ENVIRONMENTAL MANAGEMENT PROGRAMME

REVISION 3

for

KENHARDT PV 3 (PART OF SCATEC KENHARDT 2)

on

Remaining Extent of farm Onder Rugzeer farm 168

In terms of the

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

Prepared for Applicant: Scatec Kenhardt 2 (Pty) Ltd

Date: 14 July 2021

Author of Report: Dale Holder

Author Email: dale@cape-eaprac.co.za

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Cape EAPrac

Cape Environmental Assessment Practitioners

Tel: +27 44 874 0365 PO Box 2070, George 6530

Fax: +27 44 874 0432 17 Progress Street, George

www.cape-eaprac.co.za

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APPROVAL FOR RELEASE

NAME	TITLE	SIGNATURE
Dale Holder	Senior Environmental Practitioner	

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APPOINTED ENVIRONMENTAL ASSESSMENT PRACTITIONER:
Cape EAPrac Environmental Assessment Practitioners PO Box 2070 George 6530 Tel: 044-874 0365 Fax: 044-874 0432 **Report written & compiled by:** Dale Holder (Ndip Nature Conservation), who has over 15 years' experience as an environmental practitioner. **Registrations:** Director, Louise-Mari van Zyl (MA Geography & Environmental Science [US]; Registered Environmental Assessment Practitioner with the Interim Certification Board for Environmental Assessment Practitioners of South Africa, EAPSA). Ms van Zyl has over fifteen years' experience as an environmental practitioner.

PURPOSE OF THIS REPORT:
I&AP Review and Comment

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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
Details of the EAP who prepared the EMPr; and; The expertise of the EAP to prepare an EMPr, including a curriculum vitae.	This EMPr 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 EMPr as identified by the project description.	This EMP covers all aspects of the project as currently Authorised for Kenhardt PV 2. • PV Arrays and Mounting Structures; • inverter stations; • on-site substation; • grid connection • auxiliary buildings, • laydown area; • internal electrical reticulation network (underground cabling); • internal road / track network; • access road; • electrified perimeter fencing. • Battery Energy Storage System
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 – (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.	Sections 1.3

Requirement	Description
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 – (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
An environmental awareness plan describing the way – (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment.	Section 5.2
Any specific information that may be required by the competent authority.	None.

DFFE COMMENT ON EMPR

This Draft Revised EMPr (Revision 3) is submitted to the DFFE simultaneously to the I&AP review period. Any comments received by the DFFE will be incorporated into the final version submitted for approval.

Revision 3 – ENVIRONMENTAL MANAGEMENT PROGRAMME – KENHARDT PV3 (part of Scatec Kenhardt 2)

in terms of the

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

Kenhardt PV3

Remaining Extent of farm Onder Rugzeer farm 168

Submitted for:

Stakeholder Review & Comment

Report Issued by:

Cape Environmental Assessment Practitioners

Tel:	044 874 0365	PO Box 2070
Fax:	044 874 0432	17 Progress Street
Web:	www.cape-eaprac.co.za	George 6530

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OVERVIEW, BACKGROUND AND HISTORY

An environmental authorisation dated 07 August 2017 was granted to Scatec Solar SA 370 (Pty) Ltd (DFFE Ref No.14/12/16/3/3/2/836) for the Kenhardt PV3 75[1]-Megawatt (MW) Photovoltaic (PV) project and associated infrastructure on the Remaining Extent of the Onder Rugzeer farm 168.

The final EIR compiled by the CSIR and submitted to the Department contained an EMPr in part B of the submission and is also included as appendix B of this revised EMPr

Condition 16 of the EA of 07 August 2017 stated that the EMPr submitted with the Final EIR is not approved as follows:

16. The Environmental Management Programme (EMPr) submitted as part of the EIAr is not approved and must be amended to include measures as dictated by the final site lay-out map and micro-siting, and the provisions of this environmental authorisation. The EMPr must be made available for comments by registered Interested and Affected Parties and the holder of this authorisation must consider such comments. Once amended, the final EMPr must be submitted to the Department for written approval prior to commencement of the activity. Once approved the EMPr must be implemented and adhered to.

Condition 17 of the EA of 07 August 2017 provided the following details of information that should form part of the revised EMPr.

#	Condition	Discussion
17.1	All recommendations and mitigation measures in the EIAr and specialist studies attached as part of the EIAr	These have been incorporated throughout this EMPr.
17.2	An Electromagnetic Control (EMC) Plan, which identifies potential risk, mitigation measures and appropriate test and acceptable procedures during the design and construction of this facility. The EMC Plan must be made available to the Square Kilometre Array South Africa (SKA-SA) for acceptance.	Please refer to appendix I and section 4.7
17.3	The requirements of this environmental authorisation.	All conditions of the environmental authorisation have been incorporated into the EMPr in the relevant sections.
17.4	The findings and mitigation measures arising from the EMC plan.	Please refer to appendix I as well as the summary in section 4.7.
17.5	Adequate Mitigation measures to minimise the waterbody effect/ polarised light from the photovoltaic facility. These mitigation measures must be recommended by a suitably qualified ornithologist and must be made available to birdlife SA for comments and support.	The mitigation measures detailed by the avifaunal specialist are detailed in sections 4.6, 5.21 & 6.5. The operational avifaunal monitoring plan is furthermore attached in appendix H.
17.6	An alien invasive management plan to be implemented during construction and operation of the facility. The plan must include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien species is undertaken.	Section 7
17.7	A plant rescue and protection plan which allows for the maximum transplant of conservation important species from areas to be transformed. This plan must be compiled by a vegetation specialist familiar with the site in consultation with the ECO and be implemented prior to the commencement of the construction phase.	Section 8

- [1] This was amended to 100MW.

#	Condition	Discussion
17.8	A traffic management plan for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow would not be adversely impacted. This plan must include measures to minimise impacts on local commuters e.g., limiting construction vehicles traveling on public roadways during the morning and late afternoon commute time and avoid using roads through densely populated built up areas as not to disturb existing retail and commercial operations.	Appendix F
17.9	A re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the facility. Restoration must be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery of natural habitats.	Section 8
17.10	A storm water and wash water management plan to be implemented during the construction and operation of the facility. The plan must ensure compliance with applicable regulations and prevent offsite migration of contaminated stormwater or increased soil erosion. The plan must include the construction of design measures to allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of stormwater run-off.	Section 11
17.11	An erosion management plan for monitoring and rehabilitating erosion events associated with the facility. Erosion mitigation must form part of this plan to prevent and reduce the risk of any potential erosion.	Section 12
17.12	A post construction avifaunal monitoring plan that is in line with Bird life's most recent guidelines.	Appendix H
17.13	An effective monitoring system to detect any leakage or spillage of any hazardous substances during their transportation, handling, use or storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or stormwater systems.	Section 10
17.14	Measures to protect hydrological features such as streams, rivers, pans, wetlands, dams and their catchments, and other environmental sensitive areas from construction impacts, including the direct or indirect spillage of pollutants.	Section 10, 11 and 12
17.15	A fire management plan to be implemented during the construction and operation of the facility.	Section 13
17.16	An Environmental sensitivity map indicating environmentally sensitive areas and features identified during the EIA process.	The Sile Layout Plan attached in Appendix A, includes all the sensitive features identified during the EIA process.
17.17	The final site layout map	Appendix A
17.18	The final site layout map superimposed on the environmental sensitivity map. This map must reflect the approved location of the PV facility as stated in the EIAr and this environmental authorisation.	The Sile Layout Plan attached in Appendix A, includes all the sensitive features identified during the EIA process

This EA was amended[2] 25 February 2021 (DFFE Ref No. 14/12/16/3/3/2/836/AM1).

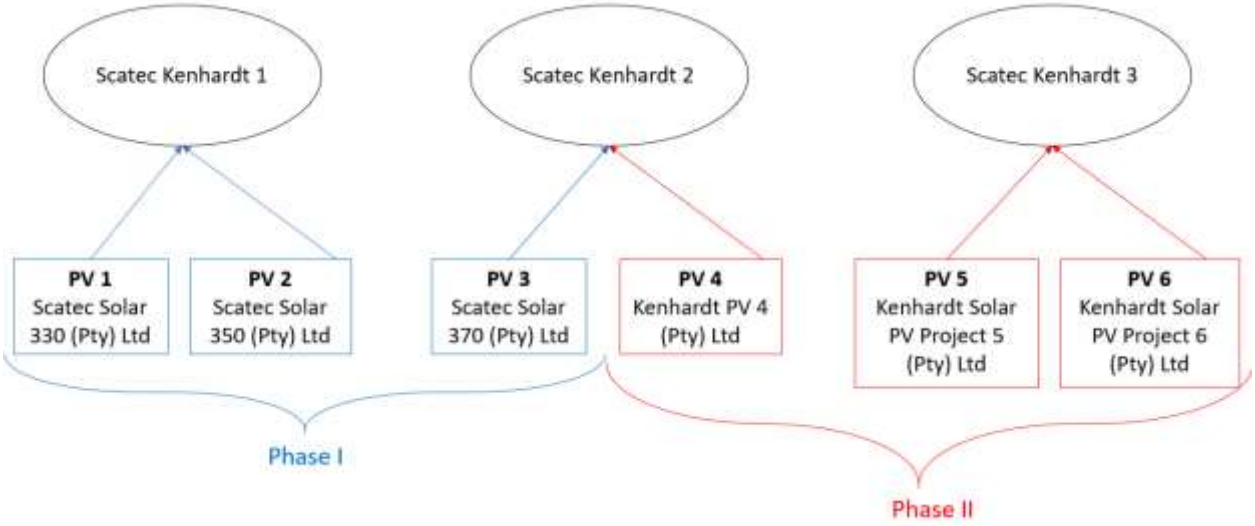
The amendment process that informed the above EA Amendment, included an addendum to the original 2016 EMPr. This addendum was prepared specifically to address the environmental management outcomes and actions associated with the inclusion of a Battery Energy Storage System (BESS) within the authorised footprint of the facility. This EMPr addendum for the BESS is attached in appendix C and must be read in conjunction with this EMPr.

This facility formed part of a series of Projects selected as a preferred Bidder under the Risk Mitigation Independent Power Purchase Procurement Programme (RMIPPPP) on 01 June 2021. The selected Projects include:

1. Scatec Kenhardt 1 (Project No. RM-TA-0032-001)
2. Scatec Kenhardt 2 (Project No. RM-TA-0195-002)
3. Scatec Kenhardt 3 (Project No. RM-TA-0195-003)

- [2] This amendment authorised the increase in generation capacity from 75MW to 100MW, inclusion of a battery energy system on a footprint of up to 6ha, the extension of the validity period of the EA and the removal of a restrictive condition.

Kenhardt PV3 (this facility) forms part of the Scatec Kenhardt 2 Project, as depicted in the image below.



Scatec were allocated 3 Projects in the RMIPPPP bid. The Kenhardt PV cluster was originally developed as six individual photovoltaic facilities, each of which has its own EA and EMPr, however, for the purposes of the RMIPPPP bid, each Project submitted in the RMIPPPP bid consists of two adjacent independently authorised facilities that together comprise a Project as detailed below:

- The **Scatec Kenhardt 1 Project** is comprised of the "Kenhardt PV1 facility" and "Kenhardt PV2 facility", authorised to Scatec Solar SA 330 (Pty) Ltd and Scatec Solar SA 350 (Pty) Ltd respectively.
- The **Scatec Kenhardt 2 Project** is comprised of the "Kenhardt PV3 facility" and "Kenhardt PV4 facility", authorised to Scatec Solar SA 370 (Pty) Ltd, and Kenhardt PV 4 (Pty) Ltd respectively.
- The **Scatec Kenhardt 3 Project** is comprised of the "Kenhardt PV5 facility" and "Kenhardt PV6 facility", authorised to Kenhardt Solar PV Project 5 (Pty) Ltd, and Kenhardt Solar PV Project 6 (Pty) Ltd respectively.

In addition to this EMPr revision, there are a number of other parallel environmental processes underway, including:

- Part 1 amendment on Kenhardt PV1 (14/12/16/3/3/2/837) to:
    - Transfer Kenhardt PV1 EA from Scatec Solar SA 330 (Pty) Ltd to Scatec Kenhardt 1 (Pty) Ltd,
    - Correct the address,
    - Remove the BESS,
- Approval of Kenhardt PV1 (14/12/16/3/3/2/837) final layout plan as required by condition 14 of the EA
- Approval of Kenhardt PV1 final EMPr in compliance with condition 16 of the EA.
- Compilation of an Electromagnetic Control (EMC) Plan for Kenhardt PV1 (14/12/16/3/3/2/837) to be submitted to SARAO in compliance with conditions 17.2 and 36 of the EA.
- Part 1 amendment for the Kenhardt PV1 Grid connection EA (14/12/16/3/3/1/1547) to:
    - Transfer the EA from Scatec Solar SA 330 (Pty) Ltd to Scatec Kenhardt 1 (Pty) Ltd
    - Remove the powerline components from the EA (This EA will be for the Scatec Kenhardt 1 Substation only).
- Approval of Scatec Kenhardt 1 facility substation final layout in terms of condition 14 of the EA for Kenhardt PV1 Grid Connection (14/12/16/3/3/1/1547).
- Approval of Scatec Kenhardt 1 substation final EMPr in terms of condition 16 of the EA for Kenhardt PV1 Grid Connection (14/12/16/3/3/1/1547).
- Part 1 amendment for Kenhardt PV2 (14/12/16/3/3/2/838) to:
    - Transfer the EA from Scatec Solar SA 350 (Pty) Ltd to Scatec Kenhardt 1 (Pty) Ltd
    - Correct address.
    - Reposition and reduce the size of the BESS
- Approval of Kenhardt PV2 final layouts in terms of condition 14 of the EA (14/12/16/3/3/2/838)

