructure;
- Establishment of a laydown area for equipment;
- Stockpiling of topsoil and cleared vegetation;
- Transportation of material and equipment to site, and personnel to and from site;
- Construction of the solar field, overhead power line⁶, facility substation and additional infrastructure; and
- Rehabilitation of Disturbed areas.

The following main activities will occur during the operational phase:

- Generation of electricity;
- Maintenance of the solar facility, including washing of panels;

• ⁶ The overhead powerline forms part of a separate EMPr.

- Management of the vegetation within the PV development; and
- Maintenance of the distribution line⁷

In the event of decommissioning, the main aim would be to return the land to its original, pre-construction condition. Should the unlikely need for decommissioning arise (i.e., if the actual SEF becomes outdated or the land needs to be used for other purposes), the decommissioning procedures will be undertaken in line with the EMPr and any legislation or guidelines relevant at the time and the site will be rehabilitated and returned to its pre-construction state. Possible decommissioning activities will include removing the infrastructure, and mechanisms to promote the re-growth of natural vegetation.

2. DOCUMENT CONTROL, REPORTING AND COMPLIANCE

To ensure accountability and effective implementation of the EMPr, a number of reporting systems⁸, documentation controls and compliance mechanisms must be in place for all project infrastructure as a minimum requirement.

2.1 DOCUMENT CONTROL AND FILING

The holder of the EA is solely responsible for the upkeep and management of the official EMPr file. As a minimum, all documentation detailed below will be stored in the EMPr file. A hard copy of all documentation shall be filed, while an electronic copy may be kept where relevant. A duplicate file will be maintained by the ECO. The EMPr file must be always on site and available on request by the Competent Authority or other relevant authorities. The EMPr file will form part of any environmental audits undertaken as prescribed in the EIA Regulations.

2.2 DOCUMENTATION TO BE AVAILABLE

At the commencement of the project the following preliminary list of documents shall be placed in the EMPr file and be accessible at all times:

- Full copy of the signed EA from the Competent Authority in terms of NEMA, granting approval for the development;
- Any Amendments of the EA from the competent Authority;
- Copy of the EMPr as well as any amendments thereof;
- All method statements prepared by the EPC and submitted to the ECO for approval;
- All weekly checklists prepared by the Environmental Site Agent (ESA);
- All monthly ECO reports prepared by the ECO;
- Minutes and attendance register of environmental site meetings;
- Attendance registers of all environmental inductions;
- An up-to-date environmental incident log;
- A copy of all instructions or directives issued;
- A copy of all corrective actions signed off. The corrective actions must be filed in such a way that a clear reference is made to the non-compliance record; and
- Complaints register.

All the records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority.

2.3 WEEKLY ENVIRONMENTAL CHECKLIST

-
- ⁷ The distribution powerline forms part of a separate EMPr.
 - ⁸ These reporting systems are adapted from the various generic EMPrs gazetted by the Department of Forestry, Fisheries and the Environment.

The ESA is required to complete a Weekly Environmental Checklist, the format of which should be approved by the ECO, with input from the EPC and the holder of the EA.

The ESA is required to sign and date the checklist, retain a copy in the EMPr file and submit a copy of the completed checklist to the EPC and the ECO on a weekly basis. The EPC must utilise the weekly checklists to initiate any corrective actions detailed therein.

2.4 MONTHLY ENVIRONMENTAL CONTROL REPORT

The ECO is responsible for compilation of the monthly ECO Report. The weekly checklists above will form the basis for the Monthly Environmental Control Reports and must be supplemented by the outcomes of the ECO inspection. The monthly Environmental Control Reports must be submitted to the following parties:

- The Competent Authority – Director Compliance Monitoring;
- The Provincial Conservation Authority;
- The DFFE' sub-directorate, Forestry;
- The Holder of the EA;
- The EPC; and
- All attendees of Environmental Site Meetings.

Copies of all completed Environmental Control reports must be attached as Annexures to the Environmental Audit Report as required in terms of the regulations.

2.5 ENVIRONMENTAL SITE MEETINGS

Minutes of the environmental site meetings shall be kept. The minutes must include an attendance register and will be attached to the Monthly Environmental Control Report that is distributed to attendees. Each set of minutes must clearly record "Matters for Attention" that will be reviewed at the next meeting.

2.6 METHOD STATEMENTS

The method statement will be done in such detail that the ECO is able to assess whether the contractor's proposal is in accordance with the EMPr. Commencement of any specific activity may not commence until such time as the method statement for that activity is approved by both the ECO and the project manager.

The method statement must cover applicable details regarding:

- development procedures;
- materials and equipment to be used;
- getting the equipment to and from site;
- how the equipment/ material will be moved while on site;
- how and where material will be stored;
- the containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- timing and location of activities;
- compliance/ non-compliance with the EMPr; and
- any other information deemed necessary by the ECOs.

Unless indicated otherwise by the ECO, the EPC shall provide the following method statements to the Project Manager no less than 14 calendar days prior to the commencement date of each activity:

- Site establishment – Site Camps, Lay-down or storage areas, satellite camps, infrastructure;
- Workshop or plant emergency maintenance;
- Drilling and Piling operations
- Handling, transport and storage of Hazardous Chemical Substance's;

- Vegetation management – Protected species relocation, site clearing, alien vegetation;
- Access management – Roads, gates, crossings etc.;
- Fire plan;
- Waste management – transport, storage, segregation, classification, disposal (all waste streams);
- Social interaction – complaints management, compensation claims, access to properties etc.;
- Water – use (source, abstraction and disposal), access and all related information, crossings and mitigation;
- Emergency preparedness – Spills, training, other environmental emergencies;
- Dust and noise management methodologies;
- Fauna interaction and risk management; and
- Heritage, Archaeology and Palaeontology management.

It is the prerogative of the ECO to request additional method statements for any other aspect of the proposed development.

The ESA and ECO shall monitor and ensure that the contractors perform in accordance with these method statements. A copy of all method statements must be kept on the EMPr file and appended to the Monthly ECO report on the month following their approval.

2.7 ENVIRONMENTAL INCIDENT LOG

The ESA is required to maintain an up-to-date and current Environmental Incident Log (environmental diary). The Environmental Incident Log is a means to record all environmental incidents and/or all non-compliance events.

An environmental incident is defined as:

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

The ESA must record all environmental incidents in the Environmental Incident Log. All incidents regardless of severity must be reported to the ECO and the Holder of the EA. The Log is to be kept in the EMPr file (and appended to the monthly environmental control reports) and at a minimum the following will be recorded for each environmental incident:

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

2.8 NON-COMPLIANCE

In response to a significant incident, re-occurring incidents or unattended incidents, a non-compliance notice will be issued to the responsible contractor by the ECO via the Holder of the EA or Project

Manager. The non-compliance notice will be issued in writing; a copy filed in the EMPr file and will at a minimum include the following:

- Time and date of the non-compliance;
- Name of the contractor responsible;
- Nature and description of the non-compliance;
- Recommended / required corrective action; and
- Date by which the corrective action to be completed.

The contractors shall act immediately when a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the development site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. The ECO should be made aware of any complaints. Any non-compliance with the agreed procedures of the EMPr is a transgression of the various statutes and laws that define how the environment is managed.

Failure to redress the cause shall be reported by the ECO to the Competent Authority for them to deal with the transgression, as it deems fit, including the issue of penalties as detailed in section 21 of this EMPr. The contractor is deemed not to have complied with the EMPr if, inter alia, there is a deviation from the environmental conditions, impact management outcomes and impact management actions as approved in the EMPr.

2.9 CORRECTIVE ACTION RECORDS

For each non-compliance notice issued, a documented corrective action must be recorded. On receiving a non-compliance notice from the ESA or ECO, the EPC must ensure that the corrective actions required take place within the stipulated timeframe. On completion of the corrective action the contractors Environmental Officer is to issue a Corrective Action Report in writing to the ECO.

If satisfied that the corrective action has been completed, the ECO are to sign-off on the Corrective Action Report and attach the report to the non-compliance notice in the EMPr file. A corrective action is considered complete once the report has been signed off by the ECO.

2.10 PHOTOGRAPHIC RECORD

A digital photographic record will be kept by the ESA. The photographic record will be used to show before, during and post rehabilitation evidence of the site as well as in cases of damages claims if they arise. Each image must be dated, include a co-ordinate and a brief description note attached. The ESA photographic record must form part of the weekly Environmental Checklists.

The EPC shall:

- Allow the ESA and ECO access to take photographs of all areas, activities and actions.

The ESA and ECO shall keep an electronic database of photographic records which will include:

- Pictures of all areas designated as work areas, site camp, development sites and storage areas taken before these areas are set up;
- All bunding and fencing;
- Road conditions and road verges;
- Condition of all farm fences;
- Topsoil storage areas;
- All areas to be cordoned off during construction;
- Waste management sites;
- Ablution facilities (inside and out);
- All completed corrective actions for non-compliances;
- All required signage;

- Photographic recordings of incidents;
- All areas before, during and post rehabilitation; and

2.11 COMPLAINTS REGISTER

The EPC shall keep a current and up-to-date complaints register. The complaints register is to be a record of all complaints received from communities, stakeholders and individuals. The Complaints Record shall:

- Record the name and contact details of the complainant;
- Record the time and date of the complaint;
- Contain a detailed description of the complaint;
- Where relevant and appropriate, contain photographic evidence of the complaint or damage (ECO / ESA to take relevant photographs); and
- Contain a copy of the ECO's written response to each complaint received and keep a record of any further correspondence with the complainant. The ECO's written response will include a description of any corrective action to be taken and must be signed by the Contractor, ECO and affected party. Where a damage claim is issued by the complainant, the ECO shall respond as described in below.

2.12 CLAIMS FOR DAMAGES

If a Claim for Damages is submitted by a community, landowner or individual, the ECO shall:

- Record the full detail of the complaint as described in above;
- The EPC will evaluate the claim and associated damage and submit the evaluation to the holder of the EA for approval;
- Following consideration by the Holder of the EA the claim is to be resolved and settled immediately, or the reason for not accepting the claim communicated in writing to the claimant.

2.13 INTERACTIONS WITH AFFECTED PARTIES

Open, transparent and good relations with affected landowners, communities and regional staff are an essential aspect to the successful management and mitigation of environmental impacts.

The ESA shall:

- Ensure that all queries, complaints and claims are dealt within an agreed timeframe⁹;
- Ensure that any or all agreements are documented, signed by all parties and a record of the agreement kept in the EMPr file and submitted to the ECO;
- Ensure that telephone numbers to register complaints are made available to all landowners and affected parties; and
- Ensure that contact with affected parties is always courteous.

2.14 ENVIRONMENTAL AUDITS

Internal environmental audits of the activity and implementation of the EMPr must be undertaken in the form of the monthly environmental control reports. The findings and outcomes must be included in the EMPr file and submitted to the ECO for inclusion in the environmental control report to be submitted to the competent authority on a monthly basis.

⁹ This relates to complaints and claims of an environmental nature only and does not pertain to complaints and claims of any other nature.

At a minimum, the monthly environmental control report is to cover the following:

- Weekly Environmental Checklists;
- Deviations and non-compliances with the checklists;
- Non-compliances issued;
- Completed and reported corrective actions;
- Environmental Monitoring;
- Results of Dust Fall out Monitoring;
- General environmental findings and actions; and
- Minutes of the Environmental Site Meetings.

In addition to the internal environmental audit (which takes place as part of the monthly environmental control report), an external audit must be undertaken:

- Within 6 months of commencement of construction activities.
- Within 30 days of completion of construction activities.
- Within 30 days of completion of rehabilitation activities.

These external audits cannot be undertaken by the ECO and must be undertaken by an external audit consultant.

Additional audits during the operational phase of the activity are to be done at the frequency determined in the regulations.

3. LEGISLATIVE AND POLICY FRAMEWORK

In terms of legislative provisions, this EMPr must satisfy:

- Section 24N of the NEMA, as amended;
- Appendix 4 of the NEMA EIA Regulations published in Government Notice No. R 326 of 7 April 2017. These regulations regulate and prescribe the content of the EMPr and specify the type of supporting information that must accompany the submission of the report to the authorities;
- The requirements outlined in the Environmental Authorisation and
- Gazetted generic EMPs for the power line and substation infrastructure.

Table 2: Compliance with Section 24N of NEMA

Requirements of Section 24N of NEMA	Reference in this EMPr?
2. The environmental management programme must contain-information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated in subsection 24(1A), including environmental impacts or objectives in respect of: <ul style="list-style-type: none"> - planning and design; - pre-construction and construction activities; - the operation or undertaking of the activity in question; - the rehabilitation of the environment; and - closure, if applicable; 	Section 5,6 & 14 of this EMPr
Details of the person who prepared the environmental management programme; and the expertise of that person to prepare an environmental management programme;	Please refer to the summary page at the beginning of this report for these details.
A detailed description of the aspects of the activity that are covered by the environmental management programme;	Section 1.8
Information identifying the persons who will be responsible for the implementation of the measures contemplated in paragraph (a);	Columns in Section 5,6 and 14 of the EMPr detail the monitoring responsibility.
Information in respect of the mechanisms proposed for monitoring compliance with the environmental management programme and for reporting on the compliance;	Section 5, 6, 14 and 16

Requirements of Section 24N of NEMA	Reference in this EMPr?
As far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and	Section 8
A description of the way it intends to- <ul style="list-style-type: none"> - modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; - remedy the cause of pollution or degradation and migration of pollutants; and - comply with any prescribed environmental management standards or practices. 	Section 1.2 to 1.4
3. The environmental management programme must, where appropriate- <ul style="list-style-type: none"> - set out time periods within which the measures contemplated in the environmental management programme must be implemented; - contain measures regulating responsibilities for any environmental damage, pollution, pumping and treatment of polluted or extraneous water or ecological degradation which may occur inside and outside the boundaries of the operations in question; and - develop an environmental awareness plan describing the manner in which- <ul style="list-style-type: none"> - the applicant intends to inform his or her employees of any environmental risk which may result from their work; and - risks must be dealt with to avoid pollution or the degradation of the environment. 	Sections 3 – 14 all contain the timeframes for the associated measures.
5. The Minister, the Minister responsible for mineral resources or an MEC may call for additional information and may direct that the environmental management programme in question must be adjusted in such a way as the Minister, the Minister responsible for mineral resources or the MEC may require.	Not applicable at this stage.
6. The Minister, the Minister responsible for mineral resources or an MEC may at any time after he or she has approved an application for an environmental authorisation approve an amended environmental management programme.	Not applicable at this stage.
7. The holder and any person issued with an environmental authorisation- <ul style="list-style-type: none"> - must at all times give effect to the general objectives of integrated environmental management laid down in section 23; - must consider, investigate, assess and communicate the impact of his or her prospecting or mining on the environment; - must manage all environmental impacts in accordance with his or her approved environmental management programme, where appropriate; and - as an integral part of the prospecting or mining, exploration or production operation, unless the Minister responsible for mineral resources directs otherwise; - must monitor and audit compliance with the requirements of the environmental management programme; - must, as far as is reasonably practicable, rehabilitate the environment affected by the prospecting or mining operations to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and - is responsible for any environmental damage, pollution, pumping and treatment of polluted or extraneous water or ecological degradation as a result of his or her operations to which such right, permit or environmental authorisation relates. 	Throughout the EMPr
8. Notwithstanding the Companies Act, 2008 (Act No. 71 of 2008), or the Close Corporations Act, 1984 (Act No. 69 of 1984), the directors of a company or members of a close corporation are jointly and severally liable for any negative impact on the environment, whether advertently or inadvertently caused by the company or close corporation which they represent, including damage, degradation or pollution.	Section 1.7 details the responsibility of the Project Applicant.

Table 3: Compliance with Appendix 4 of the 2014 NEMA EIA Regulations (as amended on 7 April 2017)

Requirement	Description
Details of the EAP who prepared the EMP; and; The expertise of the EAP to prepare an EMP, including a curriculum vitae.	This EMP was prepared by Dale Holder of Cape EAPrac who has more than 16 years' experience as an Environmental Assessment Practitioner. The CV of the EAP is attached in appendix I.
A detailed description of the aspects of the activity that are covered by the EMP as identified by the project description.	This EMP covers all aspects of the project as currently Proposed for Themeda PV <ul style="list-style-type: none"> • PV modules and mounting structures; • Inverters and transformers; • Cabling; • Battery Energy Storage System (BESS); • Site and internal access roads (up to 8 m wide); • Auxiliary buildings (33 kV switch room, gatehouse and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.); • Perimeter fencing and security infrastructure; • Rainwater tanks; • Temporary and permanent laydown areas; Facility substation. <ul style="list-style-type: none"> • Own-build grid connection solution, including on site substation:
A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers	The Site Development Plan attached in Appendix A, includes the sensitive features identified by participating specialists and indicates how these have been incorporated. The "exclusion areas" identified on this SDP as well as all areas outside of the perimeter fencing of the facility are considered as no go areas for construction activities.
A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all the phases of the development including – <ul style="list-style-type: none"> (vi) Planning and design; (vii) Pre-construction activities; (viii) Construction activities; (ix) Rehabilitation of the environment after construction and where applicable post closure; and (x) Where relevant, operation activities. 	Sections 1.3
A description and identification of impact management outcomes required for the aspects contemplated above.	Sections 4 -11
A description of the proposed impact management actions, identifying the way the impact management objectives and outcomes contemplated above will be achieved and must, where applicable include actions to – <ul style="list-style-type: none"> (v) Avoid, modify, remedy control or stop any action, activity or process which causes pollution or environmental degradation; 	Sections 4 - 11

Requirement	Description
(vi) Comply with any prescribed environmental management standards or practises; (vii) Comply with any applicable provisions of the Act regarding closure, where applicable; and (viii) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	
The method of monitoring the implantation of the impact management actions contemplated above.	Sections 4 – 11 and section 14
The frequency of monitoring the implementation of the impact management actions contemplated above.	Sections 4 – 11 and section 14
An indication of the persons who will be responsible for the implementation of the impact management actions.	Sections 4 – 11
The time periods within which the impact management actions must be implemented.	Sections 4 – 11 and section 14
The mechanism for monitoring compliance with the impact management actions.	Section 2 and 4-11
A program for reporting on compliance, considering the requirements as prescribed in the Regulations.	Section 2
An environmental awareness plan describing the way – (iii) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and (iv) Risks must be dealt with to avoid pollution or the degradation of the environment.	Section 5.2
Any specific information that may be required by the competent authority.	None.

Other than the Section 24N and Appendix 4 requirements detailed in the table above, the applicable legislation remains the same as what was considered in the Basic Assessment Report for the Themeda PV and as such, it is not re-described in this EMP.

4. PRE-CONSTRUCTION PHASE– IMPACT MANAGEMENT OUTCOMES & ACTIONS

This section provides details on the pre-construction phase impact management outcomes and actions¹⁰ that are commonly applicable to the development of a PV Energy Facility and its associated infrastructure as well as management actions outlined by participating specialists, preceding environmental process and those contained in the EA for the facility.

Each subsection includes an aspect identified for the development of the PV Energy Facility, and for each aspect a set of prescribed impact management outcomes and associated impact management actions have been identified.

The holder of the EA is ultimately responsible to ensure the implementation of these outcomes and actions.

4.1 PRE-CONSTRUCTION EA CONDITIONS.

The Environmental Authorisation for this development will require a number of administrative requirements that need to take place prior to commencement of construction. These must be included in the EMPr once the EA in respect of this activity is received.

4.2 APPOINTMENT OF ENVIRONMENTAL CONTROL OFFICER AND ENVIRONMENTAL SITE AGENT

The holder of the EA must appoint an independent Environmental Control Officer (ECO) for the construction phase of the Development.

Impact management outcome: Independent party to ensure that the mitigation/rehabilitation. measures and recommendations referred to in the EA are implemented and reported on and to ensure compliance with the provisions of the approved EMPr.						
Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> The ECO must be appointed prior to the commencement of any physical activities. The ECO will be responsible for monitoring, reviewing and verifying compliance by the EPC Contractor with the environmental specifications of this EMPr and the conditions of the EA. 	Holder of the EA	The holder of the EA to appoint independent ECO and ensure that ECO is suitably qualified and experienced.	ECO to be appointed prior to construction	ECO will undertake physical monitoring.	Monthly	The name and contact details of the appointed ECO to be submitted to the Director: Compliance

¹⁰ All Environmental Management Actions allocated to the EPC contractor will apply equally to all sub-contractors responsible for any specific task.

<ul style="list-style-type: none"> • The appointed ECO must be independent of the EPC contractor and must be suitably qualified and have experience of environmental monitoring and control on similar scale projects. • The main responsibilities of the ECO include but are not limited to the following: <ul style="list-style-type: none"> - Facilitate the pre-construction environmental compliance workshop; - Review of documentation supplied by the ESA; - Be fully knowledgeable of all the licences and permits issued to the site - Review, maintenance and update of the EMPr; - Liaison between the Project Proponent, Contractors, Authorities and other lead stakeholders on all environmental concerns, including the implementation of the EMPr; - Compilation of monthly Environmental Control Report/s (ECR) to ensure compliance with the EMPr and authorisations. Reports should be submitted to the relevant authority on a monthly basis; - Monitor compliance with this EMPr; - Monitor compliance with the EA; - Monitor implementation of the mitigation and rehabilitation measures and recommendations referred to in the EA, preceding environmental assessment, participating specialists and this EMPr. - Recommend the issuing site instructions to the EPC contractor for corrective actions required; - ECO site inspections should be undertaken at least once a month to ensure compliance with the EMPr. The duration of these visits may be increased or decreased at the discretion of the ECO in consultation with the holder of the EA. The Environmental Site Agent as described below should be on site daily and be in communication with the ECO on a daily basis; - Attendance of regular contractors' site meetings; - Maintain a record of environmental incidents (e.g., spills, impacts, legal transgressions etc.) as well as corrective and preventative measures taken. - Maintain public complaints register in which all complaints and action taken / responses must be recorded. - Keep Record of all activities on site, problems identified, transgressions noted, and a task schedule of tasks undertaken by the ECO; and • The holder of the EA, on advice from the ECO, has the authority to stop work on site if he / she consider that any actions of excessive non-compliance of the EMPr, authorisations or General Duty of Care are taking place. • The ECO must remain employed until all rehabilitation measures are completed. 					<p>Monitoring at DFFE.</p> <p>ECO to submit monthly Environmental Control Report to the Director: Compliance Monitoring at DFFE.</p>
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In addition to the ECO, this EMPr requires the appointment of a Environmental Site Agent (ESA) for the duration of the construction period of the project (this ESA must be appointed in the pre-construction phase, prior to the commencement of construction activities). The ESA need not be independent and can be appointed by the EPC.

Impact management outcome: To ensure independent full time environmental expertise on site to monitor and report on compliance

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • The ESA must be appointed prior to the commencement of any physical activities. • The ESA will be responsible for daily monitoring, reviewing and verifying compliance by the EPC Contractor with the environmental specifications of this EMPr and the conditions of the EA. • The appointed ESA must be suitably qualified and have experience of environmental monitoring and control. • The main responsibilities of the ESA include but are not limited to the following: <ul style="list-style-type: none"> - To ensure compliance with the EMPr and EA; - The ESA is required to be on site daily, which may be reviewed by the ECO and holder of the EA as construction requirements dictate; - Undertaking environmental induction of all staff; - Attending all on site construction meetings (including, but not limited to, technical and progress meetings); - Providing the ECO with a weekly environmental checklist; - Developing and maintaining a detailed photographic site record throughout the construction phase of the project; - Maintaining file records of all method statements provided by the contractors; - Management and ensuring timeous and effective rehabilitation of the site; - Maintain a record of environmental incidents (e.g., spills, impacts, legal transgressions etc.) as well as corrective and preventative measures taken. This information must also be included in the weekly reports; - Maintain public complaints register in which all complaints and action taken / responses must be recorded. 	EPC Contractor	The EPC contractor to appoint independent ESA and ensure that ESA is suitably qualified and experienced.	ESA to be appointed prior to construction	ESA will undertake physical monitoring.	The ESA to monitor site daily and provide a formal report back weekly.	<p>The name and contact details of the appointed ESA to be submitted to the Director: Compliance Monitoring at DFFE.</p> <p>Weekly Environmental Checklists to be provided to the EPC and the ECO.</p>

Impact Management Actions	Responsible person	Method implementation of	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> - If the ESA observes non-compliance that requires a “stop work” order, the ECO must immediately be informed and will request the holder of the EA to issue such an order if necessary. • The ESA must remain employed until all rehabilitation measures are completed. 						

The ECO must have a minimum of a tertiary level qualification in the natural sciences field, as well as at least 8 years’ experience and proven competency as an ECO, with extensive experience on similar scale Developments.

The ESA must have a minimum of a tertiary level qualification, as well as at least 1 years’ experience on similar scale developments and proven competency as an ECO.

4.3 PRE-CONSTRUCTION ENVIRONMENTAL COMPLIANCE WORKSHOP

It is a required action that a pre-construction environmental compliance workshop be undertaken before any construction commences on site.

Impact management outcome: To ensure that all senior contract staff members have an in-depth knowledge of the environmental requirements for the site in terms of the EA and EMPr.

