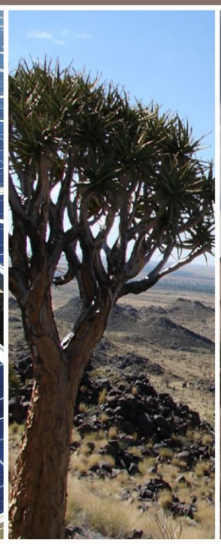
MULILO
RENEWABLE PROJECT DEVELOPMENTS

Scoping and Environmental Impact Assessment for the proposed Development of a 75 MW Solar Photovoltaic Facility (BOVEN SOLAR PV4) on the Remaining Extent of Boven Rugzeer Farm 169, north-east of Kenhardt, Northern Cape Province

EIA REPORT

PART B:

Environmental Management Programme

CONTENTS

1 INTRODUCTION 3

1.1 PROJECT DESCRIPTION 4

1.2 AUTHORS OF THE EMPr 8

1.3 IMPACTS IDENTIFIED DURING THE EIA PROCESS 10

2 APPROACH TO PREPARING THE EMPR 14

2.1 COMPLIANCE WITH RELEVANT LEGISLATION 14

2.2 COMPLIANCE WITH DEA REQUIREMENTS 18

2.3 CONTENTS OF THE EMPr 20

2.4 GOAL FOR ENVIRONMENTAL MANAGEMENT 21

3 ROLES AND RESPONSIBILITIES 21

3.1 PROJECT DEVELOPER 21

3.2 ENVIRONMENTAL CONTROL OFFICER 22

3.3 LEAD CONTRACTOR 22

3.4 FACILITY MANAGER 23

4 ALIEN INVASIVE VEGETATION MANAGEMENT PLAN 24

5 PLANT RESCUE AND PROTECTION PLAN INCLUDING RE-VEGETATION AND HABITAT REHABILITATION PLAN (INCLUDING FAUNA AND AVIFAUNA) 30

6 OPEN SPACE MANAGEMENT PLAN 48

7 TRAFFIC MANAGEMENT PLAN INCLUDING TRANSPORTATION PLAN 52

8 STORM WATER MANAGEMENT PLAN 61

9 EROSION MANAGEMENT PLAN 68

10 HAZARDOUS SUBSTANCES LEAKAGE OR SPILLAGE MONITORING SYSTEM 73

11 ENVIRONMENTAL AWARENESS AND FIRE MANAGEMENT PLAN 82

12 SPECIFIC PROJECT RELATED ENVIRONMENTAL IMPACTS 91

13 INDEPENDENT ENVIRONMENTAL MANAGEMENT PLAN FOR THE ASSOCIATED ELECTRICAL INFRASTRUCTURE 137

14 APPENDIX A – ENVIRONMENTAL SENSITIVITY MAP 141

15 APPENDIX A – ENVIRONMENTAL SENSITIVITY MAP (INCLUDING POWERLINE) 142

16 APPENDIX B – SITE LAYOUT MAP 143

17 APPENDIX C – COMBINED SITE