- Approval of Kenhardt PV2 final EMPr in terms of condition 16 of the EA (14/12/16/3/3/2/838)
- Compilation of an Electromagnetic Control (EMC) Plan for Kenhardt PV2 in compliance with conditions 17.2 and 36 of the EA (14/12/16/3/3/2/838).
- Part 1 amendment for the Kenhardt PV2 Grid Connection EA (14/12/16/3/3/1/1546) to:
    - Transfer the EA from Scatec Solar SA 350 (Pty) Ltd to Scatec Kenhardt 3 (Pty) Ltd;
    - Remove the powerline components from the EA (This EA will be for the Scatec Kenhardt 3 Substation only.
- Approval of Scatec Kenhardt 3 substation final layout plan in compliance with condition 14 of the EA (14/12/16/3/3/1/1546)
- Approval of Scatec Kenhardt 3 substation final EMPr in compliance with condition 16 of the EA (14/12/16/3/3/1/1546)
- Part 1 amendment to the Kenhardt PV3 EA (14/12/16/3/3/2/836) to:
    - Transfer the EA from Scatec Solar SA 370 (Pty) Ltd to Scatec Kenhardt 2 (Pty) Ltd
    - Correct address,
    - Reduce the footprint of the BESS from 6 ha so that there's not an overlap with the position of the BESS for Scatec Kenhardt 1 and Scatec Kenhardt 3.
- Approval of Kenhardt PV3 final layouts in terms of condition14 of the EA (14/12/16/3/3/2/836).
- Approval of Kenhardt PV3 final EMPr in terms of condition 16 of the EA (14/12/16/3/3/2/836) (i.e. this EMPr)
- Compilation and submission of an Electromagnetic Control (EMC) Plan for Kenhardt PV3 in terms of conditions 17.2 and 36 of the EA (14/12/16/3/3/2/836).
- Part 1 Amendment for Kenhardt PV4 EA (14/12/16/3/3/1/2125) to
    - Transfer the EA from Kenhardt PV 4 (Pty) Ltd to Scatec Kenhardt 2 (Pty) Ltd
    - Remove the BESS,
    - Amend the EMPr.
    - Amend the Site Layout Plan
- Part 1 Amendment for Kenhardt PV5 (14/12/16/3/3/1/2126) EA to:
    - Transfer the EA from Kenhardt Solar PV Project 5 (Pty) Ltd to Scatec Kenhardt 3 (Pty) Ltd
    - Reduce the footprint and repositioning the BESS
    - Amend the EMPr
    - Amend the Site Layout Plan
- Part 1 Amendment for Kenhardt PV6 (14/12/16/3/3/1/2127) EA to:
    - Transfer the EA from Kenhardt PV Project 6 (Pty) Ltd to Scatec Kenhardt 3 (Pty) Ltd
    - Removing the BESS
    - Amend the EMPr
    - Amend the Site Layout Plan

This document, the revised EMPr, is being undertaken to achieve the following main objectives:

1. Ensuring compliance with Appendix 4 of the 2014 EIA regulations.
2. Ensuring compliance with condition 16 and 17 of the EA.
3. Aligning the environmental impact management outcomes and actions across the 3 preferred bidder projects (i.e., the 6 x EAs with associated EMPRs) listed above (as these will be implemented simultaneously).
4. Aligning the environmental impact management outcomes and actions with the various components forming part of the EA associated with this EMPr.

MAIN REPORT - EMPR KENHARDT PV2

1. INTRODUCTION

Cape EAPrac has been appointed by the Applicant, Scatec Kenhardt 2 (Pty) Ltd, as the independent **Environmental Assessment Practitioner** (EAP) responsible for compilation of the **Environmental Management Programme** (EMPr) for the proposed Kenhardt PV3, which forms part of the preferred bidder project known as Scatec Kenhardt 2.

This EMPr is submitted in compliance with the National Environmental Management Act (NEMA, Act 107 of 1998, as amended), and conditions 16 and 17 of the EA for Kenhardt PV3 located near Kenhardt in the Northern Cape.

The key purpose of this EMPr is to ensure that the remedial and mitigation requirements identified during the Scoping & Environmental Impact Reporting process 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 original EMPr (attached in appendix B) as well as the EMPr addendum in appendix C. This addendum specifically addresses the environmental impact management outcomes and actions associated with the Battery Energy Storage System (which forms part of Scatec Kenhardt 2 project).

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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 network).

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 power lines, 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 national grid (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.).

1.1.4 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 the purpose of this report, two possible scenarios are considered, namely:

- 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 Kenhardt PV3 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 Kenhardt PV3 project and associated infrastructure.

To ensure compliance with the Conditions of the Environmental Authorisation (EA), the EMPr, recommendations of participating specialists, the following overarching outcomes are applicable:

- 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. Particularly the water quality exiting the site.
- To ensure that construction and development are undertaken with due 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 construction, operation and decommissioning requirements for the Kenhardt PV3 project as authorised. 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 (A copy of the EA and all amendments thereto are attached in **Appendix E**)

1.7 ORGANISATIONAL STRUCTURE AND RESPONSIBILITIES.

In order 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:

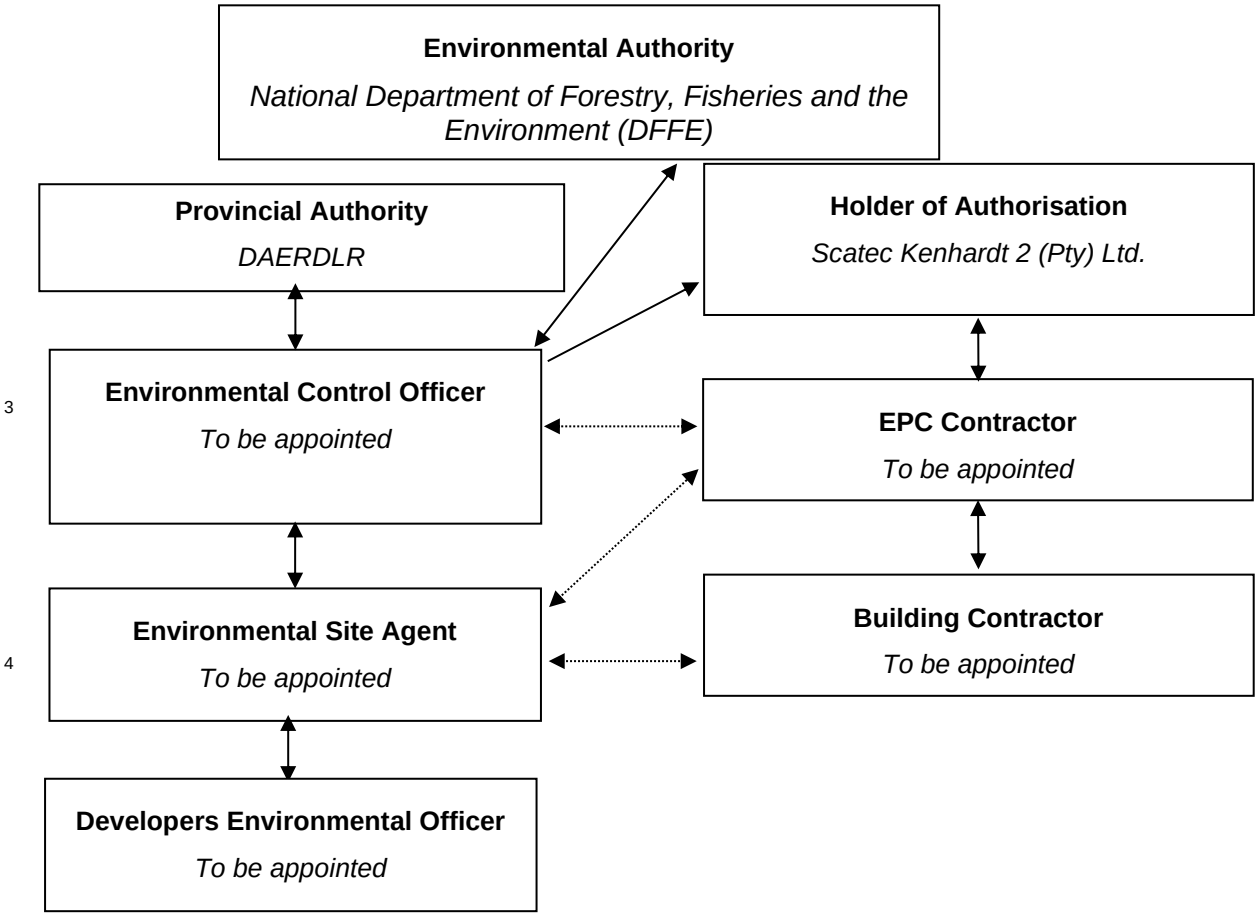

Figure 1: EMPr organisational structure during the construction phase

- [3] This refers to the Principle Environmental Control Officer
- [4] This refers to the Site Environmental Control Officer also Known as the Environmental Site Agent

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

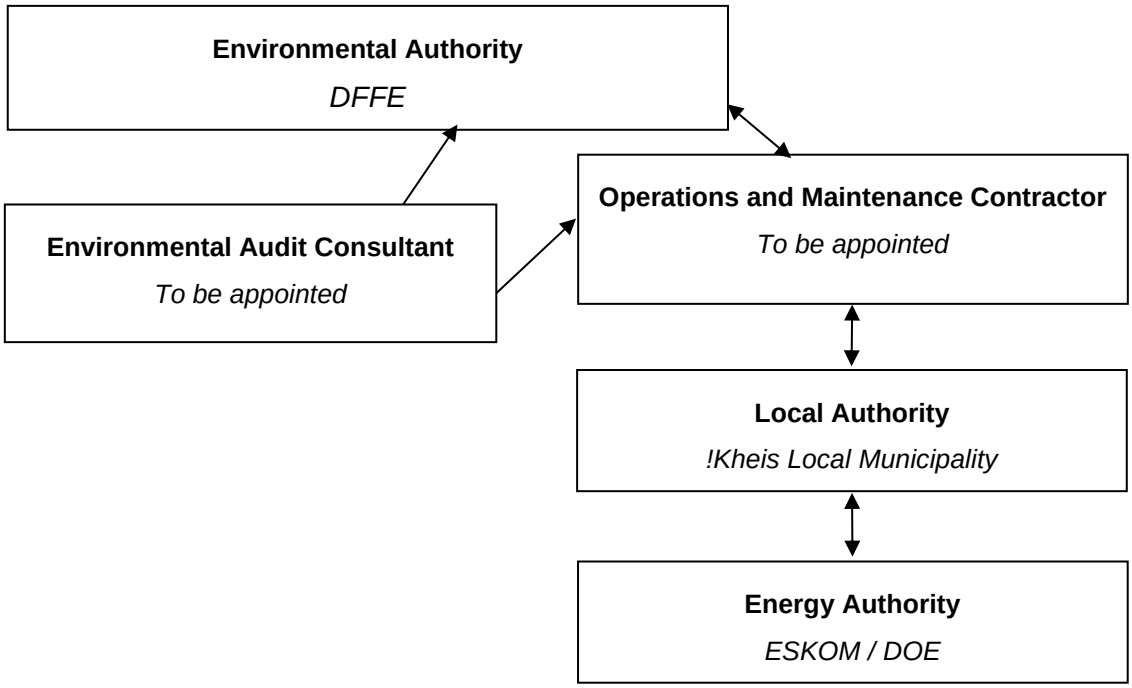

Figure 2: EMPr organisational structure during the operation phase.

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]	Role The holder of the EA is ultimately accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority. 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 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. Responsibilities - 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; - 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

- [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
	- Ensure that periodic environmental audits are undertaken on the project implementation.
Principle Environmental Control Officer (ECO)	<u>Role</u> The Holder of the EA (SPV) must appoint an ECO in terms of condition 26 of the EA. 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. The ECO is also required to prepare internal compliance audits (in the form of the monthly control report), verifying the weekly environmental checklists submitted by the ESA. 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. 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. 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. <u>Responsibilities</u> The responsibilities of the ECO will include the following: - 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; - 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;

Responsible Person(s)	Role and Responsibilities
	- Communication of all modifications to the EMPr to the relevant stakeholders - Review and approval contractors method statements.
Site Environmental Control Officer / Environmental Site Agent (ESA)[6]	Role The Holder of the EA must appoint an independent ESA in terms of this EMPr. The ESA must be independent of the holder of the EA and the EPC, report directly 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. Responsibilities The responsibilities of the ESA will include the following: - 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;
Developer / Contractor Environmental Officer (dEO)	Role The dEO is an in-house person working directly for the contractor / subcontractor. The dEOs will report to the Project Manager and are responsible for the day-to-day 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. Responsibilities - Be fully conversant with the EMPr;

- [6] To ensure consistency and integration between the roles of Principal Environmental Control Officer and Site Environmental Control Officer / Environmental Site Agent (ESA) – these two parties should be employed by the same environmental consultancy.

Responsible Person(s)	Role and Responsibilities
	- 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 EA; - 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 ESA; - Ensure that the necessary legal permits and / or licenses are in place and up to date; - Acting as EPC Environmental Representative on site and work together with the ECO and ESA;
EPC Contractor **NB:** All references to the EPC contractor will include all sub-contractors responsible for any tasks in respect of the development. All Environmental Management Actions allocated to the EPC contractor will apply equally to all sub-contractors responsible for any specific task.	Role The 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. Responsibilities - 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 as a result of a contravention of the specifications contained in EMPr, to the satisfaction of the ECO.

1.8 PROPOSED ACTIVITY

The final EIR for the proposed Kenhardt PV3 facility (forming part of the greater Scatec Kenhardt 3 Project) assessed the following activities / components associated with the project[7]:

- Solar Field, comprising Solar Arrays with a maximum height of 10m and maximum footprint of 250 hectares, including the following:
    - PV Modules;
    - Single Axis Tracking structures (aligned north south)

[7] As the Kenhardt PV3 facility forms part of a larger project (Scatec Kenhardt 2), certain of the ancillary components may not be required on both facilities forming part of the larger project – however to ensure consistency in application of management measures, the environmental impact management outcomes and actions are addressed for the total project as authorised.

    - Solar module mounting structures comprised of galvanised steel and aluminium; and
    - Foundations which will likely be drilled and piled.
- Building Infrastructure
    - Offices;
    - Operational and maintenance control centre;
    - Warehouse/workshop;
    - Ablution facilities;
    - Inverter stations;
    - On-site substation building.; and
    - Guard Houses .
- Associated Infrastructure
    - On site substation
    - Internal 33 kV power lines/underground cables;
    - Underground low voltage cables or cable trays;
    - Internal gravel roads;
    - Fencing
    - Panel maintenance and cleaning area;
    - Stormwater management structures; and
    - Temporary laydown area. To be rehabilitated on completion of construction permanent
    - Permanent laydown area of no more that 1h allowed for operation.
    - Battery Energy Storage System

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 line[8] and additional infrastructure; and
- Rehabilitation of Disturbed areas.

The following main activities will occur during the operational phase:

- Generation of electricity to add to the national grid;
- Maintenance of the solar facility, including washing of panels;
- Management of the vegetation within the PV development; and
- Maintenance of the distribution line[9]

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.