Impact Management Actions	Responsible person	Method implementation of	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • It is a required action that a pre-construction environmental compliance workshop be undertaken before any construction commences on site. This workshop can be combined with a site handover meeting but must take place before any activities take place on site and before any plant is moved onto site. 	Holder of the EA	The holder of the EA must arrange the invites to the workshop. ECO to present the workshop	Prior to commencement of construction.	ECO	Once off.	ECO to issue minutes of the workshop, to be included in first monthly environmental control report.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • The purpose of this workshop is to ensure that all relevant senior personnel are familiar with the provisions of the EMP, as well as the conditions of the EA. • The following people must be present at this Environmental Compliance Workshop: <ul style="list-style-type: none"> - The holder of the EA; - The ECO; - The EPC Contractor (including contract manager, site agent and foreman); - The sub-EPC contractor if appointed - The Electrical Contractor (including contract manager, site agent and foreman); - The Consulting Engineers (electrical, civil and structural, whichever applicable); and - Project and Asset Management. • Provision should be made in contract and tender documentation to attend a 6-hour workshop that will be chaired by the ECO. • Due to covid regulations and concerns, this workshop may take place on a virtual platform or on site. 						

4.4 PRE-CONSTRUCTION ECOLOGICAL REQUIREMENTS

It is required that, a pre-construction survey of the final development footprint must be conducted to ascertain the identity and exact numbers of individuals of protected species affected by the proposed development. A copy of this ecological walkthrough report is attached in Appendix L. No clearing of vegetation may take place until such time as all required permits in terms of both the provincial and national legislation are in place.

A single integrated permit, which covers nationally or provincially listed plant species permitting requirements, as well as meets TOPS regulations, must be obtained from the Cape Nature prior to the any plant rescue / transplant and/or removal activities. A licence for the removal of species protected in terms of the National Forest Act may also be required.

The ESA should be present for the site preparation and initial clearing activities to ensure the correct demarcation of no-go areas and supervise any flora relocation and faunal rescue activities that may need to take place during the site clearing.

4.5 WATER CONSERVATION.

It is important that the proposed water conservation infrastructure for both the construction as well as operational phases is considered at the pre-construction phase prior to any procurement taking place.

Impact management outcome: To ensure design criteria promotes sustainable resource use.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<p>All buildings should be fitted with rainwater collection and storage systems to supply water to the taps and toilets in these buildings, as well as any outdoor requirements (landscaping, washing etc).</p> <p>All toilets (excluding temporary toilets) should be fitted with dual flush systems¹¹.</p> <p>All taps to be installed in the control / substation / workshop buildings must be fitted with low-flow faucets.¹².</p> <p>The design of any temporary water reservoirs for construction water should have the smallest practically possible surface area to reduce evaporation. Under no circumstances will the discharge of treated water, wastewater or effluent be allowed.</p>	Holder of the EA	The design engineers must consider all relevant resource conservation measures in the design phase of the development	Prior to commencement of construction.	ECO / ESA	During and on completion of all associated building infrastructure on site.	Monthly ECO Report.

4.6 AVIFAUNAL MANAGEMENT

To reduce impact on the Avifaunal Component of the site, the following management actions take place during the pre-construction phase of the development.

- ¹¹ Conservative estimates have shown that a saving of more than 22 000 litres per household (this could apply to the workshops that are occupied by day and night staff) can be achieved annually with the installation of dual flush toilets (Aquanotion, 2008).
- ¹² Low flow faucets use aerators to reduce the flow of the water. These can either be built into the faucet or added as an aftermarket product. The faucets in bathrooms should have a peak flow of less than 10 litres per minute.

Impact	Mitigation/Management Objectives and Outcomes	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Avifauna: Entrapment					
Entrapment of medium and large terrestrial birds between the perimeter fences, leading to mortality.	Prevent mortality of avifauna	A single perimeter fence should be used ¹³ . No electrified wires should be within 300m of the ground. Protect remaining habitat within the farm portion.	Design the facility with a single perimeter fence or with two fences at least 4 metres apart.	Once-off during the planning phase.	Project Developer

5. CONSTRUCTION PHASE – IMPACT MANAGEMENT OUTCOMES AND ACTIONS

This section provides details on the construction phase impact management outcomes and actions¹⁴ that are commonly applicable to the development of a PV Energy Facility and its associated infrastructure as well as management actions outlined by participating specialists, EAP and those contained in the EA for the facility.

Each subsection includes an aspect identified for the development of a PV Energy Facility, and for each aspect a set of prescribed impact management outcomes and associated impact management actions have been identified.

The holder of the EA is ultimately responsible to ensure the implementation of these outcomes and actions.

The signed method statements prepared by the EPC contractor to achieve these environmental management outcomes must be appended to this EMPr as Appendix N¹⁵ and kept on record in the EMPr file.

5.1 CONSTRUCTION PHASING

- ¹³ A fence consisting of an outer diamond mesh fence and inner electric fence with a separation distance of approximately 100mm would not pose any risk of entrapment for large terrestrial species and can be considered a single fence.
- ¹⁴ All Environmental Management Actions allocated to the EPC contractor will apply equally to all sub-contractors responsible for any specific task.
- ¹⁵ Method statements only to be appended once they are approved by the ECO.

There are a number of important aspects of the construction phasing that must be implemented to ensure that the potential impact on the environment is kept to a minimum. The EPC contractor must implement the following requirements regarding phasing, when developing the construction programme. This construction programme must be approved by the holder of the EA with input from the ECO.

- The main access road, perimeter fence and internal road network to access the panel arrays should be established first and then all vehicular movement must be restricted to within this road network - This will minimise the impact of construction traffic on the undeveloped portion of the property. The only vehicles allowed to move off this road network are those needed to install the PV Mounting structures (i.e., Drills and Piling machines).
- Sites that will be temporarily disturbed by the construction activities (i.e., Temporary access, material loading, temporary storage, turning circles, etc.) must also be included in the road access network.

5.2 ENVIRONMENTAL AWARENESS AND TRAINING

It is a required action that the ESA, in consultation with the EPC, shall ensure that all construction workers receive an induction presentation, as well as on-going environmental education and awareness, on the importance and implications of the EMP, EA and the environmental requirements they prescribe.

The ESA must keep records of all environmental training sessions, including names, dates and the information presented. Details of the environmental induction are also to be included in the weekly environmental checklists and monthly environmental control reports.

Impact management outcome: All onsite staff are aware and understand the individual responsibilities in terms of this EMP.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • All staff must receive environmental induction training prior to undertaking any activities on site; • The EPC contractor must provide 24h notice to the ESA to arrange a suitable time for the ESA to present the induction training; • Refresher environmental awareness training is available as and when required; • All staff are aware of the conditions and controls linked to the EA and within the EMP and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMP; 	EPC Contractor and ESA	<p>ESA to present a pre-prepared environmental induction to all staff prior to them undertaking any activities on site.</p> <p>EPC to ensure that all environmental awareness posters</p>	Throughout construction period	ESA	Weekly as part of the weekly environmental checklist.	Signed environmental induction attendance registers to be appended to weekly environmental checklist and monthly

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • The EPC contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum: <ul style="list-style-type: none"> - Safety notifications; - Faunal Occurrences and risks; - Photographic plates of all listed and protected flora; - Hydrocarbon Spill management and correction and - Waste Management. • Environmental awareness training must include as a minimum the following: <ul style="list-style-type: none"> - Description of significant environmental impacts, actual or potential, related to their work activities; - Mitigation measures to be implemented when carrying out specific activities; - Environmental emergency preparedness and response procedures; - No Go Areas - Procedures to be followed when working near or within sensitive areas; - Wastewater management procedures; - Water usage and conservation; - Solid waste management procedures; - Sanitation procedures; - Fire prevention; - Faunal conflicts and - Vegetation management and protected & listed flora. • The EPC contractor must provide translation services to Ensure that the environmental induction be translated into the relevant languages. 		<p>are in place at a minimum of 2 locations on site and that these posters are maintained.</p> <p>ESA to attend toolbox talks at least once a week, where an environmental topic is presented (this topic should be linked to current environmental concerns on the site at that stage)</p>				environmental control report.

5.3 DEMARCATION OF NO-GO AREAS

It is required that all areas outside of the physical development footprint are to be demarcated as no-go areas and access to these areas restricted. All construction activities must be restricted to demarcated areas to restrict the impact on sensitive environmental features. The impact management actions detailed below will help in achieving this end.

Impact management outcome: To ensure the protection of all the natural areas, sensitive features and buffer areas outside of the physical development footprint

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> The exact footprint of the construction area, including panel foundations and all roads (including access, haul and internal roads which must make use of the final road layout) and infrastructure are to be surveyed and pegged before any physical construction commences on site. To ensure effective demarcation of no-go areas, the construction of the perimeter fence should be the first activity that takes place on site. All sensitive features as identified by specialists or ECO within the footprint must be demarcated for exclusion. Appropriate signage is to be placed at all No-Go Areas The contractor, in conjunction with the ECO and ESA, must walk the areas determined and mark the full extent of the area to be disturbed (allowing sufficient space for the construction activity); All areas beyond these demarcated areas are considered as “no-go” areas; Construction staff must be briefed as part of the environmental induction on the requirements regarding the no-go areas; and Any protected trees or plants that are to remain within the development footprint are to be physically demarcated. 	EPC Contractor	<p>The EPC contractor to ensure that all no-go demarcations are in place and maintained for the duration of the contract.</p> <p>The ESA to ensure that compliance with the no-go policy forms part of the environmental induction.</p> <p>ESA to monitor compliance with no-go areas.</p>	<p>Survey and pegging to commencement of construction.</p> <p>Formal perimeter fence to be constructed in parallel to site establishment</p>	ESA / ECO	<p>ESA to monitor Daily.</p> <p>ECO to monitor Monthly.</p>	<p>Weekly environmental checklists.</p> <p>Monthly environmental control reports.</p>

5.4 ESTABLISHMENT OF CONTRACTORS SITE CAMP AND TEMPORARY LAYDOWN AREA.

No temporary site camps are allowed outside of the development footprint.

The position of the contractors site camp and temporary laydown area must as be shown in the approved site layout plan. It must be noted that the contractors site camp and laydown area are temporary areas for use during the duration of construction. These areas must be rehabilitated on completion of construction as detailed in section 5.20 below. A permanent laydown area not exceeding 1 Hectare may remain for the duration of the operational phase of the project.

Impact management outcome: To ensure that the high impact activities that typically take place in a contractor's site camp / laydown area are restricted to a predefined area that does not contain any sensitive features and is rehabilitated on completion of construction.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • The Contractors Site Camp and Temporary Laydown must be situated within the development area in the position identified in the approved Site Layout Plan • No temporary site camps will be allowed outside of the development footprint; • Any necessary plant rescue within the site camp and temporary laydown must be undertaken prior to the stripping of topsoil. • Topsoil from the site camp and temporary area must be stripped and stockpiled for re-use during rehabilitation. This must be done prior to levelling and placement of gravel; • The site camp must be suitably fenced off; • All construction material must be stored in the site camp, unless otherwise approved by the ECO. This may exclude PV panel mounting structures and panel components which will be stored at each installation point, as per the manufacturer plans; • No personnel may overnight in the site camp, except in the case of security personnel; • Fires for cooking and/or heating are only allowed within the site camp after consultation with the Health and Safety Representative; • Fuel and other chemicals may only be stored in the camp site; • Storage of waste and waste management must take place within the site camp and must be removed on a regular basis. • Temporary waste pick up points in the field must be moved to the site camp on a daily basis; • The site camp must be provided with sufficient ablution facilities (chemical toilets and potable water) of which the content must be disposed of regularly and at the suitable facilities.; 	EPC Contractor	<p>The EPC contractor to provide method statement for site camp and temporary laydown establishment.</p> <p>The ESA and ECO to monitor compliance with site camp and laydown requirements.</p> <p>ECO to sign off on final rehabilitation of the site camp and temporary laydown area.</p>	<p>Site camp to be established prior to delivery of materials and plant (with the exception of plant and material required for the establishment of the perimeter fence)</p>	ESA / ECO	<p>ESA to monitor Daily.</p> <p>ECO to monitor Monthly.</p>	<p>Weekly environmental checklists.</p> <p>Monthly environmental control reports.</p>

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> Any security lighting must be restricted to the Site Camp and Laydown area and no security lighting may be placed in the field; Lighting during both the construction as well as operational phase of the development must be a low-pressure sodium or Led type, preferably yellow or warm white; All security lighting should be attached to motion sensors and be dark sky friendly¹⁶; and On completion of construction, the site camp and temporary laydown area must be rehabilitated as directed. 						

5.5 MANAGEMENT OF TOPSOIL

Topsoil from all excavations and construction activities must be salvaged and reapplied during reclamation.

In terms of best practice and for rehabilitation purposes, it is essential that at least 300mm layer of topsoil from the building and road footprints (i.e., the on-site substation, auxiliary buildings, contractor’s site camp and temporary laydown area) be stripped and stockpiled prior to the commencement of construction activities in each area. Topsoil should not be stripped from the development footprint below the solar arrays except where trenching for cabling is required (in which case topsoil should be placed on the opposite side of the trench from the subsoils and placed back in the same trench when cables are covered up).

Impact management outcome: To ensure that the handling of topsoil does not result in the pollution or loss of the resource.

¹⁶ In order to achieve this, all lighting should only be on when needed, only light the area that needs it, be no brighter than necessary, minimize blue light emissions and be fully shielded (pointing downward).

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • The EPC must ensure sufficient topsoil is reclaimed to provide for rehabilitation of temporary disturbed areas as well as for long term storage for rehabilitation post operations. • A minimum 300mm layer of topsoil must be stripped from the access, internal and perimeter roads, on-site substation, auxiliary buildings, contractors site camp and temporary laydown area; • The topsoil stockpile sites must be approved by the ECO and may not be within any sensitive areas as defined by the ECO; • Topsoil stockpiles may not obstruct natural water pathways and drainage channels. • The topsoil may not be stockpiled within any of the remaining natural areas (i.e., any open spaces between modules). An existing disturbed area within or adjacent to the laydown areas should rather be chosen for this purpose; • The topsoil stockpiles must be protected from erosion and dust as indicated by the ECO and this EMPr; • The topsoil stockpiles must be clearly demarcated to avoid contamination; • No topsoil may be mixed with subsoil; • No topsoil may be used as bedding material for cable trenches; • Topsoil stockpiles must not exceed 2m in height and stockpiles older than 6 months must be enriched before they are re-used. • The topsoil must be replaced into disturbed areas (road verges, cable trenches and contractors site camp) on completion of construction; 	EPC Contractor	<p>The EPC contractor to provide method statement for topsoil management.</p> <p>The ESA and ECO to advise on the placement of topsoil stockpiles.</p> <p>The ESA and ECO to monitor compliance.</p> <p>ECO to sign off on final rehabilitation of the site camp and temporary laydown area.</p>	Prior to construction activities in each specific area.	ESA / ECO	<p>ESA to monitor Daily.</p> <p>ECO to monitor Monthly.</p>	<p>Weekly environmental checklists.</p> <p>Monthly environmental control reports.</p>

5.6 WATER SUPPLY

This section is specific to water supply during the construction phase. Water supply for the washing of panels is discussed under the operational phase requirements.

Impact management outcome: To ensure water used during construction is lawfully and sustainably utilised.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> The EPC contractor must ensure that all water sources utilised are lawful. The EPC Contractor must ensure a supply of water is available on site for sanitation, drinking, dust suppression and all construction activities. The EPC Contractor must ensure that water supplied for drinking water is of potable standards. Water used for dust suppression on gravel roads must be of a quality compliant with the General Special Effluent Standards (31/03/2009): Temperature: max.25°C, pH: between 5.5 & 7.5 and conductivity: not be increased more than 15% above the intake water & not exceed 250 milli-Siemens per metre (determined at 25°C). No chemically treated or wastewater may be used for dust suppression. Should any temporary water storage reservoirs need to be constructed for the purposes of construction, these must be positioned within the footprint of the development in a position agreed to with the ECO. Sufficient mechanisms to prevent fauna entrapment must be implemented to the satisfaction of the ECO. Carry out Environmental Awareness Training with a discussion on water usage and conservation – This should form part of the Environmental Induction of all construction staff. The EPC contractor must maintain records of all water usage (via metering and / or water tuck logs) for the duration of the construction phase. 	EPC Contractor	<p>The EPC contractor to provide method statement for Water Supply.</p> <p>The EPC Contractor must supply records of tests undertaken on drinking water to show that it is within potable standards (these tests should be done on a three-monthly basis or anytime the water source changes)</p> <p>The EPC to measure (internally) PH, TDS and Conductivity of all water sources on a weekly basis.</p>	<p>Lawfulness and quality testing need to take place prior to construction.</p> <p>Remaining actions applicable for the duration of the construction phase.</p>	<p>EPC Contractor to provide initial and 3 monthly quality test results to ESA.</p> <p>EPC Contractor to supply weekly tests to ESA.</p> <p>Water usage records to be provided by EPC contractor on a weekly basis.</p> <p>ESA / ECO to review results and provide recommendations.</p>	<p>3 Monthly for Potability tests.</p> <p>Weekly for internal testing</p>	<p>Weekly environmental checklists.</p> <p>Monthly environmental control reports.</p>

5.7 VEGETATION CLEARING

The objective of mitigation for any development is to firstly avoid and minimise impacts on vegetation where possible and where these cannot be completely avoided, to compensate for the negative impacts of the development on vegetation and faunal habitats, and to maximise re-vegetation and rehabilitation of disturbed areas. This section deals with the management of impacts associated with the clearing of vegetation. Please refer to the section below for details regarding the rehabilitation and restoration of affected areas after completion of the construction activities.

Some loss of vegetation is an inevitable consequence of the construction of PV facilities, and vegetation clearing required for the laydown area, roads, buildings etc. could impact listed plant species, as well as high-biodiversity plant communities. Vegetation clearing will also lead to habitat loss for fauna and potentially the loss of sensitive faunal species, habitats and ecosystems.

The environmental impact management actions detailed in this section as well as those in the previous section on demarcation of no-go areas will help achieve this end.

It must be noted that no vegetation clearing may occur until such time as permits for the removal of provincially protected species as well as species protected in terms of the National Forest Act are in place.

Impact management outcome: To ensure that vegetation is lawful, minimised and restricted to the development footprint.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • Vegetation clearing can only commence once: <ul style="list-style-type: none"> - All necessary permits are in place, - Plant Rescue has been undertaken, - Development footprint has been Demarcated • Vegetation clearing must be kept to a minimum and restricted to the following areas: <ul style="list-style-type: none"> - Internal Road Network, - Perimeter Road, - Inverter / Transformer Stations, - Laydown Area, - Site Camp and - Building Footprints 	EPC Contractor	The EPC contractor to provide method statement for vegetation clearing activities.	Throughout the duration of construction.	ESA / ECO	Daily	<p>Weekly environmental checklists.</p> <p>Monthly environmental control reports.</p>

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> For the PV Array, the underlying grass/ sedge layer should be left intact (albeit trampled by construction activities) and only the larger woody plants cleared or trimmed. All areas to be cleared should be clearly demarcated, prior to the commencement of clearing activities; Vegetation cleared / removed as part of the site clearing activities must be stockpiled for use during the re-vegetation and rehabilitation stage for brush-packing. The location of the vegetation stockpile can be in the same area as the topsoil stockpile, as designated in consultation with the ECO; Only those individuals of protected plant species directly within the development footprint should be cleared. Those which can be safely left intact (e.g., below or between the solar panel arrays) must not be disturbed; Any vegetation clearing that needs to take place as part of maintenance activities (during construction and operation phases) should be done in an environmentally friendly manner, using the most effective methodology suited to the target species (herbicides and/or manual clearing). 						

5.8 TRENCHING AND CABLING

Electric cables required to connect the inverters to the on-site switching station (i.e., AC cables) within the boundaries of the development must be installed underground, within or parallel to the internal road network and/or paths between the panel rows, as far as possible. Preference should be given to mounting the DC cabling to the panel arrays, although it is understood that there will also be limited trenching associated with the DC cabling.

Cable trench excavation, cable laying and backfill must be carried out in a systematic and continuous operation, minimising the length of trench open at any one time in order to reduce the risk of runoff or faunal entrapment. Cable trenches must be backfilled in such a manner as to prevent the trench from acting as a ditch or a conduit for water flow.

Impact management outcome: To ensure that trenching activities are spatially restricted and do not result in loss or contamination of topsoil resources.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • Trenching shall be kept to a minimum through the use of single trenches for multiple service provision (including communication cabling and AC cabling in the same trenches); • Open trenches to be closed as quickly as possible to prevent faunal entrapment and erosion; • The planning and selection should be done in approximation to the SDP and cognisance shall be given to minimising the potential for soil erosion; • Trench routes with permitted working areas shall be clearly defined and marked with prior to excavation; • The stripping and separation of topsoil and subsoil shall occur on separate sides of the excavated trench and replaced in the same order (i.e., topsoil on top); • Trench lengths shall be kept as short as practically possible before backfilling and compacting; • The ECO may require the planting of additional indigenous vegetation along trench routes in order to speed up rehabilitation (particularly in areas that may be prone to erosion); • Open trenches must be inspected daily for faunal entrapment (small mammals and reptiles), which are to be removed before backfilling of the trenches; • Trenches shall be backfilled to the same level as (or slightly higher to allow for settlement) the surrounding land surface to minimise erosion. Excess soil shall be stockpiled in an area designated by the ECO. • Topsoil may not be used for bedding or blanket material in trenches. 	EPC Contractor	The EPC contractor to provide method statement trenching activities.	Throughout the construction phase	ESA and ECO	Daily	<p>Weekly environmental checklists.</p> <p>Monthly environmental control reports.</p>

5.9 DRILLING AND RAMMING OPERATIONS

It is envisioned that drilling and ramming will be the preferred method of installing the panel support structures / sub-structures. The following actions must be implemented in this regard.

Impact management outcome: To ensure that installation of the sub-structures do not cause pollution or undue mechanical damage to the environment.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> The plant required for the installation of the sub-structures (i.e., the trackers and module mounting structures) is the only plant that is allowed to leave the internal road network. <p>The contractor shall submit a method statement detailing his proposals to prevent pollution (from hydraulic fluids, fuel or oil leaks) during ramming operations. This shall be approved by the Employers Representative and the ECO prior to the onset of any ramming operations;</p> <ul style="list-style-type: none"> The contractor shall take all reasonable measures to limit dust generation as a result of drilling and ramming operations (also see section below addressing management of dust); Noise and dust nuisances shall comply with the applicable standards according to the Occupational Health and Safety (Act No. 85 of 1993) as well as the dust control regulations; Other than the known acceptable impact from trampling, any areas damaged by the ramming and associated activities shall be rehabilitated by the contractor to the satisfaction of the ECO. 	EPC Contractor	The EPC contractor to provide method statement drilling and ramming operations.	Throughout the construction phase	ESA and ECO	Daily	<p>Weekly environmental checklists.</p> <p>Monthly environmental control reports.</p>

5.10 FENCING

During construction it will be necessary to fence in the Contractor's Site Camp (to avoid theft of construction equipment and materials) and the PV Laydown Area/s (to avoid theft of the solar panels and associated infrastructure). This temporary fencing will be restricted to these areas and be removed at the end of the construction phase. The total footprint of the facility will be fenced with a permanent perimeter electrified fence to protect the operational assets.

Electric fencing should not have any strands within 30cm of the ground (to allow for the movement of small mammals and reptiles).

Impact management outcome: To ensure that fencing protects project assets and the environment while limiting impact on faunal passages.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> The establishment of the perimeter fence should be the first activity that takes place on site, as this serves to demarcate the total disturbance footprint. Any sensitive features within the project footprint should be temporarily fenced prior to commencement of construction (refer to above section on the demarcation of no-go areas). This temporary fencing must be replaced with permanent fencing prior to the completion of the construction phase. Temporary storage ponds and topsoil stockpile should be temporarily fenced. The perimeter security fencing should be constructed in a manner which allows for the passage of small and medium sized mammals, at strategic places, such as areas of dense vegetation In accordance with the EA, electrified strands should not be within 30cm of the ground. Only the facility itself should be fenced-off. Other than the fencing around the site camp / laydown area and operational buildings. No lighting may be placed on the perimeter security fencing. The final fencing plan should be submitted to the ECO for comments and approval. 	EPC Contractor	<p>Implementation of the actions herein.</p> <p>EPC contractor to submit final fencing plan to the ECO for approval.</p>	Throughout the construction phase	ESA and ECO	Daily	<p>Weekly environmental checklists.</p> <p>Monthly environmental control reports.</p>

5.11 CONSTRUCTION VEHICLES AND TRAFFIC MANAGEMENT PLAN

Construction vehicles carrying materials to the site, should avoid using roads through densely populated areas as to not disturb existing retail and commercial operations. It is important that a permit for all abnormal loads be obtained from provincial government.