- [8] The overhead powerline forms part of a separate EMPr
- [9] The distribution powerline forms part of a separate EMPr

2. DOCUMENT CONTROL, REPORTING AND COMPLIANCE

To ensure accountability and effective implementation of the EMPr, a number of reporting systems[10], 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 on site and available at all times 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.

In compliance with condition 32 of the EA, 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

The ESA is required to complete a Weekly Environmental Checklist, the format of which will be determined 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

- [10] These reporting systems are adapted from the various generic EMPrs gazetted by the Department of Forestry, Fisheries and the Environment.

outcomes of the ECO inspection. The monthly Environmental Control Reports must be submitted to the following parties:

- The Competent Authority – Director Compliance Monitoring (in compliance with condition 27 of the EA);
- The Provincial Conservation Authority;
- The DFFE' sub-directorate, Forestry;
- The SPV;
- 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 condition 28 of the EA.

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 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 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 SPV. 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 SPV 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 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 contractor's environmental officer will 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 and ECO 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

In the event that 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 SPV for approval;
- Following consideration by the SPV, 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 ECO shall:

- Ensure that all queries, complaints and claims are dealt within an agreed timeframe[11];
- Ensure that any or all agreements are documented, signed by all parties and a record of the agreement kept in the EMPr file;
- Ensure that telephone numbers to register complaints are made available to all landowners and affected parties; and
- Ensure that contact with affected parties is courteous at all times.

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 competent authority on a monthly basis.

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

- Weekly Environmental Checklists;
- Deviations and non-compliances with the checklists;

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

- 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 1 year of commencement of construction activities.
- Within 3 months of commencement of operational 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; and
- Gazetted generic EMPrs 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: - 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
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 manner in which it intends to-	Section 1.2 to 1.4

Requirements of Section 24N of NEMA	Reference in this EMPr?
- 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.	
3. The environmental management programme must, where appropriate- - 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- - 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 in order 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- - 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 EMPr; and; The expertise of the EAP to prepare an EMPr, including a curriculum vitae.	This EMPr 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 EMPr as identified by the project description.	This EMP covers all aspects of the project as currently Authorised for Kenhardt PV3. • PV Arrays and Mounting Structures; • inverter stations; • on-site substation; • grid connection[12] • auxiliary buildings, • laydown area; • internal electrical reticulation network (underground cabling); • internal road / track network; • access road; • electrified perimeter fencing. • Battery Energy Storage System
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 – (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

[12] Grid connection components are addressed in a separate EMPr. This EMPr only includes the on site substation component of the grid connection.

Requirement	Description
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 – (v) Avoid, modify, remedy control or stop any action, activity or process which causes pollution or environmental degradation; (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.	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
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 in order 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 Final Environmental Impact Report for Kenhardt PV3 and as such, it is not re-described in this EMPr.

The table below lists the legislation that was considered in the preceding environmental assessment process, and which has been considered in the compilation of this EMPr.

Table 4: Legislation applicable to Kenhardt PV3.

Legislation
NATIONAL LEGISLATION
The Constitution of the Republic of South Africa
National Environmental Management Act (NEMA)
National Environmental Management: Biodiversity (Act 10 of 2004)
Conservation of Agricultural Resources Act – CARA (Act 43 of 1983):
The Subdivision of Agricultural Land, Act 70 Of 1970
National Water Act, No 36 of 1998
National Forests Act (No. 84 of 1998):
National Heritage Resources Act, 25 of 1998
National Energy Act (No. 34 of 2008)
PROVINCIAL LEGISLATION
Northern Cape Nature Conservation Act, No. 9 of 2009
Nature and Environmental Conservation Ordinance, No 19 of 1974
Astronomy Geographic Advantage Act, 2007 (Act No 21 Of 2007)
Northern Cape Provincial Spatial Development Framework (PSDF) 2012
GUIDELINES, POLICIES AND AUTHORITATIVE REPORTS
National Protected Area Expansion Strategy (NPAES) for S.A. 2008 (2010)
Critical Biodiversity Areas
White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)
White Paper on the Energy Policy of the Republic of South Africa (1998)
Integrated Energy Plan (IEP), 2015
Integrated Resource Plan for Electricity (2010-2030)
National Development Plan 2030 (2012)
Strategic Infrastructure Projects (SIPs)
The Convention on the Conservation of Migratory Species of Wild Animals
Guidelines to minimise the impacts on birds of Solar Facilities and Associated Infrastructure in South Africa
Environmental Impact Assessment Guideline for Renewable Energy Projects
Sustainability Imperative

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

This section provides details on the pre-construction phase impact management outcomes and actions[13] 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 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.

4.1 PRE-CONSTRUCTION EA CONDITIONS.

The Environmental Authorisation for this development requires a number of administrative requirements that need to take place prior to commencement of construction. These are detailed in the table below, along with the party responsible for undertaking these.

EA Conditions	Responsible Party
Condition 14 of the EA requires that the Final Site Layout Plan be approved prior to commencement of construction[14].	The SLP is submitted simultaneously to this EMPr by the EAP.
Condition 15 requires that the Shapefiles of the Final Site Layout Plan be submitted to the Department	These are to be submitted simultaneously to the SLP and this EMPr by the EAP.
Condition 16 Requires that the Final EMPr be approved prior to commencement of construction.	EAP has submitted this for approval.
Condition 33 of the EA requires that written notice be given to the department at least 4 Days prior to the commencement of construction activities.	Holder of the EA[15]
Condition 65 requires that liaison with landowners be done prior to construction to provide sufficient tome for them to plan agricultural activities.	Holder of the EA

4.2 APPOINTMENT OF ENVIRONMENTAL CONTROL OFFICER AND ENVIRONMENTAL SITE AGENT

In compliance with condition 26 of the Environmental authorisation, 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 to ensure compliance with the provisions of the approved EMPr

- [13] All Environmental Management Actions allocated to the EPC contractor will apply equally to all sub-contractors responsible for any specific task.
- [14] After completion of a public participation process.
- [15] The appointed ECO may undertake this on behalf of the holder of the EA.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• 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. • 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: - Facilitate the pre-construction environmental compliance workshop; - Management of 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.	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 Monitoring at DFFE. ECO to submit monthly Environmental Control Report to the Director: Compliance Monitoring at DFFE.

- Maintain a 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.						

In addition to the ECO, this EMPr requires the appointment of a full time independent 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).

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
• 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 independent of the EPC contractor and 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: - 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;	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.	The name and contact details of the appointed ESA to be submitted to the Director: Compliance Monitoring at DFFE. Weekly Environmental Checklists to be provided to the EPC and the ECO.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
- 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 a public complaints register in which all complaints and action taken / responses must be recorded. - In the event that 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 (i.e. the Principal 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 (i.e. the Site ECO) 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 of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• It is a required action that a pre-construction environmental compliance workshop be undertaken before any construction commences on site. This workshop can be	Holder of the EA	The holder of the EA must arrange the	Prior to commencem	ECO	Once off.	ECO to issue minutes of the workshop, to be

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
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. • The purpose of this workshop is to ensure that all relevant senior personnel are familiar with the provisions of the EMPr, as well as the conditions of the EA. • The following people must be present at this Environmental Compliance Workshop: - 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.		invites to the workshop. ECO to present the workshop	ent of construction.			included in first monthly environmental control report.

4.4 PRE-CONSTRUCTION ECOLOGICAL REQUIREMENTS

As required by condition 74 of the EA, 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 G. 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 Department of Environmental Affairs & Nature Conservation (DEANC) permit office in Kimberly 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 is also required.

The ECO and 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
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). All toilets (excluding temporary toilets) should be fitted with dual flush systems[16]. All taps to be installed in the control / substation / workshop buildings must be fitted with low-flow faucets.[17]. 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.	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

The avifaunal specialist has proposed the following management actions take place during the pre-construction phase of the development.

- [16] 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).
- [17] 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[18]. No electrified wires should be within 300m of the ground.	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

4.7 ELECTROMAGNETIC INTERFERENCE

The location of the project warrants the identification of potential risks related to EMI in the 100-2170 MHz frequency range. The identification process allows for the proposal of focused mitigation measures and actions to manage the impact of potential EMI risk.

A specialist, ITC Services performed a risk assessment which approximates the cumulative EMI on a project basis and provides the levels of mitigation required on an equipment level.

The outcome of the risk assessment indicates that the required mitigation for all technology variants applies to the 125-850 MHz range. As per the risk assessment, the following levels of mitigation are required per technology variant:

Tracker motors

- PVH – 61 dB at 174.4 MHz
- STi Norland – 42 dB at 835.1 MHz

String inverters

- Huawei – 51 dB at 125 MHz
- Sungrow – 11 dB at 850 MHz

[18] In this instance, according to the design specifications, a fence will be used consisting of an outer diamond mesh fence and inner electric fence with a separation distance of approximately 100mm. This should not pose any risk of entrapment for large terrestrial species and can be considered a single fence.

Depending on the final chosen technology variants and the outcome of the current engagements with SARAO, the following measures can be implemented to mitigate EMI by the required levels:

- Shielding of cables with Raybraid which is expected to reduce EMI by 60 dB.
- Increase insertion loss with sufficient EMI filtering of DC and AC inputs to equipment.
- Seal enclosures with conductive gaskets.
- Waveguide (honeycomb) filters for enclosures with air ventilation openings.
- Good installation practices such as equipotential bonding, grounding etc. will be followed to ensure the overall mitigation of EMI.

Impact management outcome: To ensure that the chosen technology variants (trackers and inverters) operate with acceptable EMI levels.

Impact Management Actions	Responsible person	Method implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Ambient EMI measurements will be taken at the project locations prior to construction to serve as reference of current EMI levels. • Mitigations will be reported in the form of an EMC Control Plan. • The necessary equipment level mitigations will be implemented in order to be compliant in the 100-2170 MHz range. • Good installation practices such as equipotential bonding, grounding etc. will be followed to ensure the overall mitigation of EMI.	EPC Contractor	EMC Control Plan	Design and construction phase	SARAO	Once-off	Approval of EMC Control Plan

4.8 BATTERY ENERGY STORAGE SYSTEM (BESS)

The pre-construction impact management outcomes and actions defined in the BESS EMPr addendum attached in Appendix C must be adopted and implemented as outlined in this addendum.

5. CONSTRUCTION PHASE – IMPACT MANAGEMENT OUTCOMES AND ACTIONS

This section provides details on the construction phase impact management outcomes and actions[19] 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 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 and kept on record in the EMPr file.

5.1 CONSTRUCTION PHASING

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 consider the following requirements regarding phasing, when developing the construction programme. This construction programme must be approved by the by the holder of the EA with input from the ECO.

- The perimeter fence and 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 (e.g., 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 EMPr, 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 EMPr.

- [19] All Environmental Management Actions allocated to the EPC 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
• 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 EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr; • 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: - 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: - 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.	EPC Contractor and ESA	ESA to present a pre-prepared environmental induction to all staff prior to them undertaking any activities on site. EPC to ensure that all environmental awareness posters are in place at a minimum of 2 locations on site and that these posters are maintained. 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 particular stage)	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 environmental control report.

5.3 DEMARCATION OF NO-GO AREAS

In compliance with conditions 37, 40 and 41 of the EA, all areas outside of the physical development footprint are to be demarcated as no-no go areas and access to these areas restricted. Condition 44 of the EA requires that all construction activities must be restricted to demarcated areas to restrict the impact on sensitive environmental features, while condition 47 of the EA requires that all wetlands, rivers and riparian areas must be treated as "no-go" areas. 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
• 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. • In order 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, 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	The EPC contractor to ensure that all no-go demarcations are in place and maintained for the duration of the contract. The ESA to ensure that compliance with the no-go policy forms part of the environmental induction. ESA to monitor compliance with no-go areas.	Survey and pegging to commencement of construction. Formal perimeter fence to be constructed in parallel to site establishment	ESA / ECO	Daily	Weekly environmental checklists. Monthly environmental control reports.

5.4 ESTABLISHMENT OF CONTRACTORS SITE CAMP AND TEMPORARY LAYDOWN AREA.

The position of the contractors site camp and temporary laydown area must as show in the approved site layout plan (i.e., the plan approved in terms of condition 14 of the EA). 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
• The Contractors Site Camp and Temporary Laydown must be situated within the development area in the position identified in the approved Site Layout Plan • In compliance with condition 69 of the EA, 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;	EPC Contractor	The EPC contractor to provide method statement for site camp and temporary laydown establishment. The ESA and ECO to monitor compliance with site camp and laydown requirements. ECO to sign off on final rehabilitation of the site camp and temporary laydown area.	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)	ESA / 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
• 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.; • Any security lighting must be restricted to the Site Camp and Laydown area and no security lighting may be placed in the field; • In compliance with condition 87 of the EA, lighting during both the construction as well as operational phase of the development must be a low-pressure sodium type, preferably yellow; • In compliance with condition 87 of the EA, all security lighting should be attached to motion sensers and be dark sky friendly[20]; and • On completion of construction, the site camp and temporary laydown area must be rehabilitated as directed.						

5.5 MANAGEMENT OF TOPSOIL

In terms of condition 46 of the EA, 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.

[20] 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
• 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; • 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; • In compliance with condition 83 of the EA, the 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	The EPC contractor to provide method statement for topsoil management. The ESA and ECO to advise on the placement of topsoil stockpiles. The ESA and ECO to monitor compliance. ECO to sign off on final rehabilitation of the site camp and temporary laydown area.	Prior to construction activities in each specific area.	ESA / ECO	Daily	Weekly environmental checklists. Monthly environmental control reports.

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
• 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.25ºC, 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 25ºC). • 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	The EPC contractor to provide method statement for Water Supply. 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) The EPC to measure (internally) PH, TDS and Conductivity of all water sources on a weekly basis.	Lawfulness and quality testing need to take place prior to construction. Remaining actions applicable for the duration of the construction phase.	EPC Contractor to provide initial and 3 monthly quality test results to ESA. EPC Contractor to supply weekly tests to ESA. Water usage records to be provided by EPC contractor on a weekly basis. ESA / ECO to review results and provide recommendations.	3 Monthly for Potability tests. Weekly for internal testing	Weekly environmental checklists. Monthly environmental control reports.

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 animal 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.

Condition 39 of the EA requires that the clearing of vegetation must be restricted to areas for the development and service infrastructure, while condition 42 of the EA requires that vegetation clearing must be limited to the footprint. 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.

In compliance with conditions 43 and 75 of the EA, 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
• Vegetation clearing can only commence once: - 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: - Internal Road Network, - Perimeter Road, - Inverter / Transformer Stations, - Laydown Area, - Site Camp and - Building Footprints • For the PV Array, the grass 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;	EPC Contractor	The EPC contractor to provide method statement for vegetation clearing activities.	Throughout the duration of construction.	ESA / 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
• 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 on PV3 (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. There will also be limited trenching associated with the DC cabling (although the majority of this will be aboveground – mounted to the panel arrays.)

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
• 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	Weekly environmental checklists. Monthly environmental control reports.

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
• 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. 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 engineer and the ECO prior to the onset of any ramming operations; • 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	Weekly environmental checklists. Monthly environmental control reports.

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 in order to protect the operational assets.

In compliance with condition 88 of the EA, 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
• 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	Implementation of the actions herein. EPC contractor to submit final fencing plan to the ECO for approval.	Throughout the construction phase	ESA and ECO	Daily	Weekly environmental checklists. Monthly environmental control reports.

5.11 CONSTRUCTION VEHICLES AND TRAFFIC MANAGEMENT PLAN

In compliance with condition 60 of the EA, construction vehicles carrying materials to the site, should avoid using roads through densely populated areas as to not disturb existing retail and commercial operations. Condition 61 of the EA furthermore requires that a permit for all abnormal loads be obtained from provincial government.

During the EIA for this project, the CSIR prepared a traffic impact assessment. An additional traffic impact assessment was undertaken by JG Afrika for the integrated access road (these are attached in Appendix F). These two documents deal 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 which are summarised 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
• 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 low hanging overhead lines (lower than 5.1m) e.g., Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles, if required	Holder of the EA and EPC Contractor	Implementation in compliance with the actions defined. Implementation of the measures. Implementation of the measured identified in the TIA's. Regular monitoring of road surface quality. Apply for prior to commencement of construction	Throughout the construction phase	ESA and ECO	At commencement of construction Daily	Weekly environmental checklists. Monthly environmental control reports.

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

In compliance with condition 55 of the EA, signs must be placed along construction roads to identify speed limit, travel restriction and other standard traffic control information. Furthermore, in compliance with condition 62 of the EA, all construction vehicles should adhere to a low-speed limit to avoid collisions with susceptible faunal species. In order comply with these conditions, 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
• The designated access to the site must be established and clearly signposted prior to physical construction commencing on site as required by condition 59 of the EA. • 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 as a result 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	Weekly environmental checklists. Monthly environmental control reports.

5.12 CONSTRUCTION WASTE

In accordance with condition 67 of the EA, 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 waste[21] 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
• A dedicated waste management area should be set up in the contractors site camp. This waste management area must as a minimum: - Be clearly demarcated and sign posted - Be wind and scavenger proof; - Include separation of wate 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: - 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. • 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.	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.

[21] 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
• 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 (as a result 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
• 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	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	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
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; • 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				fuel and chemical register and provide this to the ECO on a monthly basis.		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
• 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
• 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, • 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.	EPC Contractor	As per the stated actions	Throughout the construction phase	ESA and ECO	Daily	Weekly environmental checklists. 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
• 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: - 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;	EPC Contractor	The EPC contractor to provide method statement for all on site concrete batching.	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
- 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); • In order 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.						

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 very 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. Alternative management practices can include brush cutting. Utilisation of non-selective herbicides for the management of biomass is prohibited on site.

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
• 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 in order 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; • 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; and • The contractor must also comply with the requirements of the Occupational Health and Safety Act with regards to fire protection.	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.

5.17 SANITATION

In compliance with condition 68 of the EA, the holder of the EA 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
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: • 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; • 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.	EPC Contractor	As per the stated actions	Throughout the construction phase	ESA and ECO. The EPC Contractor to supply chemical toilet service records to the ESA on a weekly basis.	Daily	Weekly environmental checklists. Monthly environmental control reports.

Sanitation during operation is discussed separately in the sections below.

5.18 BLASTING ACTIVITIES

Due to the fact that 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
• 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 special 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 addressed. Buildings	EPC Contractor	The EPC contractor to provide method statement for blasting activities should they be needed.	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
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 take into account 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
• 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. • In compliance with condition 86 of the EA, 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

All areas not forming part of the development's hard surfaces must be rehabilitated and restored on completion of construction. These include:

- The temporary laydown area (a maximum laydown of less than 1ha may for operational requirements);
- The contract site camp;
- Temporary water storage ponds;
- Overburden spoil sites;
- Temporary haul roads;
- Batching areas; and
- All other areas within the PV array and adjacent to buildings that have been compacted or impacted by any of the 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
Topsoil management • 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 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 should 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.	EPC Contractor	Implementation of the actions detailed here. Provision of a sufficient budget to undertake rehabilitation activities	Throughout the construction phase. Physical rehabilitation activities to be completed prior to contractual operations date.	ESA and ECO and Rehabilitation Specialist	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
• 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 the topsoil is stored, the more seeds, micro-organisms and soil biota are killed. • 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. **Ripping & Substrate preparation** • 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. **Mulching** • 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 separately[22]. 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.						

[22] 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
• All mulch should be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants; • 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. **Seeding** • 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 harvested[23] 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. **Transplants** • 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.						

[23] 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
• 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. **Use of soil savers** • 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 man-made 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 is 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. **General recommendations** Progressive rehabilitation is an important element of the rehabilitation strategy and should be implemented where feasible. • 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. • 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 clearing the site, 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
• 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 on a daily basis (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. • 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.	EPC Contractor	Implementation of the actions detailed here.	Throughout the construction phase.	ESA and ECO.	Daily	Weekly environmental checklists. Monthly environmental control reports.

In addition to the above actions, the avifaunal specialist recommends the following actions in respect of avifauna.

Impact	Mitigation/Management Objectives and Outcomes	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Avifauna: Disturbance					
The noise and movement associated with the construction activities at the development footprint will be a source of disturbance which would lead to the displacement of avifauna from the area	Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Construction Environmental Management Programme (EMPr.)	A site-specific EMPr must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the EMPr and should apply good environmental practice during construction. The EMPr must specifically include the following: • No off-road driving; • Maximum use of existing roads; • Measures to control noise and dust according to latest best practice; • Restricted access to the rest of the property; • Strict application of all recommendations in the botanical specialist report pertaining to the limitation of the footprint.	• Implementation of the EMPr. Oversee activities to ensure that the EMPr is implemented and enforced via site audits and inspections. Report and record any non-compliance. • Ensure that construction personnel are made aware of the impacts relating to off-road driving. • Construction access roads must be demarcated clearly. Undertake site inspections to verify. • Monitor the implementation of noise control mechanisms via site inspections and record and report non-compliance. • Ensure that the construction area is demarcated clearly and that construction personnel are made aware of these demarcations. Monitor via site inspections and report non-compliance.	On a daily basis	Contractor and ECO

5.22 HERITAGE FEATURES

Condition 85 of the EA requires that 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, the South African Heritage Resource Agency (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
• 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 undertaken. Sufficient time must be allowed to remove/collect such material before development recommences in that area.	EPC Contractor	Implementation of the actions detailed here. Implementation of chance find procedure.	Throughout the construction phase.	ESA and ECO.	Daily	Weekly environmental checklists. Monthly environmental control reports.

The following chance find procedure must be implemented, as recommended by the Palaeontology specialist during the EIA process.

CHANCE FOSSIL FINDS PROCEDURE: Scatec Solar PV Facilities near Kenhardt		
Province & region:	NORTHERN CAPE: !Kheis and Kai !Garib Municipalities	
Responsible Heritage Resources Agency	SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za).	
Rock unit(s)	Kalahari Group, including Gordonia Formation aeolian sands and Late Caenozoic alluvium.	
Potential fossils	Vertebrate bones, teeth, plant material, freshwater molluscs and calcretised trace fossils in the Kalahari Group superficial sediments.	
ECO protocol	1. Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately (*N.B.* safety first!), safeguard site with security tape / fence / sandbags if necessary.	
	2. Record key data while fossil remains are still *in situ:* Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo Context – describe position of fossils within stratigraphy (rock layering), depth below surface Photograph fossil(s) *in situ* with scale, from different angles, including images showing context (*e.g.,* rock layering)	
	3. If feasible to leave fossils *in situ*: Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation Ensure fossil site remains safeguarded until clearance is given by the Heritage Resources Agency for work to resume	3. If *not* feasible to leave fossils *in situ* (emergency procedure only): *Carefully* remove fossils, as far as possible still enclosed within the original sedimentary matrix (*e.g.,* entire block of fossiliferous rock) Photograph fossils against a plain, level background, with scale Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation
	4. If required by Heritage Resources Agency, ensure that a suitably qualified specialist palaeontologist is appointed as soon as possible by the developer.	
	5. Implement any further mitigation measures proposed by the palaeontologist and Heritage Resources Agency	
Specialist palaeontologist	Record, describe and judiciously sample fossil remains together with relevant contextual data (stratigraphy / sedimentology / taphonomy). Ensure that fossils are curated in an approved repository (e.g., museum / university / Council for Geoscience collection) together with full collection data. Submit Palaeontological Mitigation report to Heritage Resources Agency. Adhere to best international practice for palaeontological fieldwork and Heritage Resources Agency minimum standards.	

5.23 BATTERY ENERGY STORAGE SYSTEM (BESS)

The construction phase impact management outcomes and actions defined in the BESS EMPr addendum attached in Appendix C must be adopted and implemented as outlined in this addendum.

6. OPERATIONAL PHASE – IMPACT MANAGEMENT OUTCOMES AND ACTIONS

This section provides details on the operational phase impact management outcomes and actions[24] 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.

In compliance with condition 34 of the EA, 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 very 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.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Water for the cleaning of PV modules must be lawful. • Only clean water or biodegradable cleaning materials may be used for washing purposes.	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 Audit Report.

[24] 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
• 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.					operational environmental audits	

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 waste[25] 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
• 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 supplier[26] 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 rehabilitation[27]. • 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.

6.3 OPERATIONAL GENERAL ECOLOGY CONSIDERATIONS

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

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
• 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 ensure that the Avifaunal Monitoring plan in Appendix H of this EMPr is implemented.	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
• 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.	O&M Contractor	Implementation of the actions detailed in this section.	Throughout the Operational Phase	O&M Contractor to implement and maintain records.	Daily by O&M Contractor. Annually / three yearly as part of operational	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
• 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 as a result 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 ablution 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 is 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 so as to ensure that that no hunting, killing or harvesting of plants and animals occurs. • 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 (cats and dogs) should be allowed within the solar facility.				Audit consultant.	environmental audits	

6.5 AVIFAUNAL MANAGEMENT

The following avifaunal impact management actions must be implemented during the operational phase. These actions are additional to the Avifaunal monitoring requirements detailed below.

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 by an appropriately qualified rehabilitation specialist, according to the recommendations of the botanical specialist study.	Develop a Habitat Restoration Plan (HRP) and ensure that it is approved. Monitor rehabilitation via site audits and site inspections to ensure compliance. Record and report any non-compliance.	Appointment of rehabilitation specialist to develop Habitat Restoration Plan (HRP). Site inspections to monitor progress of HRP. Adaptive management to ensure HRP goals are met.	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

6.6 BATTERY ENERGY STORAGE SYSTEM (BESS)

The operational phase impact management outcomes and actions defined in the BESS EMPr addendum attached in Appendix C must be adopted and implemented as outlined in this addendum.

7. ALIEN INVASIVE VEGETATION MANAGEMENT PLAN

The following alien invasive vegetation management plan formed part of the Original EMPr (CSIR, 2016) and must be adopted an implemented by the EPC contractor.

In compliance with condition 52 of the EA, cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing, but must be temporarily stored in a demarcated area.

Impact	Mitigation/ Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
DESIGN PHASE					
Impacts due to establishment of alien invasive plants	Ensure the appropriate removal of alien invasive vegetation from the proposed project area and prevent the establishment and spread of alien invasive plants due to the project activities.	• Ensure compliance with relevant Environmental Specifications for the control and removal of alien invasive plant species. • Appoint a specialist or contact relevant authorities to seek guidance on the removal of the alien vegetation on site. • Compile and finalise an alien weed eradication programme.	• Appoint a suitable specialist/ Contractor or contact the relevant authorities to seek guidance on the removal of the planted alien invasive species. • Appoint a suitable specialist to compile an alien invasive vegetation eradication plan. • Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports.	Once-off during the design phase. .	Holder of the EA / EPC contractor
CONSTRUCTION PHASE					
Impacts due to the establishment of and increased spread of alien invasive plants	Avoid establishment and reduce the spread of alien invasive plants due to the project activities.	• Appoint a specialist or contractor to undertake a sweep and survey of the final development footprint site, with an alien invasive eradication team to remove exotic vegetation prior to the commencement of construction. • Establish an ongoing monitoring programme for the construction phase to detect and quantify any alien species that may become established and identify the problem species (as per Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) and National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEM: BA)).	• Appoint a suitable vegetation contractor to inspect the site and remove any exotic weeds prior to the commencement of construction. ECO to ensure that this is taken into consideration and implemented. • Prepare monitoring programme which will monitor the presence of alien invasive species on the site. If any alien invasive species are detected, then the distribution of these should be mapped (GPS co-ordinates of concentrations of plants). The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area.	Prior to the commencement of construction Once-off	EPC Contractor / ESA and ECO
		Ensure proper management of soil stockpiles. Do not import soil stockpiles from areas with alien plants to ensure proper management of stockpiles.	Monitor the presence of alien invasive plants during the construction phase via visual inspections and take action to remove and control these species.	On-going	ECO and Contractor
		Undertake rehabilitation of disturbed areas as soon as possible after construction. Stockpile the shallow topsoil layer separately from the subsoil layers.	Rehabilitate disturbed areas and monitor the presence of alien invasive species on site.	On-going	ECO and EPC Contractor