During the EIA for this project, JG Afrika prepared a traffic impact assessment (Attached to this EMPr). This document with the general management of traffic access in terms of the access to the site and management of abnormal loads etc. The EPC contractor must comply with the management requirements detailed in these documents as well as those below:

Impact management outcome: To minimise the impact on the road network from dust and noise pollution as well as the transport of materials and staff to site.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • Stagger component delivery to site • The use of mobile batch plants and quarries near the site would decrease the impact on the surrounding road network • Dust suppression must take place on main access road • Reduce the construction period as far as possible • Maintenance of gravel Roads • Apply for abnormal load permits prior to commencement of delivery via abnormal loads • Assess the preferred route (from port of entry to site) and undertake a 'dry run' to test • Staff and general trips should occur outside of peak traffic periods as far as possible. • Any temporary accesses needed for delivery of large plant and equipment (i.e., plant that cannot pass underneath the MV powerlines entering Manganore Substation must: <ol style="list-style-type: none"> 1. Be utilised in such a manner as not to trigger any listed activities in terms of the 2014 EIA regulations. 2. Must be done with the permission of the affected landowner. 3. Be fully rehabilitated as outlined in section 5.20 after use. 	Holder of the EA and EPC Contractor	<p>Implementation in compliance with the actions defined. Implementation of the measures. Implementation of the measured identified in the TIA's.</p> <p>Regular monitoring of road surface quality.</p> <p>Apply for prior to commencement of construction</p>	Throughout the construction phase	ESA and ECO	<p>At commencement of construction</p> <p>Daily</p>	<p>Weekly environmental checklists.</p> <p>Monthly environmental control reports.</p>

This following section provides additional management actions specifically with regards to management of construction vehicles in respect of bio-physical impacts.

Signs must be placed along construction roads to identify speed limit, travel restriction and other standard traffic control information. Furthermore, all construction vehicles should adhere to a low-speed limit to avoid collisions with susceptible faunal species. The following environmental management actions are required.

Impact management outcome: To ensure that construction traffic does not cause faunal fatalities, nor undue damage to vegetation or pollution of the environment.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • The designated access to the site must be established and clearly signposted prior to physical construction commencing on site. • Speed limits for main access road should be set at 50km per hour. • Speed limits for internal roads must be set at 25km per hour. • Speed control signage to be placed at intervals along the access road, at the entrance to the site and at intervals along the internal road network. • Temporary signage to be in place for the construction phase. This signage to be replaced with permanent signage for the operational phase. • Other than vehicles and plant required for the drilling and ramming operations, no vehicles or plant may leave the access, or internal road network (except when within the site camp and laydown area) • Dust control (as described below) must be implemented the full length of the access road and on all main internal haul roads. • Any faunal fatalities because of vehicles and plant must be reported to the ESA within 1 hour of the incident. 	EPC Contractor	Implementation in compliance with the actions defined.	Throughout the construction phase	ESA and ECO	Daily	<p>Weekly environmental checklists.</p> <p>Monthly environmental control reports.</p>

5.12 CONSTRUCTION WASTE

An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate reduction, recycling and re-use options where appropriate. Where solid waste is disposed of, such disposal shall only occur at a landfill licenced in terms of section 20(b) of the National Environmental Management Waste Act, 2008 (Act 59 of 2008).

It is proposed that the local municipality will provide services in terms of waste removal and sewage for the construction phase of the proposed project. However, should the municipality not have adequate capacity available for the handling of waste and sewage, then the EPC Contractor must make use of private contractors to ensure that the services are provided. The EPC Contractor must also ensure that adequate waste disposal measures are implemented by obtaining waste disposal dockets / slips of all waste and sewage that is removed from site.

Impact management outcome: To promote an integrated waste¹⁷ management approach and ensure the management of waste during the construction phase is both lawful and sustainable.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • All recyclable material (such as module packaging, packaging strips, pallets etc) must be recycled and may not be disposed of as part of the normal waste stream. • A dedicated waste management area should be set up in the contractors site camp / laydown area. This waste management area must as a minimum: <ul style="list-style-type: none"> - Be clearly demarcated and sign posted - Be wind and scavenger proof; - Include separation of waste streams (Recyclable waste, General Waste, Construction Rubble and Hazardous Waste); - Be maintained in a neat and tidy state with waste regularly removed. • The EPC Contractor must provide the ESA with a Waste Management register / report on a weekly Basis. This register / report must include as a minimum: <ul style="list-style-type: none"> - Records of all waste volumes for waste stream, - Proof of all volumes of recycling, - Disposal slips for all waste transported to a landfill, - Disposal slips for all hazardous waste, • All hazardous waste (including chemicals, bitumen, fuel, lubricants, oils, contaminated soil from hydrocarbon spills, paints etc.) shall be disposed of at an approved / registered hazardous-waste landfill site. The Contractor shall provide disposal certificates to the ECO. • All Hazardous waste must be temporary stored in sealed waterproof containers and may not be stored on site for longest than 30 days. • Used oil and grease must be removed from site to an approved used oil recycling company. 	EPC Contractor	The EPC contractor to provide method statement for waste management.	Throughout the construction phase	ESA and ECO. EPC Contractor to provide records of all waste volumes and disposal slips on a weekly basis.	Daily	Weekly environmental checklists. Monthly environmental control reports.

- ¹⁷ Waste in this instance excludes excess overburden from excavations.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • Under NO circumstances may any waste be spoiled on the site. • Where possible, the routine maintenance of construction plant should take place off-site. Where such maintenance must occur, it must be done in the site camp on an impermeable surface with a sump to collect any oil spills. • Temporary waste receptacles in the field must be removed to the dedicated waste management area before the end of each working day. • Ensure that no waste materials or sediments are left in the surrounding drainage lines (because of the construction). • Wastewater must be collected and disposed of at a suitable licenced disposal facility. Proof of disposal (i.e., waste disposal slips or waybills) should be retained on file for auditing purposes 						

5.13 FUEL AND CHEMICAL STORAGE

The above ground storage of fuel is subject to authorisation in terms of the National Environmental Management Act (NEMA EIA regulations) if more than 30m³ is stored on site at any one time. The environmental authorisation for this development does not include authorisation for the storage of more than 30 cubic metres of fuel.

The temporary storage of hazardous or toxic materials / liquids (chemicals, fuels, lubricants and oils) must comply with legislation and the actions in the table below must be implemented.

Impact management outcome: To ensure lawful fuel storage that does not cause soil and water pollution.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • Temporary fuel storage must take place within the contractors site camp and laydown area in an area approved by the ECO; • No storage of fuel may take place on any other portion of the site; • All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up immediately in the appropriate manner, as related to the nature of the spill. • Mobile fuel units used to refuel plant on site must make use of drip trays when refuelling; • Storage facilities may not be located within 60m of any freshwater resources where there is a potential for any spilled fuel to enter the resource; • Fuel storage facilities should be located on flat ground. No cut and fill should take place immediately on or adjacent to fuel storage areas; • All storage tanks should be double lined and be ISO 9001 certified; • All storage tanks must be enclosed by bund walls; • Bund walls must be constructed to contain at least 110% of the total capacity of the storage tanks; • Bund walls must be constructed of impermeable material or lined to ensure that petroleum products cannot escape; • A suitable material should be placed in the base of the bund walls to soak up any accidental spillages; • The tanks should be locked and secured when not in use; • Automatic shut-off nozzles are required on all dispensing units; • Storage tanks should be drained within one week of completion of activities (only unused fuel can be used by the contractor on other work sites or returned to the supplier). If the construction program extends over the builder's shutdown, the contractor must ensure that storage tanks are emptied prior to this period; • All storage tanks, containers and related equipment should be regularly maintained to ensure safe storage and dispensing of material. The engineer is to sign off on the condition and integrity of the storage tanks; • Defective hoses, valves and containment structures should be promptly repaired; 	EPC Contractor	The EPC contractor to provide method statement for chemical and fuel storage.	Throughout the construction phase	ESA and ECO. EPC Contractor maintain a fuel and chemical register and provide this to the ECO on a monthly basis.	Daily	Weekly environmental checklists. Monthly environmental control reports.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> Vehicle and equipment fuelling should be undertaken on a hard impermeable surface, over drip pans or bund walls to ensure spilled fuel or toxic liquids is captured and cleaned up; The area must be totally rehabilitated on completion of the contract and all contaminated material must be carefully removed and disposed of at a licensed dumping site for that purpose; and Spill kits must be made available on-site for the clean-up of spills. A minimum of 2 spill kits must be in the contractors site camp. Spill kits must also be available in the field within 500m of any drilling and ramming operations. 						

5.14 NOISE MANAGEMENT

Although the proposed development is located outside of an urban area, the following noise management actions are applicable to the construction phase of the development due to its proximity to farm homesteads.

The Contractor shall furthermore be responsible for compliance with the relevant legislation with respect to noise inter alia Section 25 of ECA (73 of 1989) and standards applicable to noise nuisances in the Occupational Health and Safety Act (No. 85 of 1993).

Impact management outcome: To ensure nuisance from noise and vibration does not occur.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> It is recommended that noise generation be kept to a minimum and that construction activities be confined to normal working hours (07:00 - 17:00 on Monday to Saturday). Should the Contractor wish to deviate from these work hours, approval must be granted by the Holder of the EA, 	EPC Contractor	As per the stated actions	Throughout the construction phase	ESA and ECO	Daily	Weekly environmental checklists.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • The following noise reduction actions in respect of plant should be implemented: - Provide baffle and noise screens on noisy machines as necessary; - Provide absorptive linings to the interior of engine compartments; - Ensure machinery is properly maintained (fasten loose panels, replace defective silencers); - Switch off machinery immediately when not in use; and - Reduce impact noise by careful handling. 						Monthly environmental control reports.

5.15 CONCRETE MANAGEMENT

Proper concrete management is of utmost importance. Concrete works are likely to be limited to the construction of the on-site sub-station and auxiliary buildings and are not likely to be extensive (the preferred alternative for the panel support structures will make use of a technology that does not require concrete footings, due to rammed piles/earth screws/rock anchors). However, in instances where rammed piles/earth screws or rock anchors will not be practically possible and for other concrete work associated with the substation and inverter stations, the following actions in terms of concrete management should take place.

Cement powder has a high alkaline pH that may contaminate and adversely affect both soil pH and water pH negatively. A rapid change in pH can have consequences on the functioning of soil and water organisms, as well as on the botanical component.

The use of ready-mix trucks delivering concrete directly to site is recommended and mass batching of concrete on site should be limited as far as possible.

Impact management outcome: To ensure that the handling of concrete does not result in pollution of soil or water resources.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • Trucks should deliver pre-mixed concrete to the site and pour the concrete directly into the prepared excavations. • When concrete trucks have unloaded, there is a requirement to wash out the inside of the concrete drum. Water can be provided to the trucks for this purpose (at the discretion of the contractor). Concrete suppliers may NOT dispose of this wash water anywhere on site. Trucks should return to their depot for this purpose. • Any spillages of concrete outside of the excavations (including haulage routes) must be cleaned up immediately by the supplier. • Where small batching of concrete or plaster takes place on site, the following actions must be implemented: <ul style="list-style-type: none"> - Concrete batching may only take place in areas approved by the ECO (preferably in the Site Camp); - Concrete mixing must take place on batching plates unless it is on an area that is to be hard surfaced as part of the development; - Equipment (wheelbarrows, shovels etc) must be washed into a lined settling pond; - Once the settling ponds dry out, the concrete must be removed and dispatched to a suitable disposal site. Ideally, all concrete batching should take place on an area that is to be hard surfaced as part of the development (building floor, road or paved area); • To avoid resource contamination, concrete batching should not be located within 60m of any stormwater management structure. • If an area outside of the site camp is identified for batching it must first be approved by the ECO and all topsoil must be stripped and stockpiled for re-use. • Batching at satellite sites must be done on a batching plate to prevent soil contamination. • Empty cement bags must be treated as hazardous waste and must be treated accordingly. • Cement wash water may not be discharged into the environment. 	EPC Contractor	The EPC contractor to provide method statement for all on site concrete batching.	Throughout the construction phase	ESA and ECO	Daily	<p>Weekly environmental checklists.</p> <p>Monthly environmental control reports.</p>

5.16 FIRE MANAGEMENT AND PROTECTION

As required in the veld and fire management act, it is the landowner's responsibility to develop and maintain firebreaks as well as be sufficiently prepared to combat veld fires. This requirement will fall on the lawful user of the land in respect of the PV Development.

The PV development site is arid, with sparse vegetation cover and fires are not a natural phenomenon in the area. However, under exceptional circumstances, such as following years of exceedingly high rainfall, sufficient biomass may build up to carry fires. Therefore, management of plant biomass within the site should be part of the management of the facility. Grazing by livestock is the simplest and most ecologically sound way to manage plant biomass and is recommended the preferred method to manage plant biomass at the site if found to be viable. Alternative management practices can include brush cutting. Utilisation of non-selective herbicides for the management of biomass is prohibited on site. The following environmental impact management actions must be implemented with regards to fire management.

Impact management outcome: To reduce the risk of fire to infrastructure and environment.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> Fires should only be allowed within fire-safe demarcated areas (and only within the site camp); No fuelwood collection is allowed on-site; The total removal of all invasive alien vegetation should take place to decrease the fire risk – Although there were few invasive plants identified during the environmental process, these may establish to a degree as a result of site disturbance. This must be done in accordance with the Alien Vegetation Management Plan; Cigarette butts may not be thrown in the veld but must be disposed of correctly. The contractor, must designate smoking areas (in compliance with the Tobacco Products Control Amendment Act 63 of 2008) with suitable receptacles for disposal; In case of an emergency, the contact details of the local fire and emergency services must be readily available; 	EPC Contractor	In compliance with the actions defined as well as requirements detailed in the health and safety plan.	Throughout the construction phase	ESA and ECO	Daily	Weekly environmental checklists. Monthly environmental control reports.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> Contractors must ensure that basic firefighting equipment and suitably qualified/experienced personnel are available on site at all times, as per the specifications defined by the health and safety representative / consultant; The fire risk on site is a point of discussion that must take place as part of the pre-construction compliance workshop and the environmental induction training prior to commencement of construction; Biomass from the removal of woody vegetation currently present on site should be chipped to reduce its flammability, and The contractor must also comply with the requirements of the Occupational Health and Safety Act with regards to fire protection. 						

5.17 SANITATION

The EPC must provide sanitation facilities within the construction area and along the road so that workers do not pollute the surrounding environment. These facilities must be removed from the site when the construction phase is completed. Associated waste must be disposed of at a registered waste disposal site.

Impact management outcome: To ensure safe and healthy sanitation for construction staff without increasing pollution risk.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<p>Portable chemical ablution facilities must be made available for the use by construction staff for the duration of the construction period. The following actions must be implemented in this regard:</p> <ul style="list-style-type: none"> Toilet and washing facilities must be available to the site personnel at all times (at the site camp and in the field); These facilities must be situated away from freshwater resources; One toilet for every 15 personnel is required; 	EPC Contractor	As per the stated actions	Throughout the construction phase	ESA and ECO. The EPC Contractor to supply chemical	Daily	Weekly environmental checklists. Monthly environmental control reports.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • The facilities must be serviced on a regular basis to prevent any overflow or spillage; • The servicing contractor must dispose of the waste in an approved manner (e.g., via the municipal wastewater treatment system); • The ECO must be provided with the service providers' details and the service schedule for the site; • The toilets should be secured to ensure that they do not blow over in windy conditions; • All toilet facilities must be removed from site on completion of the contract period, and; • Should the construction period be interrupted by a builder's break, the toilets should be emptied prior to the break. 				toilet service records to the ESA on a weekly basis.		

Sanitation during operation is discussed separately in the sections below.

5.18 BLASTING ACTIVITIES

Since the PV panel mountings will be drilled / rammed into the earth and will thus not require extensive excavation for foundations, it is therefore unlikely that blasting will be required. Should blasting be required for whatever reasons, the following actions must be implemented:

Impact management outcome: To ensure any blasting activities do not disturb sensitive environmental nor social features.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • No blasting may take place within 50m of a borehole without approval of a suitably qualified engineering geologist. Preventative mitigation actions could include installing PVC casing and screens in potentially affected boreholes before blasting, while damaged boreholes will have to be re-drilled; • A current and valid permit shall be obtained from the relevant authorities prior to any blasting activity; • A method statement shall be required for any blasting related activities; • All laws and regulations applicable to blasting activities shall be adhered to at all times; • A qualified and registered blaster shall supervise all blasting and rock splitting operations at all times; • The contractor shall ensure that appropriate pre-blast monitoring records are in place (i.e., photographic and inspection records of structures in close proximity to the blast area); • The contractor shall allow for good quality vibration monitoring equipment and record keeping on site at all times during blasting operations; • The contractor shall ensure that emergency services are notified, in writing, a minimum of 24 hours prior to any blasting activities commencing on site; • The contractor shall take necessary precautions to prevent damage to unique features and the general environment, which includes the removal of fly-rock. Environmental damage caused by blasting / drilling shall be repaired at the contractor's expense to the satisfaction of the ECO; • The contractor shall ensure that adequate warning is provided immediately prior to all blasting. All signals shall also be clearly given; • The contractor shall use blast mats for cover material during blasting. Topsoil may not be used as blast cover; • During demolition, the contractor shall ensure, where possible, that trees in the area are not damaged; • Appropriate blast shaping techniques shall be employed to aid in the landscaping of blast areas, and a method statement to be approved by the Engineer, shall be required in this regard; and • At least one week prior to blasting, the relevant occupants/owners of surrounding land shall be notified by the contractor and any concerns 	EPC Contractor	The EPC contractor to provide method statement for blasting activities should they be needed.	Throughout the construction phase	ESA and ECO.	Daily	<p>Weekly environmental checklists.</p> <p>Monthly environmental control reports.</p>

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
addressed. Buildings within the potential damaging zone of the blast shall be surveyed, preferably with the owner present and any cracks or latent defects pointed out and recorded either using photographs or video. Failing to do so shall render the contractor fully liable for any claim of whatsoever nature, which may arise. The contractor shall indemnify the employer in this regard.						

5.19 THEFT AND ENVIRONMENTAL CRIME

An increase in crime during the construction phase is often a concern. In the case of this development, the risk is likely to be low due to the remote nature of the site. Theft and other crime associated with construction sites is not only a concern for surrounding residents, but also the developer and the contractor. Considering this, contractors need to be proactive in order to curtail theft and crime on and resulting from the construction site.

It is recommended that the contractor develop a jobsite security plan prior to commencement of construction. This jobsite security plan should consider protection of the construction site from both internal and external crime elements, as well as the protection of surrounding communities from internal crime elements. All incidents of theft or other crime should be reported to the South African Police Service, no matter how seemingly insignificant. A copy of the jobsite security plan should be included in the first environmental control report to be submitted to the competent authority.

It is likely that the Contractor's Site Camp and the PV Laydown area/s will be fenced with a temporary fence to avoid theft during construction. Additional security measures during construction may include CCTV camera surveillance and security guards.

Impact management outcome: To ensure that activities on site do not increase the criminal activity of the area.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> The following actions are relevant in this regard (refer to the section above for details of the facility permanent security fencing): The EPC Contractor must develop a Job Site Security Plan for the project. All portable construction equipment and material must be locked away within the Contractor's Site Camp overnight and during holiday periods; Fuel storages tanks must be locked when not in use; All unassembled / un-installed PV materials must be locked within the fenced Laydown areas overnight and during holiday periods. The minimum amount of lighting should be used at night, and this should be of the low-UV emitting kind that attracts less insects. The collection, hunting or harvesting of any plants or animals at the site is strictly forbidden, and thus any person found undertaking any of these actions will be considered guilty of committing a crime. Any incidents of such crimes on nature must be reported to the ECO immediately, who will report the incident to the SAPS. 	EPC Contractor	Implementation of a Job site security plan to be compiled by the EPC.	Jobsite Security Plan to be prepared prior to site establishment Throughout the construction phase	ESA and ECO.	Daily	Weekly environmental checklists. Monthly environmental control reports.

5.20 REHABILITATION AND HABITAT RESTORATION

A detailed Rehabilitation and Habitat Restoration Plan must be compiled by a specialist prior to commencement of any construction activities.

One of the primary objectives of all the previously listed impact management outcomes are to avoid and reduce impact on the receiving environment, thus minimising the rehabilitation and restoration requirements on completion of construction. The EPC contractor must be mindful of this primary objective as part of all activities taking place on site.

Impact management outcome: To restore habitat disturbed during construction activities

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<p>Topsoil management</p> <ul style="list-style-type: none"> • Effective topsoil management is a critical element of rehabilitation, particularly in arid and semi-arid areas where soil properties are a fundamental determinant of vegetation composition and abundance. Although some parts of the site consist of exposed bedrock, most parts of the site have at least some topsoil. Where any excavation or topsoil clearing is required, the topsoil should be stockpiled and later used to cover cleared and disturbed areas once construction activity has ceased. • Excess inert material and other disturbed areas should be reshaped to blend in with the natural contours of the area; • The contractor must be mindful that insufficient topsoil be available for rehabilitation purposes, additional topsoil will need to be sourced from a commercial source at a cost to the contractor. • Topsoil is the top-most layer (0-30cm) of the soil in undisturbed areas. This soil layer is important as it contains nutrients, organic matter, seeds, micro-organisms, fungi and soil fauna. All these elements are necessary for soil processes such as nutrient cycling and the growth of new plants. The biologically active upper layer of the soil is fundamental in the maintenance of the entire ecosystem. • Topsoil should be retained on site in order to be used for site rehabilitation. The correct handling of the topsoil (as detailed earlier in the report) is a key element to rehabilitation success. Firstly, it is important that the correct depth of topsoil is excavated. If the excavation is too deep, the topsoil will be mixed with sterile deeper soil, leading to reduction in nutrient levels and a decline in plant performance on the soil. • Wherever possible, stripped topsoil should be placed directly onto an area being rehabilitated. This avoids stockpiling and double handling of the soil. Topsoil placed directly onto rehabilitation areas contains viable seed, nutrients and microbes that allow it to revegetate more rapidly than topsoil that has been in stockpile for long periods. • If direct transfer is not possible, the topsoil should be stored separately from other soil heaps until construction in an area is complete. The soil should not be stored for a long time and should be used as soon as possible. The longer 	EPC Contractor	<p>Implementation of the actions detailed here.</p> <p>Provision of a sufficient budget to undertake rehabilitation activities</p>	<p>Throughout the construction phase.</p> <p>Physical rehabilitation activities to be completed prior to contractual operations date.</p>	ESA and ECO and Rehabilitation Specialist	Daily	<p>Weekly environmental checklists.</p> <p>Monthly environmental control reports.</p>

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<p>the topsoil is stored, the more seeds, micro-organisms and soil biota are killed.</p> <ul style="list-style-type: none"> Ideally stored topsoil should be used within a month and should not be stored for longer than three months. In addition, topsoil stores should not be too deep, a maximum depth of 1m is recommended to avoid compaction and the development of anaerobic conditions within the soil. <p>Ripping & Substrate preparation</p> <ul style="list-style-type: none"> Before commencement with restoration activities detailed below, all identified rehabilitation areas that are compacted as a result of construction activities must be mechanically ripped. Imported gravel layers (such as in the laydown area and site camp) must be removed prior to ripping and commencing with rehabilitation. <p>Mulching</p> <ul style="list-style-type: none"> Mulching is the covering of the soil with a layer of organic matter of leaves, twigs bark or wood chips, usually chopped quite finely. The main purpose of mulching is to protect and cover the soil surface as well as serve as a source of seed for revegetation purposes. During site clearing the standing woody vegetation should not be cleared and burned, removed or mixed with the soil, but should be cleared separately¹⁸. The cleared vegetation should be stockpiled and used whole or shredded by hand or machine to protect the soil in disturbed areas and promote the return of indigenous species. Where there is a low shrub or grass layer, this material can be cleared and mixed as part of the topsoil (or applied as a top mulch) as this will aid revegetation and recovery when it is reapplied. All mulch should be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-Dring alien invasive plants; 						

¹⁸ Woody vegetation within the PV array should not be mechanically cleared, but rather slashed with a brush-cutter or by hand.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • No harvesting of vegetation may be done outside the area to be disturbed by construction activities; • Brush-cut mulch should be stored for as short a period as possible, and seed released from stockpiles can also be collected for use in the rehabilitation process. <p>Seeding</p> <ul style="list-style-type: none"> • In some areas the natural regeneration of the vegetation may be poor and the application of seed to enhance vegetation recovery may be required as directed by the ECO. • Seed should be collected from plants present at the site and should be used immediately or stored appropriately and used at the start of the following wet season. Seed can be broadcast onto the soil but should preferably be applied in conjunction with measures to improve seedling survival such as scarification of the soil surface or simultaneous application of mulch. • Indigenous seeds may be harvested¹⁹ for purposes of re-vegetation in areas that are free of alien or invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites; • Seed may be harvested by hand and if necessary dried or treated appropriately; • No seed of alien or foreign species should be used or brought onto the site. <p>Transplants</p> <ul style="list-style-type: none"> • Where succulent plants are available or other species which may survive translocation are present, individual plants can be dug out from areas about to be cleared and planted into areas which require revegetation. This can be an effective means of establishing indigenous species quickly, this is however unlikely to be a viable option at the current site as there are few suitable species present, but if the conditions are wet then most species have some probability of surviving. 						