Impact	Mitigation/ Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		Reinstate the topsoil layers (containing seed and vegetative material) when construction is complete to allow the plants to rapidly re-colonise the bare soil areas.			
		Keep clearance and disturbance of indigenous vegetation to a minimum.	Monitor and manage vegetation clearing by undertaking visual inspections to ensure minimal disturbance and to restrict activities to within demarcated areas.	On-going	ECO and EPC Contractor
		Ensure that the footprint required for the proposed project activities (such as temporary stockpiling, earthworks, storage areas, site establishment etc.) is kept at a minimum.	Verify that the proposed project area is determined and outlined prior to the commencement of the construction phase by undertaking visual inspections.	Once-off prior to construction and as required during the construction process.	ECO and EPC Contractor
		Ensure that alien invasive vegetation found on site, within the proposed project footprint, is immediately controlled and removed promptly, in a scheduled manner throughout the construction phase. The removal of alien vegetation on site during the construction phase should use registered control methods and take into consideration the Alien and Invasive Species Regulations published in terms of Section 97(1) of the NEM: BA, if applicable.	Monitor the presence of alien invasive plants during the construction phase via visual inspections and take action to remove and control these species. If any alien invasive species are detected, then the distribution of these should be mapped (GPS co-ordinates of concentrations of plants). The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area. Any alien invasive should be cleared from site.	On-going	ECO and EPC Contractor
		The removed alien invasive vegetation should be immediately disposed at a suitable waste disposal facility and should not be kept on site for prolonged periods of time, as this will enhance the spread of these species.	Monitor the removal of the alien vegetation found on site via visual inspections.	As necessary during the construction phase.	ECO
		All construction machinery and plant equipment delivered to site for use during the construction phase should be cleaned in order to limit the introduction of alien species.	Clean machinery and equipment prior to the construction phase. ECO to conduct visual inspections to verify that machinery and equipment are cleaned and report any non-compliance.	Prior to the commencement of construction. As necessary during the construction phase.	ECO and EPC Contractor
OPERATIONAL PHASE					

Impact	Mitigation/ Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Impacts due to establishment of alien invasive plants. Exotic weed invasion may result in the ousting of natural vegetation and alteration of ecological processes on site, with incremental impacts on the adjacent veld types.	Reduce the establishment and spread of alien invasive plants. To remove exotic weeds as and when they may arise and thereby prevent alteration of local and adjacent habitat forms.	Continue with on-going monitoring programme to detect and quantify any alien species that may become established and identify the highly invasive species during the operation phase.	Annual audit of project area and immediate surroundings. If any alien invasive species are detected, then the distribution of these should be mapped (GPS co-ordinates of concentrations of plants). The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area.	Annual	Operations and Maintenance Contractor
		Immediately control any alien plants that become established using registered control methods. Use of herbicides and undertake manual removal of alien vegetation on site where this may arise. Regular address and redress of weeds identified on site by a suitable contractor. The clearance of exotic weed to be undertaken bi-annually at a minimum and on a need's basis at an intermittent level.	Monitor the use of herbicide sprays and manual removal of alien vegetation by undertaking visual inspections and reporting any non-compliance. Maintain register of weed spraying activities and ensure that herbicide use is recorded.	Bi-annually	Holder of the EA
DECOMMISSIONING PHASE					
Exotic weed invasion of the decommissioned site resulting in ecological change	To prevent the excessive growth and propagation of exotic weeds on disturbed lands that formed a portion of the PV facility.	All-natural areas must be rehabilitated with species indigenous to the area. Re-seed with locally sourced seed of indigenous grass species that were recorded on site pre-construction.	Final external audit of area to confirm that area is rehabilitated to an acceptable level.	Once off	Main Contractor with advice from specialist
		Exotic weed control measures to be instituted through weed control programme. Regular redress of exotic weed through the use of herbicide and manual removal.	Compile weed eradication programme for a period of 12 months after the decommissioning exercise. Appoint contractor to undertake the weed eradication programme. Monitor newly disturbed areas where infrastructure has been removed to detect and quantify any aliens that may become established after decommissioning and rehabilitation. Final external audit of area to confirm that area is free of alien invasive plants after 5 years.	Weed eradication exercise to be undertaken every 6 months for a period of 12 months following decommissioning. Prior to the commencement of the decommissioning phase. Once-off	Holder of the EA with input from the specialist where necessary.

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

Condition 45 of the EA requires that all disturbed soil must be reclaimed using only indigenous vegetation and that rehabilitation activities take place in compliance with this EMPr. Condition 51 of the EA requires that no exotic plants be used for rehabilitation purposes, while condition 53 requires that such rehabilitation take place as soon as possible after the completion of construction in a particular area. The ECO must ensure that the EPC commences with the actions detailed in the plan below as soon as possible to ensure compliance with these conditions

In compliance with condition 43 of the EA, the appropriate permits must be obtained from the DFFE (Forestry) and the provincial conservation authority for the removal of all plants listed in terms of the National Forest Act and provincial legislation. These permits must be in place prior to any vegetation clearing and copies of these permits must be kept on file in the EMPr file. In addition to the environmental impact management actions detailed in the table below, all conditions contained within these permits must be complied with by the EPC Contractor.

The following plant rescue and protection plan / re – vegetation and habitat rehabilitation plan formed part of the Original EMPr (CSIR, 2016) and must be adopted and implemented. Please note that many actions originally specified in this plan have taken place as part of the design phase. In such instances these actions have been removed from the original plan and not included below.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
CONSTRUCTION PHASE					
Excessive loss of natural vegetation in and outside the development footprint area and veld degradation	Minimise loss of natural vegetation. Prevent impacts on natural vegetation in sensitive habitats and SSC.	Sensitive habitats and areas outside of the project development area should be clearly demarcated as no go areas during the construction phase to avoid accidental impacts. No development or activities should take place in the high sensitivity ecosystems.	Strict control over the behaviour of construction workers, restricting activities to within demarcated areas for construction. ECO must monitor activities and record and report non-compliance Strict control and proper education of staff to prevent misconduct. If ECO is absent, there should be a designated EO present to deal with any urgent issues.	Daily	ECO and Contractor
		Ensure that the footprint required for the proposed project activities is kept at a minimum.	Verify that the proposed project area is determined and outlined prior to the commencement of the construction phase by undertaking visual inspections.	Once-off prior to construction and as required during the construction process.	ECO
		The proposed project footprint must be demarcated to reduce unnecessary disturbance beyond the proposed project area.	Carry out visual inspections to ensure strict control over the behaviour of staff in order to restrict activities to within demarcated areas.	Weekly	ECO
		The Contractors and construction personnel must be made aware that indigenous vegetation must	Carry out Environmental Awareness Training. Conduct audits of the signed attendance registers.	Once-off training and ensure that all	Contractor/ ECO ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		not be removed or damaged (this includes succulents (e.g., Hoodia gordonii, Euphorbia spp.) the protected quiver tree, Aloe dichotoma and the Boscia sp on site.		new staff are inducted. Monthly	
		Ensure that the temporary site camp is established at least 32 m away from the banks of the major drainage lines.	Monitor the placement of the site camp via visual inspections, and record and report any non-compliance.	Once-off prior to construction and as required during the construction phase.	ECO
		Unnecessary impacts on surrounding natural vegetation must be avoided during construction. All construction vehicles should remain on properly and clearly demarcated roads.	Strict control over the behaviour of construction workers, restricting activities to within demarcated areas for construction. Include periodical site inspection in environmental performance reporting that specifically records occurrence of off-road vehicle tracks in specific areas.	Daily	ECO and Contractor
		Undertake rehabilitation of disturbed areas as soon as possible after construction. Stockpile the shallow topsoil layer separately from the subsoil layers. Reinstate the topsoil layers (containing seed and vegetative material) when construction is complete to allow the plants to rapidly re-colonise the bare soil areas. Re-seed with locally sourced seed of indigenous grass species that were recorded on site during the pre-construction phase.	Undertake following the construction phase and report any non-compliance.	Daily	ECO and Contractor
		The collection, hunting or harvesting of any plants, fuel wood or animals at the site during construction should be strictly forbidden and the staff educated to prevent this from happening.	Strict control over the behaviour of construction workers, restricting activities to within demarcated areas for construction. Carry out Environmental Awareness Training. Conduct audits of the signed attendance registers.	Daily Once-off training and ensure that all new staff are inducted. Monthly	ECO and Contractor Contractor/ ECO ECO
		Fires should only be allowed within fire-safe demarcated areas. Open fires must be prohibited. Appropriate fire safety training should also be provided to staff that are to be on site for the duration of the construction phase.	Strict control over the behaviour of construction workers, restricting activities to within demarcated areas. Ensure fire safety requirements are well understood and respected by workers (by providing basic fire safety training).	Daily	ECO and Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		Existing access roads/servitudes must be used and should be located along the boundaries of existing disturbed areas, if possible.	Compile plan pre-construction.	Prior to construction commencing	Holder of the EA
Impact on indigenous vegetation, and on SSC and their habitats	To reduce negative impacts on and loss of indigenous vegetation and protected trees. Minimise impacts on SSC and protected trees.	Appoint a specialist to undertake a second review and site visit of the final layout of the development footprint, possibly during the late summer period, in order to identify any plant species on site that may require "rescue" as well as any exotic weeds/vegetation that require removal.	Appoint an Ecologist to oversee the final development footprint area through a reconnaissance survey (already completed).	Prior to the commencement of construction	Holder of the EA
		Identification of roadways and areas where extensive vegetation loss will result is required. Upon consideration, the avoidance of unnecessary clearance of vegetation on site should be undertaken through minor deviations to the design. Ensure that the footprint required for the proposed project activities is kept at a minimum.	Review how larger vegetation will be dealt with by contractors. Vegetation should be subject to redress when given a height that aligns with the lower limit of the PV array or when adjudged to affect construction.	Ongoing	Holder of the EA
		A plant rescue operation must be initiated to confirm that no other species are located within the development site.	ECO must undertake a final walkthrough of the site prior to commencement of construction to ensure no SCC will be impacted on	Once-off	ECO and Contractor
		Clearing of vegetation should be kept to a minimum, keeping the width and length of the earthworks to a minimum.	Monitor activities and record and report non-compliance.	Daily	ECO and Contractor
		Avoid the removal of listed SSC or protected species as far as possible. Should any of the listed/protected species need to be removed, the requisite permits must be obtained prior to the removal of the species.	Monitor activities and record and report non-compliance.	Daily	ECO and Contractor
Disturbance of terrestrial fauna and flora on site due to construction workers and activities.	To advise construction staff of the requirements in respect of management of flora and fauna on site during the construction phase.	Conduct an Environmental Awareness Training and induction for all construction staff and personnel.	Carry out Environmental Awareness Training with a discussion on the management of terrestrial fauna and flora on site. Conduct audits of the signed attendance registers.	Prior to construction and as required by the ECO. Ensure that all new staff are inducted. Monthly	ECO and Contractor ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Impact on fauna as a result of construction activities.	To identify any faunal mortalities and record the details (such as the reason, spatial extent etc.) in order to avoid repetition of fatality.	Establish a recording method in order to monitor the construction activities, including species presence within site, mortalities and siting's.	Establish database of species, siting's etc. Construction personnel should advise on the findings and presence of fauna on site.	Daily to monthly	ECO
	To remove species that may be found present in the construction footprint and laydown area.	Appoint a specialist to conduct an inspection of the final project area and sweep or inspect the site for any fauna, once the fencing is complete (i.e., the established site should be flushed to ensure any large wildlife is not contained within the fenced area). Appoint a small team to flush game during the early evening. Game should be flushed by driving a team through the gated facility towards the exit.	Team to flush game as required. ECO to monitor flushing process and record any incidents or non-compliance.	Once off prior to commencement and thereafter if required.	ECO and Holder of the EA
		The Contractor or Contractors Environmental Officer should monitor trenches at the start and end of each working day to check if any small animals are trapped.	Monitor activities and record and report non-compliance.	As required during construction	ECO and Contractor
		No animals (including snakes) shall be killed on site. An expert or a suitable specialist should be appointed to remove and relocate any poisonous snakes during the construction phase.	Monitor activities and record and report non-compliance.	As required during construction	ECO and Contractor
Faunal and avifaunal road mortality as a result of increased vehicles travelling to and within the site.	Minimise loss of fauna as a result of road mortalities.	The construction personnel and staff should be made aware of the presence of fauna within the proposed project area. The construction personnel and staff must also be made aware of the general speed limits on site and must be alert at all times for potential crossings.	Carry out Environmental Awareness Training. Conduct audits of the signed attendance registers.	Once-off training and ensure that all new staff are inducted. Monthly	ECO and Contractor ECO
		To ensure that animals are not attracted to the site (and potentially resulting in increased road mortality), the waste collection bins and skips should be covered with suitable material, where appropriate, and the site camp must be kept clean on a daily basis.	Monitor the activities via visual inspections, and record and report any non-compliance.	Daily	ECO and Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Impact and loss of fauna as a result of the fence line and exclusion of fauna from site resulting in ecological change within the site.	To reduce incidental mortality and injury of fauna within the construction area.	• Ensure that the live electrical fence wire is not placed at ground level. • Conduct inspections of the fence line to address any animals that may be affected by the fence.	Conduct regular (daily) inspections of the fence line to address any animals that may be affected by the fence.	Daily to monthly record keeping. A register of all faunal siting's indicating date of siting; species affected; position of species (specific or indicative) and other observations should be established.	Holder of the EA
Increased ELP, leading to changes in nocturnal behavioural patterns amongst fauna	The avoidance of electrical light pollution through prudent positioning of external lighting.	Placement of lighting, particularly security lighting, to avoid excessive influence on surrounding areas. Placement of lighting to be judiciously considered at time of implementation.	Review lighting plans and identify important habitat zones to be avoided.	Prior to the installation of lighting.	Holder of the EA, Contractor and ECO
OPERATIONAL PHASE					
Vegetation management on site	Manage vegetation throughout the site to avoid conflict with operations of the proposed PV facility. Excessive growth of vegetation on site may affect operations of the PV facility, while excessive clearance of vegetation on site has concomitant impacts on the land in question. Management of vegetation at an optimum level of growth and height is required. Vegetation should be managed by	• Identify protocol for pruning of vegetation and clearance where required. • Identify level of pruning and vegetation management required.	Identify means of pruning and clearance of vegetation. For example, brush cutter, grazing etc.	Ongoing and as required	Environmental Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	brush cutters after the rainy season once the vegetation has flowered and disbursed seeds (June – August)				
Loss of SSC and their habitats	Control loss of natural vegetation during the operational phase. Prevent impacts on natural vegetation in sensitive habitats and SSC.	Unnecessary impacts on surrounding natural vegetation must be avoided. All operational and maintenance vehicles to remain on the roads and no driving off road allowed. No unauthorized persons should be allowed onto the site.	Strict control over the behaviour of operation workers, restricting activities to within demarcated areas for operation. Strict control and proper education of staff to prevent misconduct.	Monthly	Environmental Manager
		The collection, hunting or harvesting of any plants, any protected trees, fuel wood or animals at the site should be strictly forbidden and the staff educated to prevent this from happening.	Strict control over the behaviour of construction workers, restricting activities to within demarcated areas for construction. Carry out Environmental Awareness Training. Conduct audits of the signed attendance registers.	Daily Once-off training and ensure all new staff are inducted. As required	Facility Manager and Environmental Manager
		All hazardous materials should be stored in the appropriate manner to prevent impacts on vegetation. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.	Monitor the activities via visual inspections, and record and report any non-compliance.	Daily	Environmental Manager
		Fires should only be allowed within fire-safe demarcated areas. Open fires must be prohibited. Appropriate fire safety training should also be provided to staff that are to be on site for the duration of the operational phase.	Strict control over the behaviour of construction workers, restricting activities to within demarcated areas. Ensure fire safety requirements are well understood and respected by workers (by providing basic fire safety training).	Daily	Facility Manager and Environmental Manager
		A storm-water management plan must be implemented during the operational phase. Regular inspections of stormwater infrastructure	Verify that the stormwater management plan is being implemented and signed off prior the commencement of operations.	Prior to commencement of operations. Weekly/Monthly	Environmental Manager Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		should be undertaken to ensure that it is kept clear of all debris and weeds.	Undertake regular inspections of the stormwater infrastructure (i.e., by implementing walk through inspections).		
		Undertake maintenance of rehabilitated areas in accordance with the rehabilitation and landscaping plan.	Monitor topsoil removal and rehabilitation activities, and record and report non-compliance.	Weekly or Monthly	Facility Manager and Environmental Manager
		Continue with on-going monitoring programme to detect and quantify any alien species that may become established and identify the highly invasive species during the operation phase.	Monitor the presence of alien invasive species on the development site.	Reporting frequency depends on legal compliance framework	Facility Manager and Environmental Manager
Impact and loss of fauna as a result of operational activities.	To reduce the loss of and impact on fauna.	• Prior to the commencement of the operational phase, the plant manager and the landowner need to reach a decision in terms of the allowance of faunal activities or redress of faunal activities within site. • Identify points of excessive faunal activity and impact on operations. Undertake monitoring of faunal activities within the fenced area of the site and the immediate proximity of the site. • Reduction in speed limits in and around site.	Establish reporting procedure. Monitor the presence of fauna during the operational phase via visual inspections and site visits. Carry out Environmental Awareness Training. Conduct audits of the signed attendance registers.	Daily Daily Once-off training and ensure all new staff are inducted. As required	Facility Manager and Environmental Manager Facility Manager
Impact and loss of fauna as a result of the fence line and exclusion of fauna from site resulting in ecological change within the site.	To reduce the impact and loss of fauna from site as a result of their exclusion from the area.	• Avoidance of damage to infrastructure by faunal activity as well as impact on fauna as a result of the site infrastructure. • Identify impact of burrowing and other faunal activities on the fence line and operations activities. • Undertake the management of faunal intrusion through the fence, including possible mortalities. • Provide critter paths through the fence line to allow species access to site. • Ensure that the live electrical fence wire is not placed at ground level.	Identify where fauna may be affecting operations of site (burrows etc.) Consider redress if necessary. Conduct regular (daily) inspections of the fence line to address any animals that may be affected by the fence. Monitor the activities via visual inspections, and record and report any non-compliance.	Daily to monthly record keeping. A register of all faunal siting's indicating date of siting; species affected; position of species (specific or indicative) and other observations should be established. Daily	Holder of the EA

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		• Conduct inspections of the fence line to address any animals that may be affected by the fence. • Promote and support faunal presence and activities within the proposed PV facility.			
Impact of ELP around the site.	The avoidance of electrical light pollution through prudent positioning of external lighting.	• Placement of lighting, particularly security lighting to avoid excessive influence on surrounding areas.	Review lighting plans and identify important habitat zones to be avoided.	Prior to the installation of lighting.	Holder of the EA and Environmental Manager
Faunal and avifaunal road mortality as a result of increased vehicles travelling to and within the site.	Minimise loss of fauna as a result of road mortalities.	The operational personnel and staff should be made aware of the presence of fauna within the proposed project area. The operational personnel and staff must also be made aware of the general speed limits on site and must be alert at all times for potential crossings.	Carry out Environmental Awareness Training. Conduct audits of the signed attendance registers.	Once-off training and ensure that all new staff are inducted. Monthly	Facility Manager Environmental Manager
		To ensure that animals are not attracted to the site (and potentially resulting in increased road mortality), the waste collection bins and skips should be covered with suitable material, where appropriate, and the offices must be kept clean on a daily basis.	Monitor the activities via visual inspections, and record and report any non-compliance.	Daily	ECO and Contractor
DECOMMISSIONING PHASE					
Rehabilitation of flora on site	Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to operation.	• All damaged areas shall be rehabilitated upon completion of the contract. • All natural areas must be rehabilitated with species indigenous to the area. Re-seed with locally sourced seed of indigenous grass species that were recorded on site pre-construction. • Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.	Conduct a final external audit to confirm that area is rehabilitated to an acceptable level.	Once off	Holder of the EA with feedback and input from an appropriate specialist. with advice from specialist

9. OPEN SPACE MANAGEMENT PLAN

The following open space management plan formed part of the Original EMPr (CSIR, 2016) and must be adopted and implemented. Please note that many actions originally specified in this plan have taken place as part of the design phase. In such instances these actions have been removed from the original plan and not included below. Furthermore, please not that since the compilation of the original EMPr, a dedicated Avifaunal management Plan has been developed. The avifaunal actions detailed below must be read in conjunction with the Avifaunal Monitoring Plan in appendix H[28].

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
DESIGN PHASE					
Loss of vegetation and habitat fragmentation	Keeping the area cleared of vegetation to a minimum	Clearing of vegetation should be kept to a minimum and take into consideration the sensitivities on site as depicted in the site layout plan in appendix A.	Ensure that solar panel/array design and layout is uniform and well-adapted to the surrounding environment and that no unnecessary areas are cleared of vegetation.	Once-off during design	Holder of the EA
Impacts due to establishment of alien invasive plants	Ensure the appropriate removal of alien invasive vegetation from the proposed project area and prevent the establishment and spread of alien invasive plants due to the project activities.	• Ensure compliance with relevant Environmental Specifications for the control and removal of alien invasive plant species. • Appoint a specialist or contact relevant authorities to seek guidance on the removal of the alien vegetation on site. • Compile and finalise an alien weed eradication programme.	• Appoint a suitable specialist/ Contractor or contact the relevant authorities to seek guidance on the removal of the planted alien invasive species. • Appoint a suitable specialist to compile an alien invasive vegetation eradication plan. • Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports.	Once-off during the design phase.	Holder of the EA
Permanent barriers to animal movement and habitat fragmentation	The reduction in the impact that barrier will have on animal movement within the area	Fencing should allow for the passage of small and medium sized mammals and all forms of mesh fencing should be avoided.	Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports.	Once-off during the planning and design phase	Holder of the EA

[28] In instances where there is conflicting information between the open space management plan and the avifaunal monitoring plan, the latter takes precedence.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		All remaining areas that are not impacted upon by the proposed development footprint should remain unfenced to allow for movement corridors between the remainder of the farm.	Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports.	Once-off during the planning and design phase	Holder of the EA
		BFDs should be installed on the overhead cables where known flight paths of birds occur.	Identify appropriate points within infrastructure for the establishment of BFDs. Verify that this is undertaken by reviewing the signed approved designs.	Once-off Once-off	Holder of the EA and ECO
CONSTRUCTION PHASE					
Permanent barriers to animal movement and habitat fragmentation	The reduction in the impact that barrier will have on animal movement within the area	BFDs should be installed on the overhead cables where known flight paths of birds occur.	• The flight paths and birds observed in the area should be monitored by the ECO during the construction phase to determine where these measures should be installed. • Verify whether these have been installed by inspecting the site prior to commencement of the operational phase.	Daily Once-off	ECO and Contractor ECO
		Fencing should allow for the passage of small and medium sized mammals and all forms of mesh fencing should be avoided.	This should be monitored by the ECO to determine whether this is effective.	Daily	ECO and Contractor
Loss of vegetation and habitat fragmentation	Keeping the area cleared of vegetation to a minimum	Clearing of vegetation should be kept to a minimum, keeping the width and length of the earthworks to a minimum.	Monitor activities and record and report non-compliance.	Daily	ECO and Contractor
OPERATIONAL PHASE					
Increased risk of alien plant invasion	Ensure that the site is kept free from alien invasive species.	Continuously monitor the site and remove alien invasive species that are found.	Monitor the presence of alien invasive species on the development site.	Reporting frequency depends on legal compliance framework	Facility Manager and Environmental Manager
Increased animal road mortality	Minimise loss of fauna as a result of road mortalities.	Create awareness during staff induction programmes. Staff must be made aware of the general speed limits as well as the potential animals that may cross and how to react in these situations.	Conduct staff awareness training programmes.	Once-off training and ensure all new staff are inducted.	Facility Manager and Environmental Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Permanent barriers to animal movement and habitat fragmentation	Avoid or reduce bird collisions with or due to infrastructure related to the project	The impact on birds must be monitored by environmental staff member during the first six months of the operational phase.	Record any evidence of bird collisions, injury or other bird-related incidents (with GPS coordinates). Where necessary, a bird specialist should oversee the recording and reporting of incidents, help with species identification, assess the significance of any impacts, and if required, suggest mitigation.	Weekly for the first month, thereafter, monthly	Holder of the EA.
		Annual monitoring by an avifaunal specialist. This should be based on a minimum of 3-5 days observations.	Monitor the flight paths of birds occurring on site, noting which birds are seen.	Annually	Holder of the EA.
		Any avian mortality or injury at the facility should be duly recorded and reported.	Record any bird fatalities and undertake the necessary reporting to relevant authority.	When required	Holder of the EA.
DECOMMISSIONING PHASE					
No specific impacts are associated with the decommissioning phase other than those from the operational phase that will still be relevant for the duration of the decommissioning phase due to on-going occupation of the area.	To manage impacts on the surrounding environment during the operational phase.	Disturbed and transformed areas should be contoured to approximate naturally occurring slopes to avoid lines and forms that will contrast with the existing landscapes	Final external audit of area to confirm that area is rehabilitated to an acceptable level	Once off	Holder of the EA.
		Stockpiled topsoil should be reapplied to disturbed areas and these areas should be re-vegetated using a mix of native species in such a way that the areas will form as little contrast in form, line, colour and texture with the surrounding undisturbed landscape.	Final external audit of area to confirm that area is rehabilitated to an acceptable level	Once off	Holder of the EA.
		Edges of re-vegetated areas should be feathered to reduce form and line contrasts with surrounding undisturbed landscape.	Final external audit of area to confirm that area is rehabilitated to an acceptable level	Once off	Holder of the EA.

10. HAZARDOUS SUBSTANCES LEAKAGE OR SPILLAGE MONITORING SYSTEM

The following hazardous substances leakage or spillage monitoring system formed part of the Original EMPr (CSIR, 2016) and must be adopted and implemented.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
CONSTRUCTION PHASE					
Contamination of soil and risk of damage to vegetation and/or fauna through spillage of concrete and cement.	To control concrete and cement batching activities in order to reduce spillages and resulting contamination of soil, groundwater and the vegetation and/or fauna.	If any concrete mixing takes placed 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 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.
		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.	To control and eliminate fuel and oil spillages which may result in soil contamination and	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	Monitor the storage and handling of dangerous goods and hazardous materials on site	Weekly	EPC Contractor and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	damage to vegetation and/or fauna.	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).	via site audits and record non-compliance and incidents.		
		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[29] 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
		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	Monitor the correct removal of contaminated soil. Monitor waste disposal slips and waybills via site audits and	Daily (or during spills)	EPC Contractor and ECO

- [29] 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	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		(i.e., waste disposal slips or waybills) should be retained on file for auditing purposes.	record non-compliance and incidents.		
		A Spill Response Method Statement must be compiled by the Contractor for the construction phase in order 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 considered to be 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,	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) in order to determine if the soil is significantly contaminated or not. If the contaminated soil is considered to be significantly contaminated, then compliance with Part 8 of the NEMWA	During spill events	Holder of the EA

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		including notifying the Minister of Environmental Affairs of the significant contamination.	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
OPERATIONAL PHASE					
Contamination of soil and risk of damage to vegetation and/or fauna through spillage of fuels and oils	To control and eliminate fuel and oil spillages which may result in soil contamination and damage to vegetation and/or fauna.	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 in order 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).	Holder of the EA and Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
				Once-off (and thereafter as required).	
		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 personnel are aware of its location and instructions.	Weekly	Facility Manager
		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 considered to be 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) in order to determine if the soil is significantly contaminated or not. If the contaminated soil is considered to be 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

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Impacts due to management solid and liquid wastes disposed of on the site during operational phase.	Prevent environmental impacts as a result of the operational phase such as pollution.	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 in order 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
DECOMMISSIONING PHASE					
No specific impacts are associated with the decommissioning phase other than those from the operational phase that will still be relevant for the duration of the decommissioning phase due to on-going occupation of the area.					