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- ¹⁹ Any seed harvesting required must be done with the appropriate permits in place.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • Plants for transplant should only be removed from areas that are going to be cleared. • Perennial grasses, shrubs, succulents and geophytes are all potentially suitable candidates for transplant. • Transplants should be placed within a similar environment from where they came in terms of aspect, slope and soil depth. • Transplants must remain within the site and may not be transported off the site. • Some species can also grow from cuttings and branches of many succulent species can be rooted in the field. <p>Use of soil savers</p> <ul style="list-style-type: none"> • On steep slopes (unlikely on the development site) and areas where seed and organic matter retention is low, it is recommended that soil savers are used to stabilise the soil surface. Soil savers are synthetic materials, usually constructed of organic material such as hemp or jute and are usually applied in areas where traditional rehabilitation techniques are not likely to succeed. • In areas where soil saver is used, it should be pegged down to ensure that it captures soil and organic matter flowing over the surface. • Soil saver may be seeded directly once applied as the holes in the material catch seeds and provide suitable microsites for germination. Alternatively, fresh mulch containing seed can be applied to the soil saver. <p>General recommendations</p> <p>Progressive rehabilitation is a crucial element of the rehabilitation strategy and should be implemented where feasible.</p> <ul style="list-style-type: none"> • Once re-vegetated, areas should be protected to prevent trampling and erosion. • No construction equipment, vehicles or unauthorised personnel should be allowed onto areas that have been vegetated. • Where rehabilitation sites are located within actively grazed areas, they should be fenced. • Fencing should be removed once a sound vegetative cover has been achieved. 						

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> Any runnels, erosion channels or washaways developing after revegetation should be backfilled and consolidated and the areas restored to a proper stable condition. 						

As highlighted in the introduction to this section, the most cost-effective way to reduce the cost and effort for rehabilitation is to reduce and minimise the disturbance footprint. The installation of the panel arrays without total clearing site (i.e., only the physical removal of the woody species), is the biggest benefit that can be applied in this regard.

The PV panels and roads within the development represent hard surfaces that will generate a lot of runoff. As a result, effective runoff management is essential as is an effective vegetation cover to prevent widespread erosion across the site.

5.21 FAUNAL MANAGEMENT

Impact management outcome: To reduce the direct impact on animals affected by the construction activities.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> Any animals (including snakes, tortoises and lizards) directly threatened by the clearing or construction activities should be removed to a safe location outside of the construction area by the ECO or other suitably qualified/experienced person. All trenches, open excavations and fence lines should be inspected daily (first thing in the morning) for any trapped fauna (particularly small mammals and reptiles). These should be removed to a safe location outside of the construction area by the ECO or other suitably qualified / experienced person. Faunal ladders to be installed in all temporary water storage areas. 	EPC Contractor	Implementation of the actions detailed here.	Throughout the construction phase.	ESA and ECO.	Daily	Weekly environmental checklists. Monthly environmental control reports.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> The development footprint may need to be flushed prior to completion of the perimeter fence to ensure that no large mammals become trapped within the development site. All faunal mortalities are to be reported to the ESA, who must maintain a register of faunal mortalities. The ESA must maintain a register of all faunal observations within the development site. 						

5.22 HERITAGE FEATURES

Should any archaeological sites, artefacts, palaeontological fossils or graves be exposed during construction work, work in the immediate vicinity of the find must be stopped, SAHRA must be informed, and the services of an accredited heritage professional obtained.

Impact management outcome: Impact to heritage resources is minimised.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> Identify, demarcate and prevent impact to all known sensitive heritage features on site in accordance with the No-Go procedure detailed above; Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance; All work in a specific area must cease immediately, if any human remains and/or other archaeological, palaeontological and historical material are uncovered. Such material, if exposed, must be reported to the nearest museum, archaeologist/ palaeontologist (or the South African Police Services), so that a systematic and professional investigation can be 	EPC Contractor	<p>Implementation of the actions detailed here.</p> <p>Implementation of chance find procedure.</p>	Throughout the construction phase.	ESA and ECO.	Daily	<p>Weekly environmental checklists.</p> <p>Monthly environmental control reports.</p>

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
undertaken. Sufficient time must be allowed to remove/collect such material before development recommences in that area.						

6. OPERATIONAL PHASE – IMPACT MANAGEMENT OUTCOMES AND ACTIONS

This section provides details on the operational phase impact management outcomes and actions²⁰ that are commonly applicable to the operation of a PV Energy Facility and its associated infrastructure, as well as management actions outlined by participating specialists and those contained in the EA for the facility.

Each subsection includes an aspect identified for the development of a PV Energy Facility, and for each aspect a set of prescribed impact management outcomes and associated impact management actions have been identified.

The holder of the EA is ultimately responsible to ensure the implementation of these outcomes and actions.

Written notice of intent to commence operations must be submitted to the DFFE at least 14 days prior to the commencement of operations.

6.1 CLEANING OF PV MODULES

Any rainfall on the solar panels would be welcomed due to its cleaning effect, but as mentioned before, the annual predicted rainfall is extremely low. Water for cleaning panels should take place using water from lawful sources and can be supplemented from the rainwater collection / storage systems on site. To further reduce the use of water at the solar facility, the use of alternative panel cleaning methods could be investigated.

Impact management outcome: To ensure that cleaning of PV modules is lawful, resource efficient and does not cause erosion or pollution of the surrounding environment.

• ²⁰ All Environmental Management Actions allocated to the O&M contractor will apply equally to all sub-contractors responsible for any specific task.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • Water for the cleaning of PV modules must be lawful. • Only clean water or biodegradable cleaning materials may be used for washing purposes. • Care should be taken that the wash-water does not cause any erosion (the use of labour intensive, or high pressure/low volume techniques is recommended in this regard). • Water used in the cleaning process is likely to encourage the growth of natural vegetation around the panel arrays and rows, which will require routine brush-cutting / trimming to avoid vegetation shading the panels, interfering with tracking mechanisms or the risk of fires. Under no circumstances should vegetation beneath or around the panel arrays and rows be cleared / removed entirely, as this will result in significant erosion and associated sandblasting of infrastructure. Due to stunted nature of the xerophytic vegetation, it is unlikely that this will need to be done often. Biomass produced from these trimming activities could be chipped and used as mulch under the PV panels (to increase stormwater infiltration and reduce erosion). • The management of a vegetated cover on as much of the site as possible must take place. This will reduce fugitive dust emissions and thus cleaning frequencies. • Where practical, adopt “dry” cleaning methods, such as dusting and sweeping the site before washing down. • Low level and ongoing cleaning of PV panels over time to reduce demand on aquifers. 	O&M Contractor	Implementation of the actions detailed in this section.	Throughout the Operational Phase	O&M Contractor Audit consultant.	Daily by O&M Contractor. Annually as part of operational environmental audits	Operational Environmental Audit Report.

6.2 OPERATIONAL WASTE

During the operational phase of the development, the amount of waste generated is likely to be very minimal and limited to normal domestic waste generated in the office, workshop waste from maintenance activities and damaged PV modules.

It is proposed that the local municipality will provide services in terms of waste removal and sewage for the operational phase (excluding Hazardous Waste and damaged PV Modules) of the proposed project. However, should the municipality not have adequate capacity available for the handling of waste and sewage;

then the O&M Contractor must make use of private contractors to ensure that the services are provided. The O&M Contractor must also ensure that adequate waste disposal measures are implemented by obtaining waste disposal dockets / slips of all waste and sewage that is removed from site.

Impact management outcome: To promote an integrated waste²¹ management approach and ensure the management of waste during the construction phase is both lawful and sustainable

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • Wind and scavenger proof bins must be installed at the maintenance / control buildings and on-site substation and must be emptied on a weekly basis • All hazardous waste (including bitumen, fuel, oils, paints etc.) used during the operation and maintenance of the solar facility shall be disposed of at an approved/registered hazardous-waste landfill site. The contractor responsible for the disposal shall provide disposal certificates to the site manager. • Used oil and grease must be removed from site to an approved used oil recycling company. • Under NO circumstances may any hazardous waste be spoiled on the site. • The servicing of operation/maintenance vehicles may not take place on site. • Damaged PV modules should be stored in a designated area within the O&M complex before being returned to supplier²² for recycling. • Biomass from vegetation management activities must not be disposed of off-site but must be utilised as mulch as part of the ongoing rehabilitation²³. • Wastewater must be collected and disposed of at a suitable licenced disposal facility. Proof of disposal (i.e., waste disposal slips or waybills) should be retained on file for auditing purposes 	O&M Contractor	Implementation of the actions detailed in this section.	Throughout the Operational Phase	O&M Contractor to implement and maintain records. Audit consultant.	Daily by O&M Contractor. Annually / three yearly as part of operational environmental audits	Operational Environmental Audit Report.

- ²¹ Waste in this instance excludes excess oils that may be spilled because of transformer failure. Such an incident is discussed separately under the Hazardous Substances, Leakage and Spillage Plan below.
- ²² Or third-party recycler.
- ²³ This Biomass can be chipped should the volumes be high enough as to pose a fire risk.

6.3 OPERATIONAL GENERAL ECOLOGY CONSIDERATIONS

This section provides general management actions to ensure that operational activities do not degrade the ecological functioning of the site.

Impact management outcome: Ensure that operational activities do not degrade the ecological functioning of the site.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> Dust control should be continued into operation. Any trimming of protected species that may establish under the modules must be done in accordance with a permit. Other than the maintenance of the vegetated layer under the PV modules, NO further clearing of vegetation should take place. Speed limits within the facility must be maintained and enforced. Specialist advice to be sought for the management of any fauna that establishes within the site during operations. The O&M contractor must monitor and report any Avifaunal Mortalities as a result of collision, entrapment or electrocution by project Infrastructure. 	O&M Contractor	Implementation of the actions detailed in this section.	Throughout the Operational Phase	O&M Contractor to implement and maintain records. Audit consultant.	Daily by O&M Contractor. Annually / three yearly as part of operational environmental audits	Operational Environmental Audit Report.

6.4 GENERAL OPERATIONAL MAINTENANCE

The section in the table below details general operational maintenance environmental impact management actions that are not covered in the sections above.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • Lubricants used to grease bearing of panel tracking systems should be conservatively used to avoid leakage or spills. Any leaks or spills that occur during maintenance operations must be cleaned up immediately and the contaminated soil / material disposed on at a registered disposal site for hazardous materials. • The tracks / pathways between the PV panel rows used for cleaning and maintenance of the panels, should be maintained as single tracks and regularly brush-cut and/or mowed to allow reasonable access. • Access roads and the internal road network must be maintained in a condition that allows for reasonable access and minimised erosion potential. All drainage, stormwater management and erosion control structures must be maintained to ensure their proper functioning. • Regular monitoring for erosion to ensure that no erosion problems are occurring at the site because of the roads and other infrastructure. All erosion problems observed should be rectified as soon as possible. • All maintenance vehicles to remain on the demarcated roads. • The conservancy tank, associated with the ablation facilities at the on-site sub-station / maintenance buildings, must be maintained in full working condition. • The perimeter security fence should be routinely patrolled to ensure that it still allows for the passage of small and medium sized mammals, at least at strategic places, and that the electrified strands are not causing animal electrocution. • No unauthorized persons should be allowed onto the site. • The maintenance of the transmission line infrastructure must retain the bird-friendly design features (bird-flappers and insulation). Any bird electrocution and collision events that occur should be recorded, including the species affected and the date. If repeated collisions occur within the same area, then further mitigation and avoidance measures may need to be implemented. • Staff present during the operational phase should receive environmental education to ensure that no hunting, killing or harvesting of plants and animals occurs. 	O&M Contractor	Implementation of the actions detailed in this section.	Throughout the Operational Phase	O&M Contractor to implement and maintain records. Audit consultant.	Daily by O&M Contractor. Annually / three yearly as part of operational environmental audits	Operational Environmental Audit Report.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> All alien plants present at the site should be controlled at least twice a year using the best practice methods for the species present. Bare soil should be kept to a minimum, and at least some grass or low shrub cover should be encouraged under the panels. No pets should be allowed within the solar facility. 						

6.5 AVIFAUNAL MANAGEMENT

The following avifaunal impact management actions must be implemented during the operational phase.

Impact	Mitigation/Management Objectives and Outcomes	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Avifauna: Displacement due to habitat transformation					
Total or partial displacement of avifauna due to habitat transformation associated with the vegetation clearance and the presence of the solar PV plant and associated infrastructure.	Prevent unnecessary displacement of avifauna by ensuring that the rehabilitation of transformed areas is implemented, according to the recommendations of Avifaunal specialist study.	Implementation of the Habitat Restoration Plan	EPC or appointed contractor to provide report	Once-off Once a year As and when required	Project developer Facility Environmental Manager Project developer and facility operational manager
Avifauna: Mortality due to electrocution					
Electrocution of priority avifauna in the onsite substation or inverter station.	Prevention of ongoing electrocution of avifauna through reactive mitigation if necessary, depending on the gravity of the problem.	Implementation of mitigation measures such as insulation of live parts to prevent further electrocutions.	Site investigation to determine causes of the mortality. Implementation of appropriate measures e.g., insulation of live parts with appropriate products.	As and when required	Facility Environmental Manager Facility operational manager

7. ALIEN INVASIVE VEGETATION MANAGEMENT PLAN

Alien Invasive Vegetation Management Plan must be compiled by an Ecological Specialist prior to commencement of construction activities.

8. PLANT RESCUE AND PROTECTION PLAN / RE-VEGETATION AND HABITAT REHABILITATION PLAN

A Plant Rescue and protection Plan must be compiled by an Ecological Specialist prior to the commencement of construction.

9. OPEN SPACE MANAGEMENT PLAN

An Open Space Management Plan must be compiled by an Ecological Specialist prior to commencement of construction.

10. HAZARDOUS SUBSTANCES LEAKAGE OR SPILLAGE MONITORING SYSTEM

The following hazardous substances leakage or spillage monitoring system must be adopted and implemented.

Impact	Environmental Impact Management Action.	Monitoring		
		Methodology	Frequency	Responsibility
Contamination of soil and risk of damage to vegetation and/or fauna through spillage of concrete and cement.	If any concrete mixing takes place on site, this must be carried out in a clearly marked, designated area at the site camp on an impermeable surface (such as on boards or plastic sheeting and/or within a bunded area with an impermeable surface).	Monitor the handling and storage of sand, stone and cement as instructed.	Daily	Holder of the EA, EPC contractor and ECO.
	Bagged cement must be stored in an appropriate facility and at least 10 m away from any water courses, gullies and drains.	Monitor the handling and storage of sand, stone and cement as instructed.	Daily	Holder of the EA, EPC contractor and ECO.
	A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted.	Monitor the handling and storage of sand, stone and cement as instructed.	Daily	Holder of the EA, EPC contractor and ECO.
	Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal	Monitor the handling and storage of sand, stone and cement as instructed.	Daily Monthly	Holder of the EA, EPC contractor and ECO.

Impact	Environmental Impact Management Action.	Monitoring		
		Methodology	Frequency	Responsibility
	facility. Proof of disposal (i.e., waste disposal slips or waybills) should be retained on file for auditing purposes.	Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.		
	Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site. Empty cement bags must be collected from the construction area at the end of every day. Sand and aggregates containing cement must be kept damp to prevent the generation of dust.	Monitor the handling and storage of sand, stone and cement as instructed.	Daily	Holder of the EA, EPC contractor and ECO.
	Any excess sand, stone and cement must be removed from site at the completion of the construction period and disposed at a licenced waste disposal facility. Proof of disposal (i.e., waste disposal slips or waybills) should be retained on file for auditing purposes.	Monitor the handling and storage of sand, stone and cement as instructed. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.	Daily Monthly	Holder of the EA, EPC contractor and ECO.
Contamination of soil and risk of damage to vegetation and/or fauna through spillage of fuels and oils.	Ensure that adequate containment structures are provided for the temporary storage of liquid dangerous goods and hazardous materials on site (such as chemicals, oil, fuel, hydraulic fluids, lubricating oils etc.). Appropriate bund areas must be provided for the storage of these materials at the site camp. Bund areas should contain an impervious surface in order to prevent spillages from entering the ground. Bund areas should have a capacity of 110 % of the volume of the largest tank in the bund (tanks include storage of fuel/diesel).	Monitor the storage and handling of dangerous goods and hazardous materials on site via site audits and record non-compliance and incidents.	Weekly	EPC Contractor and ECO
	Monitor and inspect construction equipment and vehicles to ensure that no fuel spillage takes place. Ensure that drip trays are provided for construction equipment and vehicles as required.	Monitor the construction equipment and vehicles and monitor the occurrence of spills and the management process thereof. Record all spills and lessons learnt.	Daily During spill events	EPC Contractor and ECO
	Contractor to compile a Method Statement for refuelling activities under normal and emergency situations. If on-site servicing and refuelling is required in emergency situations, a designated area must be created at the construction site camp for this purpose. Drip trays ²⁴ or similar impervious materials must be used during these procedures.	Verify if a Method Statement is compiled by reviewing approved and signed off reports. Monitor the refuelling/ servicing process and record the occurrence of any spillages.	Once-off prior to commencement of construction. During emergency refuelling and servicing activities.	ECO

- ²⁴ In addition to the requirement to utilise a drip tray during refuelling, drip trays must be placed under all plant when it is not in use, regardless of whether this plant in the field or at the site camp.

Impact	Environmental Impact Management Action.	Monitoring		
		Methodology	Frequency	Responsibility
	Spilled fuel, oil or grease must be retrieved, and contaminated soil removed, cleaned and replaced.	Monitor the handling and storage of fuels and oils via site audits and monitor if spillages have taken place and if so, are removed correctly. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.	Daily (or during spills)	EPC Contractor and ECO
	Contaminated soil to be collected by the Contractor (under observation of the ECO) and disposed of at a registered waste facility designated for this purpose. Proof of disposal (i.e., waste disposal slips or waybills) should be retained on file for auditing purposes.	Monitor the correct removal of contaminated soil. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.	Daily (or during spills)	EPC Contractor and ECO
	A Spill Response Method Statement must be compiled by the Contractor for the construction phase to manage potential spill events.	Compile a Spill Response Method Statement. Audit signed and approved Spill Response Method Statement.	Once-off (and thereafter updated as required during the construction phase). Once-off (and thereafter as required during the construction phase).	Holder of the EA, EPC contractor and ECO.
	The Contractor must ensure that adequate spill containment and clean-up equipment are provided on site for use during spill events.	Monitor via site audits and record incidents and non-compliance.	Daily/Weekly	ECO and EPC Contractor
	Portable bioremediation kit (to remedy chemical spills) is to be held on site and used as required.	Ensure that a well-maintained portable bioremediation kit is available on site and that construction personnel and contractors are aware of its location and instructions	Daily	EPC Contractor and ECO
	In case of a spillage of hazardous chemicals where contamination of soil occurs, depending on the degree and level of contamination, excavation and removal to a hazardous waste disposal facility could be necessary. If the spillage is widespread and the soil is significantly contaminated, a specialist will need to be immediately appointed to address the spillage. This will usually entail the collection of samples of the contaminated soil followed by analysis in terms of the 2014 National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (i.e., GN 331). If the soil is determined to be significantly	Ensure that a suitably qualified specialist is appointed to collect and analyse the contaminated soil samples in terms of the 2014 Norms and Standards (i.e., GN 331) to determine if the soil is significantly contaminated or not. If the contaminated soil is significantly contaminated, then compliance with	During spill events	Holder of the EA

Impact	Environmental Impact Management Action.	Monitoring		
		Methodology	Frequency	Responsibility
	contaminated, then compliance with Part 8 of the NEMWA should be achieved by the Applicant, including notifying the Minister of Environmental Affairs of the significant contamination.	Part 8 of the NEMWA should be achieved by the Applicant.		
	The Contractor must record and document all significant spill events.	Monitor documentation and records of significant spill events via audits and record non-compliance and incidents.	During spill events	ECO
Contamination of soil and risk of damage to vegetation and/or fauna through spillage of fuels and oils	Monitor and inspect maintenance equipment and vehicles to ensure that no fuel spillage takes place.	Implement specifications for maintenance equipment use as specified by the maintenance Contractor.	Monthly	Holder of the EA
	Spilled fuel, oil or grease is retrieved during operations where possible and contaminated soil removed, cleaned and replaced.	Monitor the handling and storage of fuels and oils via site audits and monitor if spillages have taken place and if so, are removed correctly. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.	During spills	Holder of the EA
	Contaminated soil to be collected by the Contractor and disposed of at a registered waste facility designated for this purpose. Proof of disposal (i.e., waste disposal slips or waybills) should be retained on file for auditing purposes.	Monitor the correct removal of contaminated soil. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.	During spills	Holder of the EA
	A Spill Response Plan must be compiled for the operational phase to manage potential spill events.	Compile a Spill Response Plan. Audit signed and approved Spill Response Method Statement.	Once-off (and thereafter updated as required). Once-off (and thereafter as required).	Holder of the EA and Facility Manager
	Ensure that adequate spill containment and clean-up equipment are provided on site for use during spill events. Portable bioremediation kit (to remedy chemical spills) is to be held on site and used as required.	Ensure that a well-maintained portable bioremediation kit is available on site and that operational	Weekly	Facility Manager

Impact	Environmental Impact Management Action.	Monitoring		
		Methodology	Frequency	Responsibility
		personnel are aware of its location and instructions.		
	In case of a spillage of hazardous chemicals where contamination of soil occurs, depending on the degree and level of contamination, excavation and removal to a hazardous waste disposal facility could be necessary. If the spillage is widespread and the soil is significantly contaminated, a specialist will need to be immediately appointed to address the spillage. This will usually entail the collection of samples of the contaminated soil followed by analysis in terms of the 2014 National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (i.e., GN 331). If the soil is determined to be significantly contaminated, then compliance with Part 8 of the NEMWA should be achieved by the Applicant, including notifying the Minister of Environmental Affairs of the significant contamination.	Ensure that a suitably qualified specialist is appointed to collect and analyse the contaminated soil samples in terms of the 2014 Norms and Standards (i.e., GN 331) to determine if the soil is significantly contaminated or not. If the contaminated soil is significantly contaminated, then compliance with Part 8 of the NEMWA should be achieved by the Applicant.	During spill events	Holder of the EA
	Ensure that adequate containment structures are provided for the temporary storage of liquid dangerous goods and hazardous materials on site (such as chemicals, oil, fuel, hydraulic fluids, lubricating oils etc.). Appropriate bund areas must be provided for the storage of these materials at the PV facility. Bund areas should contain an impervious surface in order to prevent spillages from entering the ground. Bund areas should have a capacity of 110 % of the volume of the largest tank in the bund (tanks include storage of fuel/diesel).	Monitor the storage and handling of dangerous goods and hazardous materials on site via site audits and record non-compliance and incidents.	Weekly	Facility Manager
Impacts due to management solid and liquid wastes disposed of on the site during operational phase.	All operation waste to be removed from the site by an appointed service provider.	Waste removal and disposal to be monitored throughout operation.	Monthly	Facility Manager
	All liquid waste or spills (used oil, paints, lubricating compounds and grease from vehicles passing through the entrance facility) to be packaged and disposed appropriately at a registered landfill site.	Monitor the correct removal of liquid waste or spills. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.	During spills	Holder of the EA
	Adequate containers for the cleaning of equipment and materials (paint, solvent) must be provided to avoid spillages.	Monitor the storage and handling of dangerous goods and hazardous materials on site via site audits and record non-compliance and incidents.	Weekly	Facility Manager

11. STORMWATER MANAGEMENT AND EROSION MANAGEMENT PLAN

The Stormwater Management Plan appended to this EMP must be adopted and Implemented.

12. FIRE MANAGEMENT PLAN

The following Fire Management Plan must be adopted and implemented.

The PV development site is arid, with sparse vegetation cover and fires are not a natural phenomenon in the area. However, under exceptional circumstances, such as following years of exceedingly high rainfall, sufficient biomass may build up to carry fires. Therefore, management of plant biomass within the site should be part of the management of the facility. Grazing by livestock is the simplest and most ecologically sound way to manage plant biomass and is recommended the preferred method to manage plant biomass at the site if found to be practical. Alternative management practices can include brush cutting. Utilisation of non-selective herbicides for the management of biomass is prohibited on site. The following environmental impact management actions must be implemented with regards to fire management.

Impact management outcome: To reduce the risk of fire to infrastructure and environment.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> Fires should only be allowed within fire-safe demarcated areas (and only within the site camp); No fuelwood collection is allowed on-site; 	EPC Contractor	In compliance with the actions defined as well as requirements detailed in the health and safety plan.	Throughout the construction phase	ESA and ECO	Daily	Weekly environmental checklists.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
<ul style="list-style-type: none"> • The total removal of all invasive alien vegetation should take place to decrease the fire risk – Although there were few invasive plants found during the environmental process, these may establish to a degree as a result of site disturbance. This must be done in accordance with the Alien Vegetation Management Plan; • Cigarette butts may not be thrown in the veld but must be disposed of correctly. The contractor, must designate smoking areas (in compliance with the Tobacco Products Control Amendment Act 63 of 2008) with suitable receptacles for disposal; • In case of an emergency, the contact details of the local fire and emergency services must be readily available; • Contractors must ensure that basic firefighting equipment and suitably qualified/experienced personnel are available on site at all times, as per the specifications defined by the health and safety representative / consultant; • The fire risk on site is a point of discussion that must take place as part of the pre-construction compliance workshop and the environmental induction training prior to commencement of construction; • Biomass from the removal of woody vegetation currently present on site should be chipped to reduce its flammability, and • The contractor must also comply with the requirements of the Occupational Health and Safety Act with regards to fire protection. 						Monthly environmental control reports.

13. SPECIALIST ENVIRONMENTAL MANAGEMENT OUTCOMES

During the Environmental Impact Assessment Process, the participating specialists identified the following Environmental Impact Management Outcomes and actions that need to be implemented to ensure the post mitigation impact ratings are achieved.

Terrestrial Ecology

14. SPECIALIST MANAGEMENT PLAN

The aim of the management outcomes is to present the mitigations in such a way that they can be incorporated into the Environmental Management Programme (EMPr), allowing for more successful implementation and auditing of the mitigations and monitoring. **Error! Reference source not found.** presents the recommended mitigation measures and the respective timeframes, targets and performance indicators for the terrestrial assessment.

14.1 TERRESTRIAL ECOLOGY

The focus of mitigation measures is to reduce the significance of potential impacts associated with the development and thereby to:

- Prevent the further loss and fragmentation of vegetation communities and the ecologically sensitive areas in the vicinity of the project area;
- As far as possible, reduce the negative fragmentation effects of the development and enable safe movement of faunal species; and
- Prevent the direct and indirect loss and disturbance of faunal species and community (including potentially occurring species of conservation concern).

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Management outcome: Vegetation and Habitats				
Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. Brush cutting of vegetation beneath the panels should be, implemented, otherwise controlled grazing by small livestock like sheep. No topsoil stripping or complete vegetation removal beneath the panels. No imported material to be placed under the modules.	Life of operation	Project manager, Environmental Officer	Areas of indigenous vegetation	Ongoing
Where possible, existing access routes and walking paths must be made use of.	Construction/Operational Phase	Environmental Officer & Design Engineer	Roads and paths used	Ongoing
All laydown, chemical toilets etc. should be restricted to low sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded. No storage of vehicles or equipment will be allowed outside of the designated project areas.	Construction/Operational Phase	Environmental Officer & Design Engineer	Laydown areas	Ongoing
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species.	Operational phase	Environmental Officer & Contractor	Assess the state of rehabilitation and encroachment of alien vegetation	Quarterly for up to two years after the closure

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion.	Operational and Decommissioning phase	Environmental Officer & Contractor	Woody material around footprint	During Phase
A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.	Life of operation	Environmental Officer & Contractor	Spill events, Vehicles dripping.	Ongoing
A carefully considered surface water/drainage management plan must be developed for the site including attention to the use of environmentally friendly cleaning chemicals for cleaning of panels during the operational phase	Life of operation	Environmental Officer & Design Engineer	Water Quality and presence of erosion	Ongoing
It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.	Life of operation	Project manager, Environmental Officer	Any instances	Ongoing
A fire management plan needs to be compiled and implemented to restrict the impact fire might have on the surrounding areas.	Life of operation	Environmental Officer & Contractor	Fire Management	During Phase
Rocks removed in the construction phased may not be dumped, but can be used in areas where erosion control needs to be performed	Operational phase	Environmental Officer & Contractor	Rock piles	During Phase
Any individual of the nationally protected trees or protected plants that was observed needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. Preferably, the trees/plants can be relocated within the property without a permit or otherwise left unharmed. Hi visibility flags must be placed near any protected plants in order to avoid any damage or destruction of the species. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program.	Life of operation	Project manager, Environmental Officer Lodge Manager	Protected Tree/Plant species	Ongoing
The Solar panel surfaces may not have reflective surfaces which can lead to veld fires	Operational phase	Environmental Officer & Contractor	Fire Management	During Phase
Management outcome: Fauna				
The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments,	Construction/Operational Phase	Project manager, Environmental Officer	Infringement into these areas	Ongoing

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
<ul style="list-style-type: none"> Signs must be put up to enforce this 				
Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals	Construction/Operational Phase	Environmental Officer	Noise levels	Ongoing
<p>No trapping, killing, or poisoning of any wildlife is to be allowed</p> <ul style="list-style-type: none"> Signs must be put up to enforce this; 	Life of operation	Environmental Officer	Evidence of trapping etc	Ongoing
Try incorporating motion detection lights as much as possible to reduce the duration of illumination. Heights of light columns to be minimised to reduce light spill. Baffles, hoods or louvres to also be used to reduce light spill	Construction Phase	Environmental Officer & Design Engineer	Light pollution	Ongoing
Facility lighting during construction & operation should be kept to a minimum and should make use of latest technology to ensure that light disturbance is minimised. This will also reduce the attraction of insects (and in turn insectivorous birds) to the facility	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Light pollution and period of light.	Ongoing
Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible.	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Light pollution and period of light.	Ongoing
All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing
Schedule activities and operations during least sensitive periods, to avoid migration, nesting and breeding seasons.	Life of operation	Project manager, Environmental Officer & Design Engineer	Activities should take place during the day in the case.	Ongoing
Heat generated from the substations must be monitored to ensure it does not negatively affect the local fauna	Life of operation	Environmental Officer & Contractor	Heat generated by substations	Ongoing
All areas to be developed must be walked through prior to any activity to ensure no nests or fauna species are found in the area. Should any Species of Conservation Concern not move out of the area, or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.	Construction and Operational phase	Project manager, Environmental Officer	Presence of Nests and faunal species	Planning, Construction and Rehabilitation
<p>Any holes/deep excavations must be dug and planted in a progressive manner;</p> <p>Should the holes overnight they must be covered temporarily to ensure no small fauna species fall in.</p>	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of trapped animals and open holes	Ongoing
Ensure that cables and connections are insulated successfully to reduce electrocution risk.	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of electrocuted fauna	Ongoing

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Wildlife-permeable fencing with holes large enough for mongoose and other smaller mammals should be installed, the holes must not be placed in the fence where it is next to a major road as this will increase road killings in the area	Planning and construction	Environmental Officer & Contractor, Engineer	Fauna movement corridor	Ongoing
Use environmentally friendly cleaning and dust suppressant products	Construction and operation	Environmental Officer & Contractor, Engineer	Presence of chemicals in and around the project area	Ongoing
Fencing mitigations: <ul style="list-style-type: none"> • Top 2 strands must be smooth wire • Routinely retention loose wires • Minimum 30cm between wires • Place markers on fences 	Planning, construction and operation	Environmental Officer & Contractor, Engineer	Monitor fences for slack wires	Ongoing
Any exposed parts must be covered (insulated) to reduce electrocution risk.	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of electrocuted fauna	Ongoing
Management outcome: Alien species				
The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprint of the roads must be kept to prescribed widths.	Construction/Operational Phase	Project manager, Environmental Officer & Contractor	Footprint Area	Life of operation
An alien management plan must be implemented quarterly for 2 years after phase	Construction phase and Decommissioning phase	Project manager, Environmental Officer & Contractor	Assess presence and encroachment of alien vegetation	Quarterly for 2 years after phase
Management outcome: Dust				
Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces. <ul style="list-style-type: none"> • No non environmentally friendly suppressants may be used as this could result in pollution of water sources 	Life of operation	Contractor	Dustfall	Dust monitoring program.
Management outcome: Waste management				
Waste management must be a priority and all waste must be collected and stored effectively.	Life of operation	Environmental Officer & Contractor	Waste Removal	Weekly
Litter, spills, fuels, chemicals and human waste in and around the project area.	Construction/Closure Phase	Environmental Officer & Health and Safety Officer	Presence of Waste	Daily
A minimum of one toilet must be provided per 10 persons. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area.	Life of operation	Environmental Officer & Health and Safety Officer	Number of toilets per staff member. Waste levels	Daily

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility	Life of operation	Environmental Officer & Health and Safety Officer	Availability of bins and the collection of the waste.	Ongoing
Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned on site	Life of operation	Environmental Officer, Contractor & Health and Safety Officer	Collection/handling of the waste.	Ongoing
Refuse bins will be emptied and secured Temporary storage of domestic waste shall be in covered waste skips. Maximum domestic waste storage period will be 10 days.	Life of operation	Environmental Officer, Contractor & Health and Safety Officer	Management of bins and collection of waste	Ongoing, every 10 days
Management outcome: Environmental awareness training				
All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red / Orange List species, their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr.	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing
Management outcome: Erosion				
Speed limits must be put in place to reduce erosion. <ul style="list-style-type: none"> Reducing the dust generated by the listed activities above, especially the earth moving machinery, through wetting the soil surface and putting up signs to enforce speed limit as well as speed bumps built to force slow speeds; Signs must be put up to enforce this. 	Life of operation	Project manager, Environmental Officer	Water Runoff from road surfaces	Ongoing
Where possible, existing access routes and walking paths must be made use of.	Life of operation	Project manager, Environmental Officer	Routes used within the area	Ongoing
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events and strong winds.	Life of operation	Project manager, Environmental Officer	Re-establishment of indigenous vegetation	Progressively
A stormwater management plan must be compiled and implemented.	Life of operation	Project manager, Environmental Officer	Management plan	Before construction phase: Ongoing

14.2 AVIFAUNA

- At least one additional pre-construction survey is recommended, consisting of a minimum of 2 days which is necessary to inform the final EMP during operation. The survey should coincide with the peak wet season when most of the nearby wetland features in the wider study region are inundated. This will enable the observer to obtain quantified data on waterbird richness and potential flyways, which will contribute towards the understanding of impacts related to collision trauma with the panels.
- A post-construction survey during operation (with a minimum of 2-3 x 3 day surveys during a six month period (including the peak wet season)). The surveys aim to obtain mortality data from birds colliding with the panels to advise on appropriate mitigation measures to be implemented to reduce potential bird mortalities. The surveys should be conducted in a regular and systematic manner by means of direct observations and carcass searches. A management programme must be compiled to assess the efficacy of applied mitigation measures and consult or change measures to reduce on-going mortalities when detected. Additional mitigation measures should be tested or applied, especially if mortalities include birds of prey and species of conservation concern.
- It is possible that bird mortalities due to collision will occur at **existing** power lines even after mitigation. The post-construction monitoring (during operation) should also quantify mortalities (especially vulture mortalities) caused by the existing power line network. The information could then be used to inform the electrical infrastructure mortality incident register. It is suggested that monitoring should be implemented once a month for at least one year when in operation. All searches should be done on foot. A management programme must be compiled to assess the efficacy of applied mitigation measures and consult or change measures to reduce on-going mortalities when detected. Additional mitigation measures should be tested or applied, especially if mortalities include birds of prey and species of conservation concern.

OBJECTIVE 1: <i>Minimise potential collision trauma with infrastructure and augmenting existing information on bird interactions with solar infrastructure</i>	
Project Component/s	» PV panel arrays
Potential Impact	» Collision trauma caused by photovoltaic panels (the "lake-effect")
Activity/Risk Source	» Operation of PV infrastructure
Mitigation: Target/Objective	» Zero bird mortalities due to collision trauma caused by PV panels

Mitigation: Action/Control	Responsibility	Timeframe
<ol style="list-style-type: none"> 1. Apply bird deterrent devices to the PV panels to discourage birds from colonising the infrastructure or to discourage birds from constructing nests. These could include visual or bio-acoustic deterrents such as highly reflective rotating devices, anti-perching devices such as bird guards, scaring or chasing activities involving the use of trained dogs or raptors and/or netting. Nests should be removed when nest-building attempts are noticed. 2. Reduce or minimise the use of outdoor lighting to avoid attracting birds to the lights or to reduce potential disorientation to migrating birds. 3. Use indigenous plant species native to the study area during landscaping and rehabilitation. 4. Implement pre-construction monitoring protocols (as per Jenkins et al., 2017). 	ECO & OM	Operation (on-going)
<ol style="list-style-type: none"> 5. Implement post-construction monitoring and carcass surveys (as per Jenkins et al., 2017) 	ECO & OM	Operation (on-going)
<ol style="list-style-type: none"> 6. Compile management programme to assess efficacy of mitigation and on-going research/trials 	CER & ECO	Construction phase
	ECO & EM	Prior to construction - At least 1 survey of 2 days (during wet season)

OBJECTIVE 2: Minimise collisions and electrocution associated with <u>existing</u> power lines	
Project Component/s	» Existing overhead power lines
Potential Impact	» Collision and electrocution caused by existing power lines
Activity/Risk Source	» Overhead power lines
Mitigation: Target/Objective	» Reduced bird mortalities due to collision/electrocution

Mitigation: Action/Control	Responsibility	Timeframe
1. Apply bird deterrent devices to all existing power lines spanning the facility	ECO & CER	Construction
2. Implement post-construction monitoring and carcass surveys	OM	Operation - daily
3. Compile management programme to assess efficacy of mitigation and on-going research/trials	OM & CER	Operation - monthly for at least one year
4. Report mortalities (number, locality and species) to Electrical Energy Mortality Register at EWT	OM	Operation (on-going)

Mitigation: Action/Control	Responsibility	Timeframe

Performance Indicator	Reduced statistical detection/observation of bird mortalities
Monitoring	<ol style="list-style-type: none"> 1. Implement surveys for carcasses. 2. Implement post-construction monitoring to quantify bird mortalities caused by the power line network. All searches should be done on foot. 3. Compile a management programme to assess the efficacy of applied mitigation measures and consult or change measures to reduce on-going mortalities when detected. Additional mitigation measures should be tested or applied, especially if mortalities include birds of prey and species of conservation concern.

14.3 AGRICULTURAL

Prevention and management of soil erosion:

Project component/s	<ul style="list-style-type: none"> • Construction of infrastructure • Construction of the access road
Potential Impact	Soil particles can be removed from the area through wind and water erosion
Activity/risk source	The removal of vegetation in areas where infrastructure will be constructed.
Mitigation: Target/Objective	To avoid the onset of soil erosion that can spread into other areas

Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> Limit vegetation clearance to only the areas where the surface infrastructure will be constructed. Avoid parking of vehicles and equipment outside of designated parking areas. Plan vegetation clearance activities for dry seasons (late autumn, winter and early spring). Design and implement a Stormwater Management System where run-off from surfaced areas is expected. Re-establish vegetation along the access road to reduce the impact of run-off from the road surface. 	Environmental Officer / SHEQ division	During the entire construction, operational and decommissioning phases

Performance Indicator	No visible signs of soil erosion around the project infrastructure
Monitoring	<ul style="list-style-type: none"> Regular inspections around the constructed infrastructure to detect early signs of soil erosion developing. When signs of erosion are detected the areas must be rehabilitated, using a combination of geo-textiles and re-vegetation to prevent the eroded area(s) from expanding.

Prevention and management of soil pollution:

Project component/s	<ul style="list-style-type: none"> Construction of infrastructure Daily activities and maintenance during the operational phase
Potential Impact	Potential fuel and oil spills from vehicles and waste generation can cause soil pollution.
Activity/risk source	<ul style="list-style-type: none"> Petroleum hydrocarbon (present in oil and diesel) spills by machinery and vehicles during earthworks and the removal of vegetation as part of site preparation. Spills from vehicles transporting workers, equipment, and construction material to and from the construction site. The accidental spills from temporary chemical toilets used by construction workers. The generation of domestic waste by construction workers. Spills from fuel storage tanks during construction. Pollution from concrete mixing. Pollution from road-building materials.

	<ul style="list-style-type: none"> • Any construction material remaining within the construction area once construction is completed. • Containment breaches related to the battery units and any inadvertent chemical exposure therefrom.
Mitigation: Target/Objective	To avoid soil pollution that can harm the surrounding environment and human health.

Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> • Maintenance must be undertaken regularly on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills. • Any waste generated during construction must be stored in designated containers and removed from the site by the construction teams. • Any left-over construction materials must be removed from site. • Ensure battery transport and installation by accredited staff / contractors. • Compile (and adhere to) a procedure for the safe handling of battery cells during transport and installation. 	Environmental Officer / SHEQ division	During the entire construction, operational and decommissioning phases

Performance Indicator	<ul style="list-style-type: none"> • No visible signs of waste and spills within the project site. • No accumulation of contaminants in the soils of the project site.
Monitoring	<ul style="list-style-type: none"> • Regular inspections of vehicles and equipment that enter the project site. • Analysis of soil samples around high-risk areas to determine whether soil contaminants are present. • In the case that soil pollution is detected, immediate remediation must be done.

14.4 HERITAGE

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, fossils of plants, insects, bone or coalified material) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (for example see Figure 8). This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished, then no further monitoring is required.

14.5 VISUAL

Construction Phase

- The laydown and building structures should be located away from neighbouring property farmsteads.
- Following the removal of the vegetation, wind blown dust during construction should be monitored by the ECO to ensure that it does not become a nuisance factor to the local receptors. Should excessive dust be generated from the movement of vehicles on the roads such that the dust becomes visible to the immediate surrounds, dust-retardant measures should be implemented under authorisation of the ECO.
- Topsoil from the footprints of the road and structures should be dealt with in accordance with EMP.
- The buildings should be painted a grey-brown colour.
- Fencing should be simple, diamond shaped (to catch wind-blown litter) and appear transparent from a distance. The fences should be checked on a monthly basis for the collection of litter caught on the fence.
- Signage on the main access roads should be moderated.
- Lights at night have the potential to significantly increase the visual exposure of the proposed project. It is recommended that mitigations be implemented to reduce light spillage (refer to appendix for general guidelines). No overhead lighting to be used for security purposes.
- Limit the height of the PV panels to maximum of 5.5m above ground level.
- To assist in reducing the colour contrast from the BESS system, medium sized trees need to be planted around the area to provide visual screening in the medium-term. The structures also need to be placed away from the R503 receptors.
- All internal power line cables need to be buried so as to reduce visual intrusion to the local landscape.

Operation Phase

- Control of lights at night to allow only local disturbance to the current dark sky night landscape (refer to appendix for general guidelines).
- Continued erosion control and management of dust.
- The buffer needs to be managed to ensure that the area does not become a fire risk.

Decommissioning Phase

- All structures should be removed and where possible, recycled.
- Building structures should be broken down (including foundations).
- The rubble should be managed according to NEMWA and deposited at a registered landfill if it cannot be recycled or reused.
- All compacted areas should be rehabilitated according to a rehabilitation specialist.
- Monitoring for soil erosion should be undertaken on a routine biannual basis for one year following the completion of the Decommissioning Phase.

14.6 TRAFFIC

- As far as practically possible, ensure staff transport is done in the 'Off Peak' period and by bus to reduce impact in the peak periods.
- Stagger material, component, and abnormal load deliveries.
- According to the South African Road Traffic Sign Manual (SARTSM), Adequate road signage on all external roads carrying development traffic.
- Reduction in the speed of vehicles.
- Adequate enforcement of the law.
- Implementation of pedestrian safety initiatives.
- Regular maintenance of farm fences & access cattle grids.
- Construction of gravel roads in terms of Technical Recommendations for Highways (TRH20).
- Implement a road maintenance program under the auspices of the respective transport department; and
- Possible use of approved dust suppressant techniques.
- A more comprehensive route analysis should be completed before construction to better understand the works required and the potential risks.
- No fatal flaws or preferences were identified for any proposed site alternatives, construction laydown areas, substation locations or Power line routes.

15. DECOMMISSIONING PHASE – IMPACT MANAGEMENT OUTCOMES AND ACTIONS

Should the activity ever cease or become redundant, the holder of the authorisation must undertake the required actions as prescribed by legislation at the time and comply with all relevant legal requirements.

After the lifespan of the facility²⁵ (20-25 years), there is a possibility that the entire facility will be decommissioned and closed (although other options for continuation may be investigated)

Appendix 5 of Regulation 982 of the 2014 EIA Regulations contains the required contents of a Closure Plan. The table below shows the minimum requirements for a closure plan. The operating entity for this facility must ensure that the closure plan complies with these requirements as well as any other legislative requirements that may come into effect during the lifecycle of the project.

Requirement	
(1)	A closure plan must include -
(a)	Details of - (i) The EAP who prepared the closure plan; and (ii) The expertise of that EAP.
(b)	Closure objectives.
(c)	Proposed mechanisms for monitoring compliance with and performance assessment against the closure plan and reporting thereon.
(d)	Measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity and associated closure to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development including a handover report, where applicable.
(e)	Information on any proposed avoidance, management and mitigation measures that will be taken to address the environmental impacts resulting from the undertaking of the closure activity.
(f)	A description of the manner in which it intends to – (i) Modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation during closure; (ii) Remedy the cause of pollution or degradation and migration of pollutants during closure. (iii) Comply with any prescribed environmental management standards or practises; or (iv) Comply with any applicable provisions of the Act regarding closure.
(g)	Time periods within which the measure contemplated in the closure plan must be implemented.
(h)	The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of closure.
(i)	Details of all public participation processes conducted in terms of regulation 41 of the Regulation, including – (i) Copies of any representations and comments received from registered interested and affected parties; (ii) A summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments;

• ²⁵ For the purposes of this section, the lifespan of the facility is deemed to be the period of the power purchase agreement.

Requirement
(iii) The minutes of any meetings held by the EAP with interested and affected parties and other role players which record the views of the participants; (iv) Where applicable, an indication of the amendments made to the plan as a result of public participation processes conducted in terms of regulation 41 of these Regulations.
(j) Where applicable, details of any financial provisions for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts.

Within a period of at least 12 months prior to the planned closure and decommissioning of the site, a Closure Plan must be prepared and submitted to the Local Planning Authority, as well as the Provincial and National Environmental Authorities and the Department of Forestry, Fisheries and the Environment (DFFE) for input and approval. This plan must provide detail pertaining to site restoration, soil replacement, landscaping, pro-active conservation, and a timeframe for implementation. Furthermore, the Closure Plan must comply with any additional legislation and guidelines that may be applicable at the time.

Two possible scenarios are considered for this decommissioning phase, as follows:

15.1 SCENARIO 1: TOTAL CLOSURE & DECOMMISSIONING OF SOLAR FACILITY

If the decision is taken at the end of the project lifespan (20 - 25 years) to totally decommission the solar facility i.e., make the land available for an alternative land use, a closure plan as detailed above should be developed and should include provision for the following:

- All concrete and solar infrastructure etc. must be removed from the solar site i.e., panels, support structures etc.;
- The holes where the panel support structures are removed must be levelled and covered with subsoil and topsoil;
- Tracks that are to be utilised for the future land use operations should be left in-situ. The remainder of the tracks to be removed (ripped), topsoil replaced and brush-packed to encourage re-vegetation and minimise erosion;
- All auxiliary buildings and access points should be demolished, and rubble removed, unless they can be used for/by the future land use. The competent authority may prescribe that the landscaping and underground infrastructure i.e., foundations be left *in situ*;
- The underground electric cables must be removed, if they cannot be used in the future land use;
- All material (cables, PV Panels etc.) must be re-used or recycled wherever possible. Functional panels that still produce sufficient output could be repurposed upon decommissioning;
- The disturbed portions of the site must be brush-packed, replanted and/or seeded with locally sourced indigenous vegetation (as prescribed by the competent authorities) to allow re-vegetation and rehabilitation of the site (see plant species list attached);
- Discontinuation of Lease and Easement Agreements for main land and access roads;
- Consider whatever is economically or socially beneficial and risky for the project's Owners and other Stakeholders at this last stage
 - This could include selling equipment on secondary market, recycling of metals and modules as scrap, using some or all the proceeds to pay the local labour for uninstallation work, etc?
 - PV leaves no pollution and the equipment other than the modules which should be reused or recycled (There is an existing market for this).

15.2 SCENARIO 2: PARTIAL DECOMMISSIONING / UPGRADE OF SOLAR FACILITY

Due to low variable costs and loans repaid long ago, any owner of the facility may be interested in prolonging technical, functional, legal and economic lives of the plants for as long as possible, even beyond Power Purchase Agreement.

- This will require disposal of assets with shorter technical lives are critical (inverters, etc). PV modules, substructures, cables have a lifespan that should be longer than 25 years;
- Under this option, the O&M contractor will have to ensure that the validity period of all licences / permits and agreements is extended where necessary and that any legislation that has subsequently been promulgated is considered.

Should more advanced technology become available it may be decided to continue to use the site as a renewable energy / photovoltaic / solar facility. Should this be the case, it is likely that much of the existing infrastructure will be re-used in the upgraded facility.

All infrastructure that will no longer be required for the upgraded facility must be removed as described in Scenario 1 above. The remainder of the infrastructure should remain in place or upgraded depending on the requirements of the new facility. As described for Scenario 1 above, the function PV panels that are still capable of producing sufficient output, could be donated to local schools and clinics. Any upgrades to the facility at this stage must comply with relevant legislation and guidelines of the time.

16. MONITORING AND AUDITING

This section provided additional information of the monitoring and auditing requirements for the facility. It should be read in conjunction with the monitoring requirements outlined in the environmental impact management action tables as well the section on document control and reporting (which mainly deals with the internal monitoring requirements).

Environmental monitoring and audits are fundamental in ensuring the implementation of the management actions contained within this EMP are environmentally sustainable during development and operation of this PV Facility.

16.1 ENVIRONMENTAL MONITORING

16.1.1 Construction ECO and ESA Monitoring

The ECO, assisted by the ESA, is responsible for environmental monitoring during of the construction phase impact management actions as outlined in of this EMP. The monthly environmental control reports compiled by the ECO (which include the weekly environmental checklists compiled by the ESA), as well as the photographic record of works, must be submitted to the Holder of the EA, the EPC contractor, the local authority, the provincial environmental authority, the national environmental authority and Eskom.

The following overarching recording and reporting requirements are required²⁶:

- The holder of the authorisation must keep all records relating to monitoring and auditing on site and make it available for inspection to any relevant and competent authority in respect of this development.
- These compliance records must be submitted to the Director: Compliance monitoring at the DFFE.

16.1.2 Construction Phase Alien Vegetation Monitoring

• ²⁶ This must be read in conjunction with section 2 of the EMP

This section must be read in conjunction with the Alien Invasive Vegetation Management Plan once completed.

The following monitoring actions should be implemented during the construction phase of the development.

Table 4: Alien vegetation monitoring requirements during the construction phase.

Monitoring Action	Indicator	Timeframe
Document alien species present at the site	List of alien species	Preconstruction
Document alien plant distribution	Alien plant distribution map within priority areas	3 Monthly
Document & record alien control measures implemented	Record of clearing activities	3 Monthly
Review & evaluation of control success rate	Decline in documented alien abundance over time	Biannually

16.1.3 Operational Phase Alien Vegetation Monitoring

This section must be read in conjunction with the Alien Invasive Vegetation Management Plan once completed.

The following monitoring actions should be implemented during the operational phase of the development.

Table 5: Alien vegetation monitoring requirements during the operational phase

Monitoring Action	Indicator	Timeframe
Document alien species distribution and abundance over time at the site	Alien plant distribution map	Biannually
Document alien plant control measures implemented & success rate achieved	Records of control measures and their success rate. A decline in alien distribution and cover over time at the site	Biannually
Document rehabilitation measures implemented, and success achieved in problem areas	Decline in vulnerable bare areas over time	Biannually

16.1.4 Rehabilitation and Habitat Restoration Monitoring requirements

As rehabilitation success, particularly in arid areas is unpredictable, monitoring and follow-up actions are important to achieve the desired cover and soil protection.

- Re-vegetated areas should be monitored every 4 months for the first 12 months following construction.
- Re-vegetated areas showing inadequate surface coverage (less than 20% within 12 months after re-vegetation) should be prepared and re-vegetated;
- Any areas showing erosion, should be re-contoured and seeded with indigenous grasses or other locally occurring species which grow quickly.

16.1.5 Plant Rescue Monitoring Requirements

It is important to monitor the success of the plant rescue operations, in order to the licencing authority on such conditional rescue.

Post construction monitoring of plants translocated during search and rescue must be undertaken to evaluate the success of the intervention. Biannual monitoring for 2 years post-transplant should be sufficient to gauge success.

The condition and numbers of all the rescued plants should be recorded and provided to the Audit consultant for inclusion in the environmental audit report.

16.2 ENVIRONMENTAL AUDITING²⁷

The holder of the environmental authorisation must, for the period during which the environmental authorisation is valid, ensure that project compliance with the conditions of the environmental authorisation and the EMPr are audited, and that the audit reports are submitted to the Director: Compliance Monitoring at DFFE

This EMPr recommends that audits be submitted to the following auditing schedule:

- Within 6 months of commencement of construction activities;
- Within 30 days of completion of construction and rehabilitation activities;
- Every 3 years after the initial operational audit.

To promote transparency and cooperative governance, the results of relevant audits should be submitted to:

- The operators of the facility;
- The local authority;
- The provincial environmental authority;
- The national environmental authority: (DFFE); and
- Eskom.

The results of the audit must be recorded in an environmental audit report and any non-compliance must be formally recorded, along with the response-action required or undertaken. Each non-compliance incident report must be issued to the relevant person(s), so that the appropriate corrective and preventative action is taken within an agreed upon timeframe.

The table below shows the legislated requirements of an audit reports, and all relevant environmental audits undertaken as part of this development (during construction and operation) should comply with these requirements.

Table 6: Contents of an audit report

(1) An Environmental audit report prepared in terms of these Regulations must contain:
(a) Details of – (i) The independent person who prepared the environmental audit report; and (ii) The expertise of independent person that compiled the environmental audit report.
(b)Details of – (i) The independent person who prepared the environmental audit report; and (ii) The expertise of independent person that compiled the environmental audit report.
(c) A declaration that the independent auditor is independent in a form as may be specified by the competent authority.
(d) An indication of the scope of, and the purpose for which, the environmental audit report was prepared.
(e) A description of the methodology adopted in preparing the environmental audit report.
(f) An indication of the ability of the EMPr, and where applicable the closure plan to – (i) Sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an on-going basis; (ii) Sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the closure of the facility; and (iii) Ensure compliance with the provisions of environmental authorisation, EMPr, and where applicable, the closure plan.

- ²⁷ To ensure independence, the auditing defined in this section cannot be undertaken, by the Holder of the EA, the EPC contractor, nor the Environmental Control Officer. These should be undertaken by an external audit consultant.

(g) A description of any assumptions made, and any uncertainties or gaps in knowledge.
(h) A description of a consultation process that was undertaken during the course of carrying out the environmental audit report.
(i) A summary and copies of any comments that were received during any consultation process
(j) Any other information requested by the competent authority.

17. METHOD STATEMENTS

Method statements are written submissions by the Contractor to the Employers Representative and ECO in response to the requirements of this EMPr or in response to a request by the Employers Representative or ECO. The Contractor shall be required to prepare method statements for several specific construction activities and/or environmental management aspects.

The Contractor shall not commence the activity for which a method statement is required until the Employers Representative and ECO have approved the relevant method statement.

Method statements must be submitted at least five (5) working days prior to the proposed date of commencement of the specific activity. Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved.

An approved method statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the contract. However, any damage caused to the environment through activities undertaken without an approved method statement shall be rehabilitated at the contractor's cost.

Additional method statements can be requested at the ECO's discretion at any time during the construction phase.

The method statements should include relevant details, such as:

- Construction procedures and location on the construction site;
- Start date and duration of the specific construction procedure;
- Materials, equipment and labour to be used;
- How materials, equipment and labour would be moved to and from the development site, as well as on site during construction;
- Storage, removal and subsequent handling of all materials, excess materials and waste materials;
- Emergency procedures in case of any potential accident / incident which could occur during the procedure;
- Compliance / non-compliance with an EMPr specification and motivation for proposed non-compliance.

17.1 METHOD STATEMENTS REQUIRED

Based on the specifications in this EMPr, the following method statements are likely to be required as a minimum (more method statements may be requested at any time as required under the direction of the ECO):

- Vegetation clearing & topsoil stripping, and associated stockpiling;
- Hazardous substances declaration of use, handling and storage – e.g., for fuels, chemicals, oils and any other harmful / toxic / hazardous materials;
- Cement and concrete batching;
- Traffic, transport & delivery accommodation e.g., need for traffic diversion/turning circles etc.;
- Solid waste management / control procedures;
- Stormwater and wastewater management / control systems;
- Erosion remediation and stabilisation;
- Fire control and emergency procedures;

- Job site security plan;
- Blasting activities (if necessary);
- Drilling and Ramming activities;
- Re-vegetation, rehabilitation and re-seeding.

18. HEALTH & SAFETY

The holder of the Authorisation must train safety representatives, managers and workers in workplace safety. The construction process must be compliant with all safety and health measures by the relevant act.

This section aims to provide a high-level overview to occupational Health and Safety Act but does not in any manner replace the project specific Health and Safety plan which would need to be compiled and approved in terms of this act and associated regulations.

The Occupational Health and Safety Act (No. 85 of 1993) aims to provide for / ensure the health and safety of persons at work or in connection with the activities of persons at work and to establish an advisory council for occupational health and safety.

The main Contractor must ensure compliance with the Occupational Health and Safety Act, as well as that all subcontractors comply with the Occupational Health and Safety Act.

The following is of key importance (Section 8 of the previously mentioned Act):

General duties of employers to their employees

(1) Every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of his employees.

(2) Without derogating from the generality of an employer's duties under subsection (1), the matters to which those duties refer include in particular-

(a) the provision and maintenance of systems of work, plant and machinery that, as far as is reasonably practicable, are safe and without risks to health;

(b) taking such steps as may be reasonably practicable to eliminate or mitigate any hazard or potential hazard to the safety or health of employees, before resorting to personal protective equipment;

(c) making arrangements for ensuring, as far as is reasonably practicable, the safety and absence of risks to health in connection with the production, processing, use, handling, storage or transport of articles or substances;

(d) establishing, as far as is reasonably practicable, what hazards to the health or safety of persons are attached to any work which is performed, any article or substance which is produced, processed, used, handled, stored or transported and any plant or machinery which is used in his business, and he shall, as far as is reasonably practicable, further establish what precautionary measures should be taken with respect to such work, article, substance, plant or machinery in order to protect the health and safety of persons, and he shall provide the necessary means to apply such precautionary measures;

(e) providing such information, instructions, training and supervision as may be necessary to ensure, as far as is reasonably practicable, the health and safety at work of his employees;

(f) as far as is reasonably practicable, not permitting any employee to do any work or to produce, process, use, handle, store or transport any article or substance or to operate any plant or machinery, unless the precautionary measures contemplated in paragraphs (b) and (d), or any other precautionary measures which may be prescribed, have been taken;

(g) taking all necessary measures to ensure that tire requirements of this Act are complied with by every person in his employment or on premises under his control where plant or machinery is used;

(h) enforcing such measures as may be necessary in the interest of health and safety;

(i) ensuring that work is performed, and that plant or machinery is used under the general supervision of a person trained to understand the hazards associated with it and who have the authority to ensure that precautionary measures taken by the employer are implemented; and

(j) causing all employees to be informed regarding the scope of their authority as contemplated in section 37 (1) (b).

19. CONTRACTORS CODE OF CONDUCT

The Contractor's Code of Conduct is a document to be drawn up by the holder of the EA²⁸ and provided to all contractors or subcontractors that undertake any service on site. This code of conduct should include generic conduct rules for construction and operation activities on this Solar Energy Facility and must be signed by all contractors. **This code of conduct does not exonerate contractors from complying with this EMPr and must not be viewed as a stand-alone document.**

The following general template is suggested for this Code of Conduct document and must be adapted and updated to include the provisions of this EMPr, recommendations of participating specialists, conditions of approval of the Environmental Authorisation, conditions imposed by the Local Authority (as part of the rezoning and consent use), as well as all service agreements.

19.1 OBJECTIVES

To ensure compliance with the Conditions of the Environmental Authorisation, the Environmental Management Programme (EMPr), recommendations of participating specialists, conditions imposed by the Local Authority as part of the rezoning and subdivision, as well as the service agreements.

- To ensure the least possible damage to:
 - Existing infrastructure on and adjacent to the site;
 - Indigenous flora and fauna (biophysical environment); and
 - Water quality of surface and groundwater on and surrounding the site;
- Construction and development are undertaken with due consideration to all environmental factors;
- Where such damage occurs, provision is made for re-instatement and rehabilitation;

19.2 ACCEPTANCE OF REQUIREMENTS

To achieve these objectives, the Developer and EPC Contractor bind themselves jointly and severally to fulfil and comply with all the obligations contained herein, as well as prescriptions and obligations contained in other documents controlling the development of this Solar Energy Facility.

19.3 CONTRACTOR'S PRE-CONSTRUCTION OBLIGATIONS

Contractors may not commence any construction of this Solar Energy Facility until:

- The Contractor and the ECO have carried out a joint site inspection (this is to be done as part of the pre-construction compliance workshop as detailed in the EMPr above);
- A qualified ecologist has undertaken an inspection of the final development footprint and determined the number, species and extent of protected / listed plant species within this area;

• ²⁸ or delegated to the EPC contractor.

- A permit for the removal or relocation-and-transplant of any protected / listed plant species must be obtained, where necessary;
- Search and rescue of sensitive plants, within the development footprint has been carried out in compliance with the plant rescue and protection plan and signed off by the ECO (where this is necessary);
- The construction and no-go areas are suitably demarcated to the satisfaction of the ECO;
- Where necessary, approval of Building / Construction Plans has been obtained from the local authority; and
- All contract staff have attended the required environmental induction training and on-going environmental education sessions, as necessary.

19.4 CONTRACTOR'S OBLIGATIONS DURING CONSTRUCTION

- The Contractor is required to comply with the necessary Health and Safety requirements as required by the Occupational Health and Safety Act of 1993;
- The Contractor must comply with the construction requirements as detailed in the EMPr, including the following plans once they are completed prior to commencement of construction:
 - Transport & Traffic Management Plan,
 - Stormwater and Erosion-Control Management Plan,
 - Vegetation Clearing & Plant Rescue Plan (to be developed),
 - Re-vegetation & Rehabilitation Plan (to be developed),
 - Alien Management Plan (to be developed),
 - Open Space Management Plan (to be developed);
- The contractor must comply with all the requirements detailed in the Environmental Authorisation;
- All conditions, processes and fees as prescribed by the Local Authority must be complied with.

20. PENALTIES

Should any person commit an action of non-compliance he/she may be convicted of an offence, in terms of Sub-regulation (1) of the National Environmental Management Act, to imprisonment for a period not exceeding ten years or to a fine not exceeding R10 Million as prescribed in terms of the Adjustment of Fines Act, 1991 (Act No. 101 of 1991).

Apart from a fine resulting from any legal mechanism, the ECO may advise the Employers Representative to impose a penalty for non-compliance in terms of this Environmental Management Programme (EMPr). The procedure detailed below is for a spot fine in terms of this EMPr and does not detail the procedure for fining in terms of any other legal mechanism.

20.1 PROCEDURES

The contractor shall comply with the environmental specifications and requirements of this EMPr, the EA and Section 28 of NEMA, on an on-going basis and any failure on his part to do so will entitle the ER to impose a penalty.

In the event of non-compliance, the following recommended process shall be followed:

- The ECO shall issue a notice of non-compliance to the employer's representative, stating the nature and magnitude of the contravention. A copy shall be provided to the Project Developer / Proponent.
- The Employers Representative will issue this notice to the Contractor.
- The Contractor shall act to correct the transgression within the period specified by the Employers Representative.

- The Contractor shall provide the Employers Representative with a written statement describing the actions to be taken to discontinue the non-compliance, the actions taken to mitigate its effects and the expected results of the actions. A copy shall be provided to the Project Developer / Proponent.
- In the case of the Contractor failing to remedy the situation within the predetermined period, the Employers Representative shall impose a monetary penalty (spot fine) based on the conditions of contract.
- Should the transgression be a blatant disregard of conditions of the EMPr or EA, the Employers Representative (on advice from the ECO) can at their discretion immediately issue a fine and require the remediation (without first giving the contractor a chance to remediate).
- In the case of non-compliance giving rise to physical environmental damage or destruction, the Employers Representative shall be entitled to undertake or to cause to be undertaken such remedial works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so.
- In the event of a dispute, difference of opinion, etc. between any parties in regard to or arising out of interpretation of the conditions of the EMPr, disagreement regarding the implementation or method of implementation of conditions of the EMPr or EA etc. any party shall be entitled to require that the issue be referred to specialists for determination.
- The Employers Representative on advice from the ECO shall always have the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remediation measures.

20.2 OFFENCES AND PENALTIES

Any avoidable non-compliance with the conditions of the EMPR shall be considered sufficient ground for the imposition of a monetary penalty by the Employers Representative.

Possible offences, which should result in the issuing of a contractual penalty, include, but are not limited to:

- Unauthorised entrance into no-go areas;
- Catching and killing of wild animals, and removal or damage to conservation-worthy plant species;
- Open fires outside of the contractor camp site and insufficient fire control;
- Unauthorised damage to natural vegetation;
- Unauthorised camp establishment (including stockpiling, storage, etc.);
- Hydrocarbons / hazardous material: negligent spills / leaks and insufficient storage;
- Ablution facilities: non-use, insufficient facilities, insufficient maintenance;
- Insufficient solid waste management (including clean-up of litter, unauthorised dumping etc.);
- Erosion due to negligence / non-performance;
- Excessive cement / concrete spillage / contamination;
- Non-induction of staff.

21. ABBREVIATIONS

AIA	Archaeological Impact Assessment
BGIS LUDS	Biodiversity Geographic Information System Land Use Decision Support
CBA	Critical Biodiversity Area
CDSM	Chief Directorate Surveys and Mapping
CEMPr	Construction Environmental Management Programme

DEFF	Department of Environment, Forestry and Fisheries
DEA&NC	Department of Environmental Affairs and Nature Conservation
DME	Department of Minerals and Energy
DSR	Draft Scoping Report
EAP	Environmental Impact Practitioner
EHS	Environmental, Health & Safety
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GPS	Global Positioning System
GWh	Giga Watt hour
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
kV	Kilo Volt
LUDS	Land Use Decision Support
LUPO	Land Use Planning Ordinance
MW	Mega Watt
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NPAES	National Protected Area Expansion Strategy
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act

PM	Post Meridiem; "Afternoon"
PSDF	Provincial Spatial Development Framework
S.A.	South Africa
SACAA / CAA	South African Civil Aviation Authority
SAHRA	South African National Heritage Resources Agency
SANBI	South Africa National Biodiversity Institute
SANS	South Africa National Standards
SDF	Spatial Development Framework
TOPS	Threatened and Protected Species

Appendix A : Site Layout Plan – Aristida PV (Included in Draft EIR)

Appendix B : DFFE Generic EMPr for sub-station infrastructure (DFFE, 2019)

GENERIC ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR) FOR THE DEVELOPMENT AND EXPANSION OF SUBSTATION INFRASTRUCTURE FOR THE TRANSMISSION AND DISTRIBUTION OF ELECTRICITY





environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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22. INTRODUCTION

1. BACKGROUND

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) requires that an environmental management programme (EMPr) be submitted where an environmental impact assessment (EIA) has been identified as the environmental instrument to be utilised as the basis for a decision on an application for environmental authorisation (EA). The content of an EMPr must either contain the information set out in Appendix 4 of the Environmental Impact Assessment Regulations, 2014, as amended (EIA Regulations) or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a government notice. Once the Minister has identified, through a government notice that a generic EMPr is relevant to an application for EA, that generic EMPr must be applied by all parties involved in the EA process, including but not limited to the applicant and the competent authority (CA).

2. PURPOSE

This document constitutes a generic EMPr relevant to applications for the development or expansion of substation infrastructure for the transmission and distribution of electricity, and all listed and specified activities necessary for the realisation of such infrastructure.

3. OBJECTIVE

The objective of this generic EMPr is to prescribe and pre-approve generally accepted impact management outcomes and impact management actions, which can commonly and repeatedly be used for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of substation infrastructure for the transmission and distribution of electricity. The use of a generic EMPr is intended to reduce the need to prepare and review individual EMPrs for applications of a similar nature.

4. SCOPE

The scope of this generic EMPr applies to the development or expansion of substation infrastructure for the transmission and distribution of electricity requiring EA in terms of NEMA. This generic EMPr applies to activities requiring EA, mainly activity 11 and 47 of the Environmental Impact Assessment Regulations Listing Notice 1 of 2014, as amended, and activity 9 of the Environmental Impact Assessment Regulations Listing Notice 2 of 2014, as amended, and all associated listed or specified activities necessary for the realization of such infrastructure.

5. STRUCTURE OF THIS DOCUMENT

This document is structured in three parts with an Appendix as indicated in the table below:

Part	Section	Heading	Content
A		Provides general guidance and information and is not legally binding	Definitions, acronyms, roles & responsibilities and documentation and reporting.
B	1	Pre-approved generic EMPr template	<p>Contains generally accepted impact management outcomes and impact management actions required for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of substation infrastructure for the transmission and distribution of electricity, which are presented in the form of a template that has been pre-approved.</p> <p>The template in this section is to be completed by the contractor, with each completed page signed and dated by the holder of the EA prior to commencement of the activity.</p> <p>Where an impact management outcome is not relevant, the words “not applicable” can be inserted in the template under the “responsible persons” column.</p> <p>Once completed and signed, the template represents the EMPr for the activity approved by the CA and is legally binding. The template is not required to be submitted to the CA as once the generic EMPr is gazetted for implementation, it has been approved by the CA.</p> <p>To allow interested and affected parties access to the pre-approved EMPr template for consideration through the decision-making process, the EAP on behalf of the applicant /proponent must make the hard copy of this</p>

Part	Section	Heading	Content
			<p>EMPr available at a public location and where the applicant has a website, the EMPr should also be made available on such publicly accessible website.</p>
	2	Site specific information	<p>Contains preliminary infrastructure layout and a declaration that the applicant/holder of the EA will comply with the pre-approved generic EMPr template contained in <u>Part B: Section 1</u>, and understands that the impact management outcomes and impact management actions are legally binding. The preliminary infrastructure layout must be finalized to inform the final EMPr that is to be submitted with the basic assessment report (BAR) or environmental impact assessment report (EIAR), ensuring that all impact management outcomes and impact management actions have been either pre-approved or approved in terms of <u>Part C</u>.</p> <p>This section must be submitted to the CA together with the final BAR or EIAR. The information submitted to the CA will be considered to be incomplete should a signed copy of <u>Part B: section 2</u> not be submitted. Once approved, this Section forms part of the EMPr for the development and is legally binding.</p>
C		Site specific sensitivities/ attributes	<p>If any specific environmental sensitivities/ attributes are present on the site which require site specific impact management outcomes and impact management actions, not included in the pre-approved generic EMPr, to manage impacts, these specific impact management outcomes and impact management actions must be included in this section. These specific environmental attributes must be referenced spatially and impact management outcomes and impact management actions must be provided. These specific impact management outcomes and impact management actions must be presented in the format of the pre-approved EMPr template (<u>Part B: section 1</u>)</p>

Part	Section	Heading	Content
			<p>This section will not be required should the site contain no specific environmental sensitivities or attributes. However, if <u>Part C</u> is applicable to the site, it is required to be submitted together with the BAR or EIAR, for consideration of, and decision on, the application for EA. The information in this section must be prepared by an EAP and must contain his/her name and expertise including a curriculum vitae. Once approved, Part C forms part of the EMPr for the site and is legally binding.</p> <p>This section applies only to additional impact management outcomes and impact management actions that are necessary for the avoidance, management and mitigation of impacts and risks associated with the specific development or expansion and which are not already included in <u>Part B: section 1</u>.</p>
Appendix 1			<p>Contains the method statements to be prepared prior to commencement of the activity. The method statements are not required to be submitted to the competent authority.</p>

6. COMPLETION OF PART B: SECTION 1: THE PRE-APPROVED GENERIC EMPr TEMPLATE

The template is to be completed prior to commencement of the activity, by providing the following information for each environmental impact management action:

- For implementation
 - a 'responsible person',
 - a method for implementation,
 - a timeframe for implementation
- For monitoring
 - a responsible person
 - frequency
 - evidence of compliance.

The completed template must be signed and dated by the holder of the EA prior to commencement of the activity. The method statements prepared and agreed to by the holder of the EA must be appended to the template as Appendix 1. Each method statement

must be signed and dated on each page by the holder of the EA. This template once signed and dated is legally binding. The holder of the EA will remain responsible for its implementation.

7. Amendments of the impact management outcomes and impact management actions

Once the activity has commenced, a holder of an EA may make amendments to the impact management outcomes and impact management actions in the following manner:

- Amendment of the impact management outcomes: in line with the process contemplated in Regulation 37 of the EIA Regulations; and
- Amendment of the impact management actions: in line with the process contemplated in Regulation 36 of the EIA Regulations.

8. Documents to be submitted as part of part B: section 2 site specific information and declaration

Part B: Section 2 has three distinct sub-sections. The first and third sub-sections are in a template format. Sub-section two requires a map to be produced.

Sub-section 1 contains the project name, the applicant's name and contact details, the site information, which includes coordinates of the property or farm in which the proposed substation infrastructure is proposed as well as the 21-digit Surveyor General code of each cadastral land parcel and, where available, the farm name.

Sub-section 2 is to be prepared by an EAP and must contain his/her name and expertise including a curriculum vitae. This sub-section must include a map of the site sensitivity overlaid with the preliminary infrastructure layout using the national web based environmental screening tool, when available for compulsory use at: <https://screening.environment.gov.za/screeningtool>. The sensitivity map shall identify the nature of each sensitive feature e.g. threatened plant species, archaeological site, etc. Sensitivity maps shall identify features both within the planned working area and any known sensitive features and within 50 m from the development footprint.

Sub-section 3 is the declaration that the applicant (s)/proponent (s) or holder of the EA in the case of a change of ownership must complete which confirms that the applicant/EA holder will comply with the pre-approved 'generic EMPr' template in Section 1 and understands that the impact management outcomes and impact management actions are legally binding.

(a) AMENDMENTS TO PART B: SECTION 2 – SITE SPECIFIC INFORMATION AND DECLARATION

Should the EA be transferred, Part B: Section 2 must be completed by the new applicant/proponent and submitted with the application for an amendment of the EA in terms of regulations 29 or 31 of the EIA Regulations, whichever applies. The information submitted as part of such an application for an amendment to an EA will be considered to be incomplete should a signed copy of Part B: Section 2 not be submitted. Once approved, Part B: Section 2 forms part of the EMPr for the development and the EMPr becomes legally binding to the new EA holder.

3. PART A – GENERAL INFORMATION

1. DEFINITIONS

In this EMPr any word or expression to which a meaning has been assigned in the NEMA or EIA Regulations has that meaning, and unless the context requires otherwise –

"clearing" means the clearing and removal of vegetation, whether partially or in whole, including trees and shrubs, as specified;

"construction camp" is the area designated for key construction infrastructure and services, including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management;

"contractor" - The Contractor has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract, are in line with the Environmental Management Programme and that Method Statements are implemented as described.

"hazardous substance" is a substance governed by the Hazardous Substances Act, 1973 (Act No. 15 of 1973) as well as the Hazardous Chemical and Substances Regulations, 1995;

"method statement" means a written submission by the Contractor to the Project Manager in response to this EMPr or a request by the Project Manager and ECO. The method statement must set out the equipment, materials, labour and method(s) the Contractor proposes using to carry out an activity identified by the Project Manager when requesting the Method Statement. This must be done in such detail that the Project Manager and ECO is able to assess whether the Contractor's proposal is in accordance with this specification and/or will produce results in accordance with this specification;

The method statement must cover as a minimum applicable details with regard to:

- (i) Construction procedures;
- (ii) Plant, materials and equipment to be used;
- (iii) Transporting the equipment to and from site;
- (iv) How the plant/ material/ equipment will be moved while on site;
- (v) How and where the plant/ material/ equipment will be stored;
- (vi) The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- (vii) Timing and location of activities;
- (viii) Compliance/ non-compliance; and
- (ix) Any other information deemed necessary by the Project Manager.

"slope" means the inclination of a surface expressed as one unit of rise or fall for so many horizontal units;

“solid waste” means all solid waste, including construction debris, hazardous waste, excess cement/ concrete, wrapping materials, timber, cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers);

“spoil” means excavated material which is unsuitable for use as material in the construction works or is material which is surplus to the requirements of the construction works;

“topsoil” means a varying depth (up to 300 mm) of the soil profile irrespective of the fertility, appearance, structure, agricultural potential, fertility and composition of the soil;

“works” means the works to be executed in terms of the Contract

2. ACRONYMS AND ABBREVIATIONS

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

RI&AP's	Registered Interested and affected parties
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3. ROLES AND RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) IMPLEMENTATION

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

- Table 7: Guide to roles and responsibilities for implementation of an EMPr

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

Responsible Person(s)	Role and Responsibilities
Developer Site Supervisor (DSS)	<p><u>Role</u></p> <p>The DSS reports directly to the DPM, oversees site works, liaises with the contractor(s) and the ECO. The DSS is responsible for the day to day implementation of the EMPr and for ensuring the compliance of all contractors with the conditions and requirements stipulated in the EMPr.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - Ensure that all contractors identify a contractor's Environmental Officer (cEO); - Must be fully conversant with the conditions of the EA. Oversees site works, liaison with Contractor, DPM and ECO; - Must ensure that all landowners have the relevant contact details of the site staff, ECO and cEO; - Issuing of site instructions to the Contractor for corrective actions required; - Will issue all non-compliances to contractors; and - Ratify the Monthly Environmental Report.
Environmental Control Officer (ECO)	<p><u>Role</u></p> <p>The ECO should have appropriate training and experience in the implementation of environmental management specifications. The primary role of the ECO is to act as an independent quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts. In this respect, the ECO is to conduct periodic site inspections, attend regular site meetings, pre-empt problems and suggest mitigation and be available to advise on incidental issues that arise. The ECO is also required to conduct compliance audits, verifying the monitoring reports submitted by the cEO. The ECO provides feedback to the DSS and Project Manager regarding all environmental matters. The Contractor, cEO and dEO are answerable to the Environmental Control Officer for non-compliance with the Performance Specifications as set out in the EA and EMPr.</p> <p>The ECO provides feedback to the DSS and Project Manager, who in turn reports back to the Contractor and potential and Registered Interested & Affected Parties' (RI&AP's), as required. Issues of non-compliance</p>

Responsible Person(s)	Role and Responsibilities
	<p>raised by the ECO must be taken up by the Project Manager, and resolved with the Contractor as per the conditions of his contract. Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e. those that are deemed to be a variation, not allowed for in the Performance Specification) must be endorsed by the Project Manager. The ECO must also, as specified by the EA, report to the relevant CA as and when required.</p> <p><u>Responsibilities</u></p> <p>The responsibilities of the ECO will include the following:</p> <ul style="list-style-type: none"> - Be aware of the findings and conclusions of all EA related to the development; - Be familiar with the recommendations and mitigation measures of this EMPr; - Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them; - Undertake regular and comprehensive site inspections / audits of the construction site according to the generic EMPr and applicable licenses in order to monitor compliance as required; - Educate the construction team about the management measures contained in the EMPr and environmental licenses; - Compilation and administration of an environmental monitoring plan to ensure that the environmental management measures are implemented and are effective; - Monitoring the performance of the Contractors and ensuring compliance with the EMPr and associated Method Statements; - In consultation with the Developer Site Supervisor order the removal of person(s) and/or equipment which are in contravention of the specifications of the EMPr and/or environmental licenses; - Liaison between the DPM, Contractors, authorities and other lead stakeholders on all environmental concerns; - Compile a regular environmental audit report highlighting any non-compliance issues as well as satisfactory or exceptional compliance with the EMPr; - Validating the regular site inspection reports, which are to be prepared by the contractor Environmental Officer (cEO);

Responsible Person(s)	Role and Responsibilities
	<ul style="list-style-type: none"> - Checking the cEO's record of environmental incidents (spills, impacts, legal transgressions etc.) as well as corrective and preventive actions taken; - Checking the cEO's public complaints register in which all complaints are recorded, as well as action taken; - Assisting in the resolution of conflicts; - Facilitate training for all personnel on the site – this may range from carrying out the training, to reviewing the training programmes of the Contractor; - In case of non-compliances, the ECO must first communicate this to the Senior Site Supervisor, who has the power to ensure this matter is addressed. Should no action or insufficient action be taken, the ECO may report this matter to the authorities as non-compliance; - Maintenance, update and review of the EMPr; - Communication of all modifications to the EMPr to the relevant stakeholders.
<p>developer Environmental Officer (dEO)</p>	<p><u>Role</u></p> <p>The dEOs will report to the Project Manager and are responsible for implementation of the EMPr, environmental monitoring and reporting, providing environmental input to the Project Manager and Contractor's Manager, liaising with contractors and the landowners as well as a range of environmental coordination responsibilities.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - Be fully conversant with the EMPr; - Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Employees, Contractor(s) ; - Confine the development site to the demarcated area; - Conduct environmental internal audits with regards to EMPr and authorisation compliance (on cEO);

Responsible Person(s)	Role and Responsibilities
	<ul style="list-style-type: none"> - Assist the contractors in addressing environmental challenges on site; - Assist in incident management: - Reporting environmental incidents to developer and ensuring that corrective action is taken, and lessons learnt shared; - Assist the contractor in investigating environmental incidents and compile investigation reports; - Follow-up on pre-warnings, defects, non-conformance reports; - Measure and communicate environmental performance to the Contractor; - Conduct environmental awareness training on site together with ECO and cEO; - Ensure that the necessary legal permits and / or licenses are in place and up to date; - Acting as Developer's Environmental Representative on site and work together with the ECO and contractor;
Contractor	<p><u>Role</u></p> <p>The Contractor appoints the cEO and has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract are in line with the EMPr and that Method Statements are implemented as described. External contractors must ensure compliance with this EMPr while performing the onsite activities as per their contract with the Project Developer. The contractors are required, where specified, to provide Method Statements setting out in detail how the impact management actions contained in the EMPr will be implemented during the development or expansion of substation infrastructure for the transmission and distribution of electricity activities.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - project delivery and quality control for the development services as per appointment; - employ a suitably qualified person to monitor and report to the Project Developer's appointed person on the daily activities on-site during the construction period; - ensure that safe, environmentally acceptable working methods and practices are implemented and that equipment is properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely;

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

Responsible Person(s)	Role and Responsibilities
	<ul style="list-style-type: none">- Assist the ECO with the preparing of the monthly report; and- Where more than one Contractor is undertaking work on site, each company appointed as a Contractor will appoint a cEO representing that company.

4. ENVIRONMENTAL DOCUMENTATION REPORTING AND COMPLIANCE

To ensure accountable and demonstrated implementation of the EMPr, a number of reporting systems, documentation controls and compliance mechanisms must be in place for all substation infrastructure projects as a minimum requirement.

4.1 Document control/Filing system

The holder of the EA is solely responsible for the upkeep and management of the EMPr file. As a minimum, all documentation detailed below will be stored in the EMPr file. A hard copy of all documentation shall be filed, while an electronic copy may be kept where relevant. A duplicate file will be maintained in the office of the DSS (where applicable). This duplicate file must remain current and up-to-date. The filing system must be updated and relevant documents added as required. The EMPr file must be made available at all times on request by the CA or other relevant authorities. The EMPr file will form part of any environmental audits undertaken as prescribed in the EIA Regulations.

4.2 Documentation to be available

At the outset of the project the following preliminary list of documents shall be placed in the filing system and be accessible at all times:

- Full copy of the signed EA from the CA in terms of NEMA, granting approval for the development or expansion;
- Copy of the generic and site specific EMPr as well as any amendments thereof;
- Copy of declaration of implementing generic EMPr and subsequent approval of site specific EMPr and amendments thereof;
- All method statements;
- Completed environmental checklists;
- Minutes and attendance register of environmental site meetings;
- An up-to-date environmental incident log;
- A copy of all instructions or directives issued;
- A copy of all corrective actions signed off. The corrective actions must be filed in such a way that a clear reference is made to the non-compliance record;
- Complaints register.

4.3 Weekly Environmental Checklist

The ECOs are required to complete a Weekly Environmental Checklist, the format of which is to be agreed prior to commencement of the activity. The ECOs are required to sign and date the checklist, retain a copy in the EMPr file and submit a copy of the completed checklist to the DSS on a weekly basis.

The checklists will form the basis for the Monthly Environmental Reports. Copies of all completed checklists will be attached as Annexures to the Environmental Audit Report as required in terms of the EIA Regulations.

4.4 Environmental site meetings

Minutes of the environmental site meetings shall be kept. The minutes must include an attendance register and will be attached to the Monthly Report that is distributed to attendees. Each set of minutes must clearly record "Matters for Attention" that will be reviewed at the next meeting.

4.5 Required Method Statements

The method statement will be done in such detail that the ECOs are enabled to assess whether the contractor's proposal is in accordance with the EMPr.

The method statement must cover applicable details with regard to:

- development procedures;
- materials and equipment to be used;
- getting the equipment to and from site;
- how the equipment/ material will be moved while on site;
- how and where material will be stored;
- the containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- timing and location of activities;
- compliance/ non-compliance with the EMPr; and
- any other information deemed necessary by the ECOs.

Unless indicated otherwise by the Project Manager, the Contractor shall provide the following method statements to the Project Manager no less than 14 days prior to the commencement date of the activity:

- Site establishment – Camps, Lay-down or storage areas, satellite camps, infrastructure;
- Batch plants;
- Workshop or plant servicing;
- Handling, transport and storage of Hazardous Chemical Substance's;
- Vegetation management – Protected, clearing, aliens, felling;
- Access management – Roads, gates, crossings etc.;
- Fire plan;
- Waste management – transport, storage, segregation, classification, disposal (all waste streams);
- Social interaction – complaints management, compensation claims, access to properties etc.;
- Water – use (source, abstraction and disposal), access and all related information, crossings and mitigation;
- Emergency preparedness – Spills, training, other environmental emergencies;
- Dust and noise management methodologies;

- Fauna interaction and risk management – only if the risk was identified – wildlife interaction especially on game farms; and
- Heritage and palaeontology management.

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

4.6 Environmental Incident Log (Diary)

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

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

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

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

The Environmental Incident Log will be captured in the EAR.

4.7 Non-compliance

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

- Time and date of the non-compliance;

- Name of the contractor responsible;
- Nature and description of the non-compliance;
- Recommended / required corrective action; and
- Date by which the corrective action to be completed.
- The contractors shall act immediately when a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the development site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. The ECO should be made aware of any complaints. Any non-compliance with the agreed procedures of the EMPr is a transgression of the various statutes and laws that define the manner by which the environment is managed. Failure to redress the cause shall be reported to the relevant CA for them to deal with the transgression, as it deems fit. The contractor is deemed not to have complied with the EMPr if, inter alia, There is a deviation from the environmental conditions, impact management outcomes and impact management actions activities, as approved in generic and site specific EMPr as relevant as set out in the EMPr, which deviation has, or may cause, an environmental impact.

4.8 Corrective action records

For each non-compliance notice issued, a documented corrective action must be recorded. On receiving a non-compliance notice from the DSS, the contractor's cEO will ensure that the corrective actions required take place within the stipulated timeframe. On completion of the corrective action the cEO is to issue a Corrective Action Report in writing to the ECOs. If satisfied that the corrective action has been completed, the ECOs are to sign-off on the Corrective Action Report, and attach the report to the non-compliance notice in the EMPr file. A corrective action is considered complete once the report has signed off by the ECOs.

4.9 Photographic record

A digital photographic record will be kept. The photographic record will be used to show before, during and post rehabilitation evidence of the project as well used in cases of damages claims if they arise. Each image must be dated and a brief description note attached.

The Contractor shall:

1. Allow the ECOs access to take photographs of all areas, activities and actions.

The ECOs shall keep an electronic database of photographic records which will include:

1. Pictures of all areas designated as work areas, camp areas, development sites and storage areas taken before these areas are set up;
2. All bunding and fencing;
3. Road conditions and road verges;
4. Condition of all farm fences;
5. Topsoil storage areas;
6. All areas to be cordoned off during construction;
7. Waste management sites;
8. Ablution facilities (inside and out);

9. Any non-conformances deemed to be “significant”;
10. All completed corrective actions for non-compliances;
11. All required signage;
12. Photographic recordings of incidents;
13. All areas before, during and post rehabilitation; and
14. Include relevant photographs in the Final Environmental Audit Report.

4.10 Complaints register

The ECOs shall keep a current and up-to-date complaints register. The complaints register is to be a record of all complaints received from communities, stakeholders and individuals. The Complaints Record shall:

1. Record the name and contact details of the complainant;
2. Record the time and date of the complaint;
3. Contain a detailed description of the complaint;
4. Where relevant and appropriate, contain photographic evidence of the complaint or damage (ECOs to take relevant photographs); and
5. Contain a copy of the ECOs written response to each complaint received and keep a record of any further correspondence with the complainant. The ECO's written response will include a description of any corrective action to be taken and must be signed by the Contractor, ECO and affected party. Where a damage claim is issued by the complainant, the ECOs shall respond as described in **(section 4.11)** below.

4.11 Claims for damages

In the event that a Claim for Damages is submitted by a community, landowner or individual, the ECOs shall:

1. Record the full detail of the complaint as described in **(section 4.10)** above;
2. The DPM will evaluate the claim and associated damage and submit the evaluation to the Senior Site Representative for approval;
3. Following consideration by the DPM, the claim is to be resolved and settled immediately, or the reason for not accepting the claim communicated in writing to the claimant. Should the claimant not accept this, the ECO shall, in writing report the incident to the Developer's negotiator and legal department; and
4. A formal record of the response by the ECOs to the claimant as well as the rectification of the method of making payments not amount will be recorded in the EMPr file.

4.12 Interactions with affected parties

Open, transparent and good relations with affected landowners, communities and regional staff are an essential aspect to the successful management and mitigation of environmental impacts.

The ECOs shall:

1. Ensure that all queries, complaints and claims are dealt within an agreed timeframe;
2. Ensure that any or all agreements are documented, signed by all parties and a record of the agreement kept in the EMPr file;
3. Ensure that a complaints telephone numbers are made available to all landowners and affected parties; and
4. Ensure that contact with affected parties is courteous at all times;

4.13 Environmental audits

Internal environmental audits of the activity and implementation of the EMPr must be undertaken. The findings and outcomes included in the EMPr file and submitted to the CA at intervals as indicated in the EA.

The ECOs must prepare a monthly EAR. The report will be tabled as the key point on the agenda of the Environmental Site Meeting. The Report is submitted for acceptance at the meeting and the final report will be circulated to the Project Manager and filed in the EMPr file. At a frequency determined by the EA, the ECOs shall submit the monthly reports to the CA. At a minimum the monthly report is to cover the following:

- Weekly Environmental Checklists;
- Deviations and non-compliances with the checklists;
- Non-compliances issued;
- Completed and reported corrective actions;
- Environmental Monitoring;
- General environmental findings and actions; and
- Minutes of the Bi-monthly Environmental Site Meetings.

4.14 Final environmental audits

On final completion of the rehabilitation and/or requirements of the EA a final EAR is to be prepared and submitted to the CA. The EAR must comply with Appendix 7 of the EIA Regulations.

24. PART B: SECTION 1: PRE-APPROVED GENERIC EMPr TEMPLATE

5. IMPACT MANAGEMENT OUTCOMES AND IMPACT MANAGEMENT ACTIONS

This section provides a pre-approved generic EMPr template with aspects that are common to the development of substation infrastructure for the transmission and distribution of electricity. There is a list of aspects identified for the development or expansion of substation infrastructure for the transmission and distribution of electricity, and for each aspect a set of prescribed impact management outcomes and associated impact management actions have been identified. Holders of EAs are responsible to ensure the implementation of these outcomes and actions for all projects as a minimum requirement, in order to mitigate the impact of such aspects identified for the development or expansion of substation infrastructure for the transmission and distribution of electricity.

The template provided below is to be completed by providing the information under each heading for each environmental impact management action.

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

1.8.1.1 5.1 Environmental awareness training

Impact management outcome: All onsite staff are aware and understands the individual responsibilities in terms of this EMPr.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - All staff must receive environmental awareness training prior to commencement of the activities; - The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course; - Refresher environmental awareness training is available as and when required; - All staff are aware of the conditions and controls linked to the EA and within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr; - The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum: <ul style="list-style-type: none"> a) Safety notifications; and b) No littering. - Environmental awareness training must include as a minimum the following: 	EPC Contractor	Compliance with EMPr / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

<p>a) Description of significant environmental impacts, actual or potential, related to their work activities;</p> <p>b) Mitigation measures to be implemented when carrying out specific activities;</p> <p>c) Emergency preparedness and response procedures;</p> <p>d) Emergency procedures;</p> <p>e) Procedures to be followed when working near or within sensitive areas;</p> <p>f) Wastewater management procedures;</p> <p>g) Water usage and conservation;</p> <p>h) Solid waste management procedures;</p> <p>i) Sanitation procedures;</p> <p>j) Fire prevention; and</p> <p>k) Disease prevention.</p> <p>– A record of all environmental awareness training courses undertaken as part of the EMPr must be available;</p> <p>– Educate workers on the dangers of open and/or unattended fires;</p> <p>– A staff attendance register of all staff to have received environmental awareness training must be available.</p> <p>– Course material must be available and presented in appropriate languages that all staff can understand.</p>						
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5.2 Site Establishment development

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

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - A method statement must be provided by the contractor prior to any onsite activity that includes the layout of the construction camp in the form of a plan showing the location of key infrastructure and services (where applicable), including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous materials storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management; - Location of camps must be within approved area to ensure that the site does not impact on sensitive areas identified in the environmental assessment or site walk through; - Sites must be located where possible on previously disturbed areas; 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

<ul style="list-style-type: none"> - The camp must be fenced in accordance with Section 5.5: Fencing and gate installation; and - The use of existing accommodation for contractor staff, where possible, is encouraged. 						
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5.3 Access restricted areas

Impact management outcome: Access to restricted areas prevented.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - Identification of access restricted areas is to be informed by the environmental assessment, site walk through and any additional areas identified during development; - Erect, demarcate and maintain a temporary barrier with clear signage around the perimeter of any access restricted area, colour coding could be used if appropriate; and - Unauthorised access and development related activity inside access restricted areas is prohibited. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.4 Access roads

Impact management outcome: Minimise impact to the environment through the planned and restricted movement of vehicles on site.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - An access agreement must be formalised and signed by the DPM, Contractor and landowner before commencing with the activities; - All private roads used for access to the servitude must be maintained and upon completion of the works, be left in at least the original condition - All contractors must be made aware of all these access routes. - Any access route deviation from that in the written agreement must be closed and re-vegetated immediately, at the contractor's expense; - Maximum use of both existing servitudes and existing roads must be made to minimize further disturbance through the development of new roads; - In circumstances where private roads must be used, the condition of the said roads must be recorded in accordance with section 4.9: photographic record; prior to use and the condition thereof agreed by the landowner, the DPM, and the contractor; - Access roads in flattish areas must follow fence lines and tree belts to avoid fragmentation of vegetated areas or croplands 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

<ul style="list-style-type: none"> - Access roads must only be developed on a pre-planned and approved roads. 						
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1.8.1.2

1.8.1.3

1.8.1.4

5.5 Fencing and Gate installation

Impact management outcome: Minimise impact to the environment and ensure safe and controlled access to the site through the erection of fencing and gates where required.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - Use existing gates provided to gain access to all parts of the area authorised for development, where possible; - Existing and new gates to be recorded and documented in accordance with section 4.9: photographic record; - All gates must be fitted with locks and be kept locked at all times during the development phase, unless otherwise agreed with the landowner; - At points where the line crosses a fence in which there is no suitable gate within the extent of the line servitude, on the 	<p>EPC Contractor</p>	<p>Compliance with EMPR / Method Statements</p>	<p>Duration of the construction phase</p>	<p>ECO / ESA</p>	<p>Daily</p>	<p>Monthly Environmental Control Reports</p>

<p>instruction of the DPM, a gate must be installed at the approval of the landowner;</p> <ul style="list-style-type: none"> - Care must be taken that the gates must be so erected that there is a gap of no more than 100 mm between the bottom of the gate and the ground; - Where gates are installed in jackal proof fencing, a suitable reinforced concrete sill must be provided beneath the gate; - Original tension must be maintained in the fence wires; - All gates installed in electrified fencing must be re-electrified; - All demarcation fencing and barriers must be maintained in good working order for the duration of the development activities; - Fencing must be erected around the camp, batching plants, hazardous storage areas, and all designated access restricted areas, where applicable; - Any temporary fencing to restrict the movement of life-stock must only be erected with the permission of the land owner. - All fencing must be developed of high quality material bearing the SABS mark; - The use of razor wire as fencing must be avoided; - Fenced areas with gate access must remain locked after hours, during weekends and on holidays if staff is away from site. Site security will be required at all times; - On completion of the development phase all temporary fences are to be removed; - The contractor must ensure that all fence uprights are appropriately removed, ensuring that no uprights are cut at ground level but rather removed completely. 						
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5.6 Water Supply Management

Impact management outcome: Undertake responsible water usage.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - All abstraction points or bore holes must be registered with the DWS and suitable water meters installed to ensure that the abstracted volumes are measured on a daily basis; - The Contractor must ensure the following: <ul style="list-style-type: none"> a. The vehicle abstracting water from a river does not enter or cross it and does not operate from within the river; b. No damage occurs to the river bed or banks and that the abstraction of water does not entail stream diversion activities; and c. All reasonable measures to limit pollution or sedimentation of the downstream watercourse are implemented. - Ensure water conservation is being practiced by: <ul style="list-style-type: none"> a. Minimising water use during cleaning of equipment; b. Undertaking regular audits of water systems; and c. Including a discussion on water usage and conservation during environmental awareness training. d. The use of grey water is encouraged. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.7 Storm and waste water management

Impact management outcome: Impacts to the environment caused by storm water and wastewater discharges during construction are avoided.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - Runoff from the cement/ concrete batching areas must be strictly controlled, and contaminated water must be collected, stored and either treated or disposed of off-site, at a location approved by the project manager; - All spillage of oil onto concrete surfaces must be controlled by the use of an approved absorbent material and the used absorbent material disposed of at an appropriate waste disposal facility; - Natural storm water runoff not contaminated during the development and clean water can be discharged directly to watercourses and water bodies, subject to the Project Manager's approval and support by the ECO; - Water that has been contaminated with suspended solids, such as soils and silt, may be released into watercourses or water bodies only once all suspended solids have been removed from the water by settling out these solids in settlement ponds. The release of settled water back into the environment must be subject to the Project Manager's approval and support by the ECO. 	<p>EPC Contractor</p>	<p>Compliance with EMPR / Method Statements</p>	<p>Duration of the construction phase</p>	<p>ECO / ESA</p>	<p>Daily</p>	<p>Monthly Environmental Control Reports</p>

5.8 Solid and hazardous waste management

Impact management outcome: Wastes are appropriately stored, handled and safely disposed of at a recognised waste facility.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - All measures regarding waste management must be undertaken using an integrated waste management approach; - Sufficient, covered waste collection bins (scavenger and weatherproof) must be provided; - A suitably positioned and clearly demarcated waste collection site must be identified and provided; - The waste collection site must be maintained in a clean and orderly manner; - Waste must be segregated into separate bins and clearly marked for each waste type for recycling and safe disposal; - Staff must be trained in waste segregation; - Bins must be emptied regularly; - General waste produced onsite must be disposed of at registered waste disposal sites/ recycling company; - Hazardous waste must be disposed of at a registered waste disposal site; - Certificates of safe disposal for general, hazardous and recycled waste must be maintained. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.9 Protection of watercourses and estuaries

Impact management outcome: Pollution and contamination of the watercourse environment and or estuary erosion are prevented.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - All watercourses must be protected from direct or indirect spills of pollutants such as solid waste, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and contaminated water or organic material resulting from the Contractor's activities; - In the event of a spill, prompt action must be taken to clear the polluted or affected areas; - Where possible, no development equipment must traverse any seasonal or permanent wetland - No return flow into the estuaries must be allowed and no disturbance of the Estuarine functional Zone should occur; - Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available; - There must not be any impact on the long term morphological dynamics of watercourses or estuaries; - Existing crossing points must be favored over the creation of new crossings (including temporary access) - When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken: <ul style="list-style-type: none"> a) Water levels during the period of construction; 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

<p>No altering of the bed, banks, course or characteristics of a watercourse</p> <p>b) During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained;</p> <p>c) Where earthwork is being undertaken in close proximity to any watercourse, slopes must be stabilised using suitable materials, i.e. sandbags or geotextile fabric, to prevent sand and rock from entering the channel; and</p> <p>d) Appropriate rehabilitation and re-vegetation measures for the watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows.</p>					
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5.10 Vegetation clearing

Impact management outcome: Vegetation clearing is restricted to the authorised development footprint of the proposed infrastructure.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
General:	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environment

<ul style="list-style-type: none"> - Indigenous vegetation which does not interfere with the development must be left undisturbed; - Protected or endangered species may occur on or near the development site. Special care should be taken not to damage such species; - Search, rescue and replanting of all protected and endangered species likely to be damaged during project development must be identified by the relevant specialist and completed prior to any development or clearing; - Permits for removal must be obtained from the relevant CA prior to the cutting or clearing of the affected species, and they must be filed; - The Environmental Audit Report must confirm that all identified species have been rescued and replanted and that the location of replanting is compliant with conditions of approvals; - Trees felled due to construction must be documented and form part of the Environmental Audit Report; - Rivers and watercourses must be kept clear of felled trees, vegetation cuttings and debris; - Only a registered pest control operator may apply herbicides on a commercial basis and commercial application must be carried out under the supervision of a registered pest control operator, supervision of a registered pest control operator or is appropriately trained; - A daily register must be kept of all relevant details of herbicide usage; - No herbicides must be used in estuaries; - All protected species and sensitive vegetation not removed must be clearly marked and such areas fenced off in accordance to Section 5.3: Access restricted areas. 					<p>al Control Reports</p>
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Alien invasive vegetation must be removed and disposed of at a licensed waste management facility.						
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5.11 Protection of fauna

Impact management outcome: Disturbance to fauna is minimised.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - No interference with livestock must occur without the landowner's written consent and with the landowner or a person representing the landowner being present; - The breeding sites of raptors and other wild birds species must be taken into consideration during the planning of the development programme; - Breeding sites must be kept intact and disturbance to breeding birds must be avoided. Special care must be taken where nestlings or fledglings are present; - Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds; - No poaching must be tolerated under any circumstances. All animal dens in close proximity to the works areas must be marked as Access restricted areas; - No deliberate or intentional killing of fauna is allowed; 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

<ul style="list-style-type: none"> - In areas where snakes are abundant, snake deterrents to be deployed on the pylons to prevent snakes climbing up, being electrocuted and causing power outages; and - No Threatened or Protected species (ToPs) and/or protected fauna as listed according NEMBA (Act No. 10 of 2004) and relevant provincial ordinances may be removed and/or relocated without appropriate authorisations/permits. 						
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5.12 Protection of heritage resources

Impact management outcome: Impact to heritage resources is minimised.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - Identify, demarcate and prevent impact to all known sensitive heritage features on site in accordance with the No-Go procedure in Section 5.3: Access restricted areas; - Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance; - All work must cease immediately, if any human remains and/or other archaeological, palaeontological and historical material are uncovered. Such material, if exposed, must be reported to the nearest museum, archaeologist/palaeontologist (or the South African Police Services), so that a systematic and professional investigation can be undertaken. Sufficient time must be allowed to 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

remove/collect such material before development recommences.						
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5.13 Safety of the public

Impact management outcome: All precautions are taken to minimise the risk of injury, harm or complaints.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - Identify fire hazards, demarcate and restrict public access to these areas as well as notify the local authority of any potential threats e.g. large brush stockpiles, fuels etc.; - All unattended open excavations must be adequately fenced or demarcated; - Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding; - Ensure structures vulnerable to high winds are secured; - Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.14 Sanitation

Impact management outcome: Clean and well maintained toilet facilities are available to all staff in an effort to minimise the risk of disease and impact to the environment.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> – Mobile chemical toilets are installed onsite if no other ablution facilities are available; – The use of ablution facilities and or mobile toilets must be used at all times and no indiscriminate use of the veld for the purposes of ablutions must be permitted under any circumstances; – Where mobile chemical toilets are required, the following must be ensured: <ul style="list-style-type: none"> a) Toilets are located no closer than 100 m to any watercourse or water body; b) Toilets are secured to the ground to prevent them from toppling due to wind or any other cause; c) No spillage occurs when the toilets are cleaned or emptied and the contents are managed in accordance with the EMPr; d) Toilets have an external closing mechanism and are closed and secured from the outside when not in use to prevent toilet paper from being blown out; e) Toilets are emptied before long weekends and workers holidays, and must be locked after working hours; f) Toilets are serviced regularly and the ECO must inspect toilets to ensure compliance to health standards; – A copy of the waste disposal certificates must be maintained. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.15 Prevention of disease

Impact Management outcome: All necessary precautions linked to the spread of disease are taken.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - Undertake environmentally-friendly pest control in the camp area; - Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV AIDS; - The Contractor must ensure that information posters on AIDS are displayed in the Contractor Camp area; - Information and education relating to sexually transmitted diseases to be made available to both construction workers and local community, where applicable; - Free condoms must be made available to all staff on site at central points; - Medical support must be made available; - Provide access to Voluntary HIV Testing and Counselling Services. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.16 Emergency procedures

Impact management outcome: Emergency procedures are in place to enable a rapid and effective response to all types of environmental emergencies.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - Compile an Emergency Response Action Plan (ERAP) prior to the commencement of the proposed project; - The Emergency Plan must deal with accidents, potential spillages and fires in line with relevant legislation; - All staff must be made aware of emergency procedures as part of environmental awareness training; - The relevant local authority must be made aware of a fire as soon as it starts; - In the event of emergency necessary mitigation measures to contain the spill or leak must be implemented (see Hazardous Substances section 5.17). 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.17 Hazardous substances

Impact management outcome: Safe storage, handling, use and disposal of hazardous substances.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - The use and storage of hazardous substances to be minimised and non-hazardous and non-toxic alternatives substituted where possible; 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environment

<ul style="list-style-type: none"> - All hazardous substances must be stored in suitable containers as defined in the Method Statement; - Containers must be clearly marked to indicate contents, quantities and safety requirements; - All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers; - Bunded areas to be suitably lined with a SABS approved liner; - An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis; - All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS); - All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet; - Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available; - The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers; - The tanks/ bowsers must be situated on a smooth impermeable surface (concrete) with a permanent bund. The impermeable lining must extend to the crest of the bund and the volume inside the bund must be 130% of the total capacity of all the storage tanks/ bowsers (110% statutory requirement plus an allowance for rainfall); - The floor of the bund must be sloped, draining to an oil separator; 						<p>al Control Reports</p>
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<ul style="list-style-type: none"> - Provision must be made for refueling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained; - All empty externally dirty drums must be stored on a drip tray or within a bunded area; - No unauthorised access into the hazardous substances storage areas must be permitted; - No smoking must be allowed within the vicinity of the hazardous storage areas; - Adequate fire-fighting equipment must be made available at all hazardous storage areas; - Where refueling away from the dedicated refueling station is required, a mobile refueling unit must be used. Appropriate ground protection such as drip trays must be used; - An appropriately sized spill kit kept onsite relevant to the scale of the activity/s involving the use of hazardous substance must be available at all times; - The responsible operator must have the required training to make use of the spill kit in emergency situations; - An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken; - In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management: Waste Act 59 of 2008. Refer to Section 5.7 for procedures concerning storm and waste water management and 5.8 for solid and hazardous waste management. 						
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5.18 Workshop, equipment maintenance and storage

Impact management outcome: Soil, surface water and groundwater contamination is minimised.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> – Where possible and practical all maintenance of vehicles and equipment must take place in the workshop area; – During servicing of vehicles or equipment, especially where emergency repairs are effected outside the workshop area, a suitable drip tray must be used to prevent spills onto the soil. The relevant local authority must be made aware of a fire as soon as it starts; – Leaking equipment must be repaired immediately or be removed from site to facilitate repair; – Workshop areas must be monitored for oil and fuel spills; – Appropriately sized spill kit kept onsite relevant to the scale of the activity taking place must be available; – The workshop area must have a bunded concrete slab that is sloped to facilitate runoff into a collection sump or suitable oil / water separator where maintenance work on vehicles and equipment can be performed; – Water drainage from the workshop must be contained and managed in accordance Section 5.7: Storm and waste water management. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

Impact management outcome: Minimise spillages and contamination of soil, surface water and groundwater.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> – Concrete mixing must be carried out on an impermeable surface; – Batching plants areas must be fitted with a containment facility for the collection of cement laden water. – Dirty water from the batching plant must be contained to prevent soil and groundwater contamination – Bagged cement must be stored in an appropriate facility and at least 10 m away from any water courses, gullies and drains; – A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted; – Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal facility; – Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site; – Sand and aggregates containing cement must be kept damp to prevent the generation of dust (Refer to Section 5.20: Dust emissions) – Any excess sand, stone and cement must be removed or reused from site on completion of construction period and disposed at a registered disposal facility; 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

<ul style="list-style-type: none"> – Temporary fencing must be erected around batching plants in accordance with Section 5.5: Fencing and gate installation. 						
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5.20 Dust emissions

Impact management outcome: Dust prevention measures are applied to minimise the generation of dust.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> – Take all reasonable measures to minimise the generation of dust as a result of project development activities to the satisfaction of the ECO; – Removal of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces must be re-vegetated or stabilised as soon as is practically possible; – Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present; – During high wind conditions, the ECO must evaluate the situation and make recommendations as to whether dust-damping measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level; – Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind; 	<p>EPC Contractor</p>	<p>Compliance with EMPR / Method Statements</p>	<p>Duration of the construction phase</p>	<p>ECO / ESA</p>	<p>Daily</p>	<p>Monthly Environmental Control Reports</p>

<ul style="list-style-type: none"> - Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO; - Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas; - Straw stabilisation must be applied at a rate of one bale/10 m² and harrowed into the top 100 mm of top material, for all completed earthworks; - For significant areas of excavation or exposed ground, dust suppression measures must be used to minimise the spread of dust. 						
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5.21 Blasting

Impact management outcome: Impact to the environment is minimised through a safe blasting practice.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - Any blasting activity must be conducted by a suitably licensed blasting contractor; and - Notification of surrounding landowners, emergency services site personnel of blasting activity 24 hours prior to such activity taking place on Site. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.22

Noise

Impact Management outcome: Prevent unnecessary noise to the environment by ensuring that noise from development activity is mitigated.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> – The Contractor must keep noise level within acceptable limits, Restrict the use of sound amplification equipment for communication and emergency only; – All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained; – Any complaints received by the Contractor regarding noise must be recorded and communicated. Where possible or applicable, provide transport to and from the site on a daily basis for construction workers; – Develop a Code of Conduct for the construction phase in terms of behaviour of construction staff. Operating hours as determined by the environmental authorisation are adhered to during the development phase. Where not defined, it must be ensured that development activities must still meet the impact management outcome related to noise management. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.23 Fire prevention

Impact management outcome: Prevention of uncontrollable fires.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - Designate smoking areas where the fire hazard could be regarded as insignificant; - Firefighting equipment must be available on all vehicles located on site; - The local Fire Protection Agency (FPA) must be informed of construction activities; - Contact numbers for the FPA and emergency services must be communicated in environmental awareness training and displayed at a central location on site; - Two way swap of contact details between ECO and FPA. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.24 Stockpiling and stockpile areas

Impact management outcome: Reduce erosion and sedimentation as a result of stockpiling.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - All material that is excavated during the project development phase (either during piling (if required) or earthworks) must be stored appropriately on site in order to minimise impacts to watercourses, watercourses and water bodies; - All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular weeding and control methods; - Topsoil stockpiles must not exceed 2 m in height; - During periods of strong winds and heavy rain, the stockpiles must be covered with appropriate material (e.g. cloth, tarpaulin etc.); - Where possible, sandbags (or similar) must be placed at the bases of the stockpiled material in order to prevent erosion of the material. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.25 Civil works

Impact management outcome: Impact to the environment minimised during civil works to create the substation terrace.

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

<ul style="list-style-type: none"> - Where terracing is required, topsoil must be collected and retained for the purpose of re-use later to rehabilitate disturbed areas not covered by yard stone; - Areas to be rehabilitated include terrace embankments and areas outside the high voltage yards; - Where required, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled; - These areas can be stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly; - Rehabilitation of the disturbed areas must be managed in accordance with Section 5.35: Landscaping and rehabilitation; - All excess spoil generated during terracing activities must be disposed of in an appropriate manner and at a recognised landfill site; and - Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes. 	<p>EPC Contractor</p>	<p>Compliance with EMPR / Method Statements</p>	<p>Duration of the construction phase</p>	<p>ECO / ESA</p>	<p>Daily</p>	<p>Monthly Environmental Control Reports</p>
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5.26 Excavation of foundation, cable trenching and drainage systems

Impact management outcome: No environmental degradation occurs as a result of excavation of foundation, cable trenching and drainage systems.

Impact Management Actions	Implementation	Monitoring
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	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> – All excess spoil generated during foundation excavation must be disposed of in an appropriate manner and at a licensed landfill site, if not used for backfilling purposes; – Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes; – Management of equipment for excavation purposes must be undertaken in accordance with Section 5.18: Workshop, equipment maintenance and storage; and – Hazardous substances spills from equipment must be managed in accordance with Section 5.17: Hazardous substances. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.27 Installation of foundations, cable trenching and drainage systems

Impact management outcome: No environmental degradation occurs during the installation of foundation, cable trenching and drainage system.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> – Batching of cement to be undertaken in accordance with Section 5.19: Batching plants; and – Residual solid waste must be disposed of in accordance with Section 5.8: Solid waste and hazardous management. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.28 Installation of equipment (circuit breakers, current Transformers, Isolators, Insulators, surge arresters, voltage transformers, earth switches)

Impact management outcome: No environmental degradation occurs as a result of installation of equipment.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - Management of dust must be conducted in accordance with Section 5. 20: Dust emissions; - Management of equipment used for installation must be conducted in accordance with Section 5.18: Workshop, equipment maintenance and storage; - Management hazardous substances and any associated spills must be conducted in accordance with Section 5.17: Hazardous substances; and - Residual solid waste must be recycled or disposed of in accordance with Section 5.8: Solid waste and hazardous management. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.29 Steelwork Assembly and Erection

Impact management outcome: No environmental degradation occurs as a result of steelwork assembly and erection.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> During assembly, care must be taken to ensure that no wasted/unused materials are left on site e.g. bolts and nuts Emergency repairs due to breakages of equipment must be managed in accordance with Section 5.18: Workshop, equipment maintenance and storage and Section 5.16: Emergency procedures. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.30 Cabling and Stringing

Impact management outcome: No environmental degradation occurs as a result of stringing.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> Residual solid waste (off cuts etc.) shall be recycled or disposed of in accordance with Section 6.8: Solid waste and hazardous Management; Management of equipment used for installation shall be conducted in accordance with Section 5.18: Workshop, equipment maintenance and storage; 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

– Management hazardous substances and any associated spills shall be conducted in accordance with Section 5.17: Hazardous substances.						
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5.31 Testing and Commissioning (all equipment testing, earthing system, system integration)

Impact management outcome: No environmental degradation occurs as a result of Testing and Commissioning.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Residual solid waste must be recycled or disposed of in accordance with Section 5.8: Solid waste and hazardous management.	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.32 Socio-economic

Impact management outcome: enhanced socio-economic development.

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

	person			person		
<ul style="list-style-type: none"> - Develop and implement communication strategies to facilitate public participation; - Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process; - Sustain continuous communication and liaison with neighboring owners and residents - Create work and training opportunities for local stakeholders; and - Where feasible, no workers, with the exception of security personnel, must be permitted to stay over-night on the site. This would reduce the risk to local farmers. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.33 Temporary closure of site

Impact management outcome: Minimise the risk of environmental impact during periods of site closure greater than five days.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - Bunds must be emptied (where applicable) and need to be undertaken in accordance with the impact management 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environment

<p>actions included in sections 5.17: Hazardous substances and 5.18: Workshop, equipment maintenance and storage;</p> <ul style="list-style-type: none"> - Hazardous storage areas must be well ventilated; - Fire extinguishers must be serviced and accessible. Service records to be filed and audited at last service; - Emergency and contact details displayed must be displayed; - Security personnel must be briefed and have the facilities to contact or be contacted by relevant management and emergency personnel; - Night hazards such as reflectors, lighting, traffic signage etc. must have been checked; - Fire hazards identified and the local authority must have been notified of any potential threats e.g. large brush stockpiles, fuels etc.; - Structures vulnerable to high winds must be secured; - Wind and dust mitigation must be implemented; - Cement and materials stores must have been secured; - Toilets must have been emptied and secured; - Refuse bins must have been emptied and secured; - Drip trays must have been emptied and secured. 						<p>al Control Reports</p>
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5.34 Dismantling of old equipment

Impact management outcome: Impact to the environment to be minimised during the dismantling, storage and disposal of old equipment commissioning.

Impact Management Actions	Implementation	Monitoring
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	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - All old equipment removed during the project must be stored in such a way as to prevent pollution of the environment; - Oil containing equipment must be stored to prevent leaking or be stored on drip trays; - All scrap steel must be stacked neatly and any disused and broken insulators must be stored in containers; - Once material has been scrapped and the contract has been placed for removal, the disposal Contractor must ensure that any equipment containing pollution causing substances is dismantled and transported in such a way as to prevent spillage and pollution of the environment; - The Contractor must also be equipped to contain and clean up any pollution causing spills; and - Disposal of unusable material must be at a licensed waste disposal site. 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

5.35 Landscaping and rehabilitation

Impact management outcome: Areas disturbed during the development phase are returned to a state that approximates the original condition.

Impact Management Actions	Implementation	Monitoring
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	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - All areas disturbed by construction activities must be subject to landscaping and rehabilitation; All spoil and waste must be disposed of to a registered waste site; - All slopes must be assessed for contouring, and to contour only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983 - All slopes must be assessed for terracing, and to terrace only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983; - Berms that have been created must have a slope of 1:4 and be replanted with indigenous species and grasses that approximates the original condition; - Where new access roads have crossed cultivated farmlands, that lands must be rehabilitated by ripping which must be agreed to by the holder of the EA and the landowners; - Rehabilitation of access roads outside of farmland; - Indigenous species must be used for with species and/grasses to where it compliments or approximates the original condition; - Stockpiled topsoil must be used for rehabilitation (refer to Section 5.24: Stockpiling and stockpiled areas); - Stockpiled topsoil must be evenly spread so as to facilitate seeding and minimise loss of soil due to erosion; - Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed; - Subsoil must be ripped before topsoil is placed; - The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment; 	EPC Contractor	Compliance with EMPR / Method Statements	Duration of the construction phase	ECO / ESA	Daily	Monthly Environmental Control Reports

<ul style="list-style-type: none"> - Where impacted through construction related activity, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled; - Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly; - Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150 mm of topsoil. - Where required, re-vegetation including hydro-seeding can be enhanced using a vegetation seed mixture as described below. A mixture of seed can be used provided the mixture is carefully selected to ensure the following: <ul style="list-style-type: none"> a) Annual and perennial plants are chosen; b) Pioneer species are included; c) Species chosen must be indigenous to the area with the seeds used coming from the area; d) Root systems must have a binding effect on the soil; e) The final product must not cause an ecological imbalance in the area 					
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6 ACCESS TO THE GENERIC EMPr

Once completed and signed, to allow the public access to the generic EMPr, the holder of the EA must make the EMPr available to the public in accordance with the requirements of Regulation 26(h) of the EIA Regulations.

25. PART B: SECTION 2

26.

7 SITE SPECIFIC INFORMATION AND DECLARATION**7.1 Sub-section 1: contact details and description of the project****7.1.1 Details of the applicant:****Name of applicant:** Aristida PV (Pty), Themeda PV (Pty) Ltd**Tel No:** 27 (21) 418 2596**Fax No:** + 27 (0) 86 611 0882**Postal Address:** 101, Block A, West Quay Building

7 West Quay Road, Waterfront

Cape Town, 8000

Physical Address: 101, Block A, West Quay Building

7 West Quay Road, Waterfront

Cape Town, 8000

7.1.2 Details and expertise of the EAP:**Name of EAP:** Dale Holder (Cape Environmental Assessment Practitioners)**Tel No:** 044 8740365**Fax No:** 044 884 0432**E-mail address:** dale@cape-eaprac.co.za**Expertise of the EAP** (Curriculum Vitae included):**7.1.3 Project name:** Aristida PV, Themeda PV

This EMP'r must be read in conjunction with the overarching EMP'r for the larger project

7.2 Sub-section 2: Development footprint site map

This sub-section must include a map of the site sensitivity overlaid with the preliminary infrastructure layout. The sensitivity map must be prepared from the national web based environmental screening tool, when available for compulsory use at: <https://screening.environment.gov.za/screeningtool>. The sensitivity map shall identify the nature of each sensitive feature e.g. threatened plant species, archaeological site, etc. Sensitivity maps shall identify features both within the planned working area and any known sensitive features within 50 m from the development footprint.

Appendix A includes the final Site layout plan that shows all the sensitive features in the vicinity of this infrastructure.

7.3 Sub-section 3: Declaration

The proponent/applicant or holder of the EA affirms that he/she will abide and comply with the prescribed impact management outcomes and impact management actions as stipulated in part B: section 1 of the generic EMPr and have the understanding that the impact management outcomes and impact management actions are legally binding. The proponent/applicant or holder of the EA affirms that he/she will provide written notice to the CA 14 day prior to the date on which the activity will commence of commencement of construction to facilitate compliance inspections.

Signature Proponent/applicant/ holder of EA

Date: 15 August 2022



7.4 Sub-section 4: amendments to site specific information (Part B; section 2)

Should the EA be transferred to a new holder, Part B: Section 2 must be completed by the new holder and submitted with the application for an amendment of the EA in terms of Regulations 29 or 31 of the EIA Regulations, whichever applies. The information submitted for an amendment to an environmental authorisation will be considered to be incomplete should a signed copy of Part B: Section 2 not be submitted. Once approved, Part B: Section 2 forms part of the EMPr for the development and the EMPr becomes legally binding to the new EA holder.

27. PART C

8 SITE SPECIFIC ENVIRONMENTAL ATTRIBUTES

If any specific environmental sensitivities/attributes are present on the site which require more specific impact management outcomes and actions, not included in the pre-approved generic EMPr template, to manage impacts, those impact management outcomes and impact management actions must be included in this section. These specific management controls must be referenced spatially, and must include impact management outcomes and impact management actions. The management controls including impact management outcomes and impact management actions must be presented in the format of the pre-approved generic EMPr template. This applies only to additional impact management outcomes and impact management actions that are necessary.

If Part C is applicable to the development as authorised in the EA, it is required to be submitted to the CA together with the BAR or EIAR, for consideration of, and decision on, the application for EA. The information in this section must be prepared by an EAP and the name and expertise of the EAP, including the curriculum vitae are to be included. Once approved, Part C forms part of the EMPr for the site and is legally binding.

This section will **not be required** should the site contain no specific environmental sensitivities or attributes.

The site specific attributes are included in the main EMPr which must be read in conjunction with this generic EMPr

28. APPENDIX 1: METHOD STATEMENTS

To be prepared by the contractor prior to commencement of the activity. The method statements are **not required** to be submitted to the CA.

Appendix C : Stormwater Management Plan (Sivest, 2022) (Included under Draft EIR)

Appendix D : Transportation and Traffic Management Plan (Sivest, 2022) (included under Draft EIR)

Appendix E : Construction Method Statements (to be appended once approved by the ECO)