11. STORMWATER MANAGEMENT PLAN

The following Stormwater Management Plan formed part of the Original EMPr (CSIR, 2016) and must be adopted and implemented. Condition 48 of the EA requires that no discharge of effluent or polluted water must be allowed to enter any rivers or wetland areas.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
DESIGN PHASE					
Impact of the project if a detailed storm water management plan is not correctly prepared.	To limit the effect of uncontrolled storm water run-off from developed areas onto natural areas	• Prepare a detailed stormwater management plan outlining appropriate treatment measures to address runoff from disturbed portions of the site, such that they do not: • result in concentrated flows into natural watercourses i.e., provision should be made for	Check compliance with specified conditions. Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports.	Once-off during design followed by regular control During the design phase	Contractor ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		temporary or permanent measures that allow for attenuation, control of velocities and capturing of sediment upstream of natural water courses; • result in any necessity for concrete or other lining of natural water courses to protect them from concentrated flows of the development; • divert flows out of their natural flow pathways, thus depriving downstream watercourses of water.			
CONSTRUCTION PHASE					
Diversion and impedance surface water flows – Changes to the hydrological regime and increased potential for erosion. Diversion and increased velocity of surface water flows – reduction in permeable surfaces	Prevent interference with natural run-off patterns, diverting flows and increasing the velocity of surface water flows.	The appointed Contractor should compile a Method Statement for Stormwater Management during the construction phase.	Compile a Method Statement for Stormwater Management during the construction phase. Inspect and verify if a Method Statement for Stormwater Management has been compiled by the Contractor via audits prior to the commencement of the construction phase.	Prior to the construction phase. Once-off prior to the commencement of the construction phase.	Contractor ECO
		Stormwater and any run-off generated by the hard surfaces should be discharged into retention swales or areas with rock riprap (or similar). These could be used to enhance the sense of place, if they are planted with indigenous vegetation.	Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	Weekly or bi-weekly	ECO
		Erosion and sedimentation into water bodies must be minimised through the effective stabilisation (gabions and Reno mattresses or similar) and the re-vegetation of any disturbed riverbanks.	Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	Weekly or Bi-weekly	ECO
		Place energy dissipation structures in a manner that allows the management of flows prior to being discharged into the natural environment, thus not only preventing erosion, but supporting the maintenance of natural base flows within these systems i.e., hydrological regime (water quantity and quality) is maintained.	Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	Weekly or bi-weekly	ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		Reinforce soil slopes to minimise erosion during rehabilitation (as needed, and once construction in a specific area has ceased).	Monitor activities and record and report non-compliance.	As needed during the construction phase	ECO
		Any irrigation of the development area for landscaping or dust control purposes should be controlled, such that it does not result in any measurable increase in moisture being passed into natural drainage lines.	Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	Weekly or bi-weekly	ECO
		Drainage along the sides of the roads should be designed so that it does not result in concentrated flows into watercourses.	Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	Weekly or bi-weekly	ECO
		Perform periodic inspections and maintenance of soil erosion measures and stormwater control structures.	Monitor activities and record and report non-compliance.	As needed during the construction phase	ECO
Pollution of the surrounding environment as a result of the contamination of stormwater. Contamination could result from the spillage of chemicals, oils, fuels, sewage, solid waste, litter etc.	To prevent contaminated stormwater from entering into and adversely impacting on freshwater ecosystems and reducing the water quality. To reduce sedimentation of nearby water systems. To apply best practice principles in managing risks to storm water pollution.	The appointed Contractor should compile a Method Statement for Stormwater Management during the construction phase.	Compile a Method Statement for Stormwater Management during the construction phase. Inspect and verify if a Method Statement for Stormwater Management has been compiled by the Contractor via audits prior to the commencement of the construction phase.	Prior to the construction phase. Once-off prior to the commencement of the construction phase.	Contractor ECO
		Provide secure storage for fuel, oil, chemicals and other waste materials to prevent contamination of stormwater runoff. Fuels and chemicals (i.e., any hazardous materials and dangerous goods) used during the construction phase must be stored safely on site and in bunded areas. Fuel and chemical storage containers must be inspected to ensure that any leaks are detected early.	Monitor the storage and handling of dangerous goods and hazardous materials on site via site audits and record non-compliance and incidents. Monitor if spillages have taken place and if they are removed correctly.	Weekly	ECO
		All stockpiles must be protected from erosion and stored on flat areas where run-off will be minimised. Erosion and sedimentation into water bodies must be minimised through effective stabilisation. No stockpiling should take place within a watercourse.	Monitor the excavations and stockpiling process throughout the construction phase via visual site inspections. Record non-compliance and incidents.	Daily	ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		Stockpiles must be located away from river channels i.e., greater than 32 m.			
		Littering and contamination of water resources during construction must be prevented by effective construction camp management.	Monitor via site audits and record non-compliance and incidents (i.e., by implementing walk through inspections).	Weekly	Contractor and ECO
		Emergency plans must be in place to deal with potential spillages (especially those leading to any watercourses).	Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	Weekly or Bi-weekly	ECO
		Erosion and sedimentation into water bodies must be minimised through the effective stabilisation (gabions and Reno mattresses or similar) and the re-vegetation of any disturbed riverbanks.	Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	Weekly or Bi-weekly	ECO
		Ensure that the temporary site camp and ablution facilities are established at least 32 m away from the banks of the major drainage lines.	Monitor the placement of the site camp via visual inspections, and record and report any non-compliance.	Once-off prior to construction and as required during the construction phase.	ECO
		Ensure that there is no ad-hoc crossing of channels by vehicles during the construction phase. Access routes across the site should be strictly demarcated and selected with a view to minimise impacts on drainage lines.	Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	Weekly or Bi-weekly	ECO
		.	Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	Weekly or Bi-weekly	ECO
		Regular inspections of stormwater infrastructure should be undertaken to ensure that it is kept clear of all debris and weeds.	Monitor via site audits and record non-compliance and incidents (i.e., by implementing walk through inspections).	Weekly	Contractor and ECO
OPERATIONAL PHASE					
Stormwater discharge into the surrounding environment during operations	To minimise the contamination of stormwater by uncontrolled release of contaminated or grey water.	An operational phase Stormwater Management Plan should be designed and implemented, with a view to prevent the passage of concentrated flows from hardened surfaces and onto natural areas.	Compile a Stormwater Management Plan for the operational phase. Inspect and verify if a Stormwater Management Plan has been compiled prior to the commencement of the operational phase.	Continuously during operational phase. Once-off prior to the commencement of the operational phase.	Holder of the EA / EPC contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	To protect soil resources and prevent soil erosion.	All release points into the natural environment must have appropriate energy dissipaters to minimise scouring/erosion.	Monitor activities and record and report non-compliance. Monitor the placement of energy dissipaters via visual inspections, and record and report any non-compliance.	On-going	Holder of the EA / EPC contractor
		As far as reasonably possible, separate "clean" and "dirty" storm water. As far as reasonably possible, capture and contain "dirty" stormwater for appropriate disposal/discharge.	Monitor via site audits and record non-compliance and incidents (i.e., by implementing inspections).	Weekly or as required during operations.	Holder of the EA / EPC contractor
		Regular inspections of stormwater infrastructure should be undertaken to ensure that it is kept clear of all debris and weeds.	Undertake regular inspections of the stormwater infrastructure (i.e., by implementing walk through inspections).	Weekly/Monthly	Holder of the EA / EPC contractor
DECOMMISSIONING PHASE					
The proposed solar facility would be expected to run for a minimum period of 20 years, after which it would either be decommissioned, alternatively upgraded or an application submitted to obtain a new license. Should the plant be decommissioned, the solar field would be rehabilitated to its original (pre-development) state. In the (unlikely) event that none of the mitigation measures outlined for the construction and operational phases of the proposed project had been implemented, the period of time for recovery to take place would be extended. In the event that decommissioning occurs, and assuming implementation of mitigation measures, the hydrological regime should fully recover over time to present day conditions.					

12. EROSION MANAGEMENT PLAN

The following Erosion Management Plan formed part of the Original EMPr (CSIR, 2016) and must be adopted and implemented.

Condition 50 of the EA requires that anti-erosion measures such as silt fences must be installed in disturbed areas. The plan in the table below provides the actions required to comply with the EA conditions.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
CONSTRUCTION PHASE					
Increased wind erosion and resultant deposition of dust	Prevent wind erosion and resultant deposition of dust on surrounding indigenous vegetation.	Sand, stone and cement should be stored in demarcated areas, and covered or sealed to prevent wind erosion and resultant deposition of dust on the surrounding indigenous vegetation.	Undertake regular inspections of the via site audits to verify that sand, stone and cement are stored and handled as instructed.	Daily	ECO and Contractor
		During construction, efforts should be made to retain as much natural vegetation as possible on the	Monitor activities via site inspections and record and report non-compliance.	Daily	ECO and Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		site, to reduce disturbed areas and maintain plant cover, thus reducing erosion risks.			
		All stockpiles must be protected from erosion and stored on flat areas where run-off will be minimised. Erosion and sedimentation into water bodies must be minimised through effective stabilisation.	Monitor the stockpiling process throughout the construction phase via visual site inspections. Record non-compliance and incidents.	Daily	ECO
Excessive loss of natural vegetation within the development footprint area	Prevent loss of natural vegetation through erosion.	Vegetation clearing during construction must be restricted to the footprint of the proposed project components and planned infrastructure only. It should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time.	Monitor vegetation clearing throughout the construction phase via visual site inspections. Record non-compliance and incidents. Undertake regular monitoring for erosion to ensure is reduced and rectified as soon as possible.	Daily Daily	ECO and Contractor ECO
		Stockpile the shallow topsoil layer separately from the subsoil layers (especially if the excavation exceeds 0.5 m). Reinstate the topsoil layers (containing seed and vegetative material) when construction is complete to allow the plants to rapidly re-colonise the bare soil areas.	Rehabilitate disturbed areas and monitor the presence of alien invasive species on site.	Daily (stockpiling) and once-off for the reinstatement of the topsoil layer	ECO and Contractor
		Re-seed with locally sourced seed of indigenous grass species that were recorded on site pre-construction.	Re-seed with seeds of indigenous grass species.	Once off	ECO with advice from specialist (if required)
		Topsoil stockpiles not used in three months after stripping must be seeded to prevent dust and erosion.	Regular monitoring for erosion to ensure that no erosion problems are occurring at the site. All erosion problems observed should be rectified as soon as possible.	Weekly initially and thereafter monthly	ECO and Contractor
Erosion of surface soils, riling and gulley's.	Measures to be implemented that address or avoid the loss of surface soils and exacerbates gulley formation.	Identify cause of erosion and possible means of redress (i.e., implement erosion control measures, where applicable), such as the use of geofabric, stone gabions and re-vegetation or similar measures. Erosion control measures should seek to reduce surface flow velocity and allow for settlement on site	Monitor the erosion on site during construction, as well as the implementation and effectiveness of erosion control on site (such as the use of geofabric, stone gabions and re-vegetation or similar measures).	Ongoing and as required during erosion events.	ECO and Project Developer (Scatec Solar)

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		of silt laden surface waters. Washaways, excessive loss of soils and galleys can be considered to be indicative of excessive erosion.			
OPERATIONAL PHASE					
Excessive loss of natural vegetation in the development footprint area and resulting impacts on SSC, faunal habitat and habitat fragmentation.	Prevent loss of natural vegetation and minimise habitat fragmentation and the loss of connectivity as a result of erosion.	To prevent erosion, indigenous grasses that seed themselves below the solar arrays should (where possible) be left to form a ground cover and kept short.	ECO to advise on seed to be used.	Prior to re-vegetation.	Holder of the EA / EPC contractor
		The use of silt fences, sandbags or other suitable methods must be implemented in areas that are susceptible to erosion. Other erosion control measures that can be implemented are as follows: 1) Brush packing with cleared vegetation, 2) Planting of vegetation, 3) Hydro seeding/hand sowing. All erosion control mechanisms need to be regularly maintained.	Monitor efficiency of erosion control measures.	Weekly or monthly	Holder of the EA / EPC contractor
		Conduct regular monitoring for erosion to ensure that no erosion problems are occurring at the site as a result of the roads and other infrastructure. Ensure that all erosion problems are rectified as soon as possible.	Undertake regular monitoring for erosion to ensure is reduced and rectified as soon as possible.	Monthly	Holder of the EA / EPC contractor
Increased wind erosion and resultant deposition of dust.	Prevent wind erosion and resultant deposition of dust on surrounding indigenous vegetation.	Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.	Include periodic site inspections in environmental performance reporting that inspects the effectiveness and integrity of the run-off control system and specifically records occurrence or non-occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring.	Monthly	Holder of the EA / EPC contractor
DECOMMISSIONING PHASE					
No specific impacts are associated with the decommissioning phase other than those from the operational phase that will still be relevant for the duration of the decommissioning phase due to on-going occupation of the area. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas. Monitoring: Final external audit of area to confirm that area is rehabilitated to an acceptable level (once off event to be conducted by ECO).					

13. FIRE MANAGEMENT PLAN

The following Fire Management Plan formed part of the Original EMPr (CSIR, 2016) and must be adopted and implemented.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
DESIGN PHASE					
Potential impacts resulting from the lack of overall compliance with the conditions of the EA (issued by the DEA)	Ensure compliance with all environmental conditions of approval (issued by DEA as part of the EA).	Audit the implementation of the EMPr requirements.	Audit report on compliance with actions and monitoring requirements.	Weekly	ECO / ESA
		Establish clear and transparent reporting of the activities undertaken with regard to all recommendations included in the EMPr.	Audit report on compliance with actions and monitoring requirements.	Weekly	Holder of the EA / EPC contractor
CONSTRUCTION PHASE					
Potential risk of fire due to construction activities or behaviour of staff on site during the construction phase	Prevent fire on site resulting of workers smoking or starting fires (i.e., cooking, heating purposes).	Designate smoking areas, as well as areas for cooking, where the fire hazard could be regarded as insignificant.	Ad-hoc checks to ensure workers are smoking or cooking in designated areas only.	Daily	ECO and Contractor
		Educate workers on the dangers of open and/or unattended fires.	Ensure fire safety requirements are well understood and respected by construction personnel. Carry out Environmental Awareness Training. Conduct audits of the signed attendance registers.	Ongoing. Once-off training and ensure that all new staff are inducted. Monthly	ECO and Contractor Contractor/ ECO ECO
		Open fires must be prohibited. Appropriate fire safety training should also be provided to staff that are to be on the site for the duration of the construction phase.	Ensure fire safety requirements are well understood and respected by construction personnel. Provide basic fire safety training.	On-going	ECO and Contractor
		Fire-fighting equipment must be made available at various appropriate locations on the construction site.	Ensure fire safety requirements are well understood and respected by workers. Assurance of functionality of fire extinguishers via inspections and certification by an accredited fire service company.	On-going Bi-annually	ECO and Contractor Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		No person other than a qualified specialist or personnel authorised by the Project Developer, will disturb animals on the site.	Check compliance with specified conditions using a report card and allocate fines when necessary.	On-going	ECO and Contractors
		Educate workers on site about suitable behaviour on site and initiate environmental awareness. Staff must be informed that no trapping, snaring or feeding of any animal will be allowed.	Carry out Environmental Awareness Training. Conduct audits of the signed attendance registers.	Once-off training and ensure that all new staff are inducted. Monthly	Contractor/ ECO ECO
		The Contractor should install and maintain Construction Site Information Boards in the position, quantity, design and dimensions specified by the Project Developer.	Monitor compliance and record non-compliance and incidents.	Before construction	ECO
		General building materials should be stored in appropriate designated areas on site such that there will be no runoff from these areas towards sensitive systems. The site camp must be removed after construction.	Monitor compliance and record non-compliance and incidents.	Before construction	ECO
		Make construction personnel aware of the importance of limiting water wastage, as well as reducing water use.	Conduct audits of the signed attendance registers.	Once-off training and ensure that all new staff are inducted. Monthly	Contractor/ ECO ECO
OPERATIONAL PHASE					
Potential risk of fire due to behaviour of staff on site during the operational phase	Ensure appropriate and efficient fire prevention during the operational phase.	Designate smoking areas as well as areas for cooking, where the fire hazard could be regarded as insignificant.	Random inspections during a month to ensure workers are smoking or starting fires in designated areas only.	Monthly	Facility Manager
		Educate workers on the dangers of open and/or unattended fires.	Ensure fire safety requirements are well understood and respected by operational personnel. Carry out Environmental Awareness Training.	Ongoing Once-off training and ensure that all new staff are inducted. Monthly	Facility Manager Facility Manager Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			Conduct audits of the signed attendance registers.		
		Open fires must be prohibited. Appropriate fire safety training should also be provided to staff that are to be on the site for the duration of the operational phase.	Ensure fire safety requirements are well understood and respected by operational personnel. Provide basic fire safety training.	On-going	Holder of the EA / EPC contractor
		Ensure that adequate fire-fighting equipment is available and easily accessible on site.	Ensure fire safety requirements are well understood and respected by workers. Assurance of functionality of fire extinguishers via inspections and certification by an accredited fire service company.	On-going Bi-annually	Holder of the EA / EPC contractor
DECOMMISSIONING PHASE					
Ensure that the construction mitigation and management measures are adhered to during the decommissioning phase.					

In addition to the above, the fire management outcomes and actions defined in the BESS EMPr addendum attached in Appendix C must be adopted and implemented as outlined in this addendum.

14. DECOMISSIONING PHASE – IMPACT MANAGEMENT OUTCOMES AND ACTIONS

In compliance with condition 35 of the EA, 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 facility[30] (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;

- [30] 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 conduction 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 (!Kheis Local Municipality), as well as the Provincial and National Environmental Authorities (the Northern Cape Department of Environmental Affairs & Nature Conservation (DEANC) 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:

14.1 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 assess 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 of 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).

14.2 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.

15. ADDITIONAL EA REQUIREMENTS

The table below lists all the additional requirements in terms of the Environmental Authorisation that are not covered elsewhere in this EMPr. The holder of the EA is ultimately responsible for compliance with these requirements but may delegate responsibility to the EPC Contractor or O&M contractor where applicable.

#	Condition
49	Underground tables and internal roads must be aligned as much as possible along existing infrastructure to limit damage to vegetation and watercourses
54	Workers must be made aware of the importance of not polluting rivers or wetlands. Such awareness needs to be promoted throughout the construction phase.
56	Internal access roads must be located to minimise stream crossings. All structures crossing streams must be located and constructed that they do not decrease channel stability or increase water velocity.
57	Roads must be designed in such a way so that changes surface water run off patterns are limited.
63	The holder of the authorisation must reduce visual impacts during construction by minimising areas of surface disturbance, controlling erosion, using dust suppression techniques and restoring exposed soil as closely as possible to their original contour and vegetation.
71	Borrow pit materials must be obtained only from authorised and permitted sites. Permits must be kept on site by the ECO.
92	National Government, provincial government, local authorities or committees appointed in terms of the conditions of the Environmental Authorisation will not be held liable for damages as a result of the stopping of construction for non-compliance issues.

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 EMPr. 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 required[31]:

- 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.
- In compliance with condition 32 of the EA, these compliance records must be submitted to the Director: Compliance monitoring at the DFFE.

16.1.2 Operational Avifaunal Monitoring

An operational Avifaunal Monitoring plan has been compiled by an avifaunal specialist, Mr Chris van Rooyen, in compliance with condition 17.12 of the EA. This plan is attached in Appendix H and summarised below.

The operational monitoring at the Solar Energy Facility will be conducted in accordance with the latest version of the Solar Best Practice Guidelines (Jenkins, A.R., Ralston-Patton, Smit- Robinson, A.H. 2017. Guidelines for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa. BirdLife South Africa) hereafter referred to as the Best Practice Guidelines.

16.1.2.1 Aim of operational monitoring

Operational monitoring should assess if there are any changes in the following:

- habitat available to birds in and around the Solar Energy facility
- abundance and species composition of birds
- movements of priority species
- breeding success of priority species
- to record any avifaunal mortality linked to the Solar Energy Facility
- assess the significance of recorded mortality of the Solar Energy Facility

Most importantly, operational monitoring should highlight if additional mitigation is required to reduce impacts to acceptable levels.

Operational monitoring can be divided into two categories:

- habitat classification
- quantifying bird numbers and movements (replicating baseline data collection)

The objectives of operational monitoring are to:

[31] This must be read in conjunction with section 2 of the EMPr

- determine the actual impacts of the SEF
- assess the significance of measured impacts at the SEF
- determine if additional mitigation is required at the SEF

16.1.2.2 Timing

Operational monitoring should commence within three months of Commercial Operation Date (COD) to ensure that the immediate effects of the facility on resident and passing birds are recorded, before they have time to adjust or habituate to the development. However, it should be borne in mind that it is also important to obtain an understanding of the impacts of the facility as they would be over the lifespan of the facility. Over time the habitat within the SEF may change, birds may become habituated to, or learn to avoid the facility. It is therefore necessary to monitor over a longer period than just an initial one year. Two surveys must be conducted every year in the high season (February to March), preferably after the site has experienced substantial rainfall, and in the dry season (May to October).

16.1.2.3 Duration

The monitoring should run over a period of at least two years. After the first two years of monitoring, the programme must be reviewed to incorporate significant findings that have emerged. If significant displacement impacts (or other impacts e.g., collision mortalities) are observed and mitigation is required, the avifaunal specialist must engage with the owner to discuss potential mitigation measures and the extension of the monitoring beyond the two-year mark. The monitoring should also be extended if the first two years experienced below average rainfall. Should it be necessary to extend the monitoring for the reasons mentioned, it should be conducted for at least another three years to account for climatic variation.

16.1.2.4 Habitat classification

Any observed changes in bird numbers and movements at a SEF may be linked to changes in the available habitat. The avian habitats will be assessed twice a year (i.e., when the surveys are conducted), to record any changes in the baseline conditions.

16.1.2.5 Avifaunal live-bird monitoring and carcass searches

In order to determine if there are any impacts relating to displacement and/or disturbance, all methods used to estimate bird numbers and movements during the original pre-construction baseline monitoring in the EIA phase must be applied as far as is practically possible in the same way to operational work in order to ensure maximum comparability of these two data sets. In the present instance, the following data collection protocol must be implemented:

- On-site surveys must be conducted in the following manner:
  - Four (4) walk transects must be identified by the avifaunal specialist, using the final lay-out plan, totalling 1km each, three (3) within the PV footprint, and one (1) control transect outside the footprint.
  - A suitable monitor must be identified to conduct the monitoring. This can either be the avifaunal specialist his/herself, or it can be a person trained by the avifaunal specialist in the monitoring protocol.
  - The monitor must record all species on both sides of the walk transect. The monitor must stop at regular intervals to scan the environment with binoculars.
  - Each transect must be counted twice during each survey over a period of four days.
  - Transects must be counted early in the morning, and late in the afternoon.
  - The following variables must recorded:
    - Species;
    - Number of birds;
    - Date;

        - Start time and end time;
        - Estimated distance from transect (m);
        - Wind direction;
        - Wind strength (estimated Beaufort scale 1 - 7);
        - Weather (sunny; cloudy; partly cloudy; rain; mist);
        - Temperature (cold; mild; warm; hot);
        - Behaviour (flushed; flying-display; perched; perched-calling; perched-hunting; flying-foraging; flying-commute; foraging on the ground.
- All incidental sightings of priority species in and around the proposed PV development area must recorded.
- The section of the Aries - Nieuwehoop 400kV transmission line running west of the study area must inspected for evidence of breeding raptors on the towers.
- A sample of solar panel rows, as identified by the avifaunal specialist, perimeter fence and above ground 33kV powerlines must be systematically searched for bird carcasses on a weekly basis. The searcher could be a SEF staff member that is permanently based at the facility and reports to the SEF management. If a carcass is discovered, the following must be done:
    - The carcass must be photographed (both front and back) and given a unique ID number, and the following details must be recorded in a register of mortalities:
        - Date found
        - Time found
        - Coordinates
        - Habitat
        - Estimated time since death
        - Carcass condition
        - Probable cause of death
    - The carcass must then be stored in a plastic bag with its unique ID number on site in a freezer for subsequent confirmation of species identity by the avifaunal specialist.
    - The Operations Manager must ensure that the mortality register is kept up to date.
- If there are sections where the 33kV cables cannot buried due to technical constraints, a bird-friendly design must be employed after an appropriately qualified and experienced avifaunal specialist have signed-off on the final design.
- All 33kV powerlines must be inspected twice a week for bird carcasses which may be the result of collisions or electrocutions. The searcher could be a SEF staff member that is permanently based at the facility and reports to the SEF management. If a carcass is discovered, the standard procedure for carcass processing should be followed as outlined above.

16.1.2.6 Deliverables

Annual report

An operational monitoring report will be completed at the end of each year of operational monitoring. As a minimum, the report will attempt to answer the following questions:

- How has the habitat available to birds in and around the Solar Energy Facility changed?
- How has the number birds and species composition changed?
- How have the movements of priority species changed?
- How has the Solar Energy Facility affected priority species' breeding success?
- What are the likely drivers of any changes observed?
- What is the significance of any impacts observed, both locally and regionally?
- What mitigation measures are required to reduce the impacts?

Progress reports

One progress report must be provided with basic statistics and any issues that need to be red flagged. The progress report must provide a summary of the transect data and any mortality that have been collected to date and must highlight and discuss any concerns that have emerged during the monitoring so far. If need be, suggestions for mitigation should also be included.

16.1.2.7 Summary of tasks

Activity	Year 1	Year 2		Year 3	Year 4	Year 5
Implement carcass surveys	Within three months of Commercial Operation Date (COD)	From day 1	Assess whether further monitoring is required, based on the results of the first two years of monitoring. If so, continue with Years 2 - 5.	From day 1	From day 1	From day 1
Live bird monitoring survey 1 (rainy season)	February to March	February to March		February to March	February to March	February to March
Specialist to produce progress report	Within one month of completing survey 1	Within one month of completing the survey 1		Within one month of completing the survey 1	Within one month of completing the survey 1	Within one month of completing the survey 1
Live bird monitoring survey 2 (dry season)	May to October	May to October		May to October	May to October	May to October
Specialist to produce annual report.	Within two months of the final carcass search for that year	Within two months of the final carcass search for that year		Within two months of the final carcass search for that year	Within two months of the final carcass search for that year	Within two months of the final carcass search for that year

16.1.3 Construction Phase Alien Vegetation Monitoring

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

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

Table 5: Alien vegetation monitoring requirements during the construction phase.

Monitoring Action	Indictor	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

16.1.4 Operational Phase Alien Vegetation Monitoring

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

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

Table 6: Alien vegetation monitoring requirements during the operational phase

Monitoring Action	Indictor	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

16.1.5 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.

16.1.6 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 AUDITING[32]

Condition 28 of the EA requires that 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

Condition 29 of the EA notes that the frequency of auditing and submission of the environmental audit reports must be as per the frequency indicated in the EMPr taking into account the processes for such auditing prescribed in Regulation 34 of GN R. 982. In this regard, this EMPr recommends that audits be submitted to the following auditing schedule:

- Within 1 year commencement of construction activities;
- Within 1 year of commencement of operational activities;
- Every 3 years after the initial operational audit.

- [32] 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.

In compliance with condition 30 of the EA, the holder of the authorisation must in addition to the schedule above, submit environmental audit reports to the Department within 30 days of completion of the construction phase and within 30 days of completion of rehabilitation activities. The Rehabilitation requirements detailed in this EMPr however require that rehabilitation be concluded simultaneously with the construction phase. I this regard, a single environmental audit report can be compiled to satisfy the requirements of condition 30.

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

- The operators of the facility;
- The local authority (!Kheiss Local Municipality);
- The provincial environmental authority: Department of Environmental Affairs & Nature Conservation (DENC);
- 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.

Condition 31 of the EA requires that these audits be compiled in accordance with Appendix 7 of the EIA regulations, 2014. Appendix 7 of Regulation 982 of the 2014 EIA Regulations contains the required contents of an Environmental Audit Report. 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 7: 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.
(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 Engineer and ECO in response to the requirements of this EMPr or in response to a request by the Engineer 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 Engineer 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

In terms of condition 64 of the EA, 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 aforesaid 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 EA[33] 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

In order 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;
- A permit for the removal or relocation-and-transplant of any protected / listed plant species has been obtained from the Kimberly office of the Northern Cape Department of Environmental Affairs & Nature Conservation (DEANC), 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 (!Kheis Local Municipality); 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

- [33] or delegated to the EPC contractor.

- 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 detailed therein:
    - 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. SITE DEVELOPMENT PLAN

The Site Layout Plan (SLP) is attached in Appendix A of this EMPr. Approval of this EMPr infers approval of the SLP. The holder of the EA and the contractor must ensure that all works are undertaken in approximation to the SLP. Should there be any dispute on any aspect of the works in relation to the SDP, the ECO must make ruling, which should be referred to the CA if necessary.

The table below shows the key components as defined in the SDP and the EMPr applicability of each of these components.

Table 8: EMPr Sections applicable to SLP Components

SDP Component	EMPr Applicability
Construction Road	Sections 4, 5, 6,7 & 8
Perimeter Road	Sections 4, 5, 6,7 & 8
Internal Roads	Sections 4, 5, 6,7 & 8
Access Road	Sections 4, 5, 6,7 & 8
Perimeter Fencing	Sections 5
PV Arrays including sub-structures	Sections 4, 5, 6,7 & 8
Inverter Stations	Sections 4, 5, 6,7 & 8
AC Cabling	Sections 4 & 5,
Sub-Station	Appendix E
Auxilliary Building	Sections 4 & 5
Laydown Area	Section 5
BESS	Appendix C

21. 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 Engineer 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.

21.1 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 Engineer, stating the nature and magnitude of the contravention. A copy shall be provided to the Project Developer / Proponent.
- The Engineer will issue this notice to the Contractor.
- The Contractor shall act to correct the transgression within the period specified by the Engineer.
- The Contractor shall provide the Engineer 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 time frame, the Engineer 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 Engineer (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 Engineer 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 Engineer on advice from the ECO shall at all times have the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remediation measures.

21.2 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 Engineer

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.

22. 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
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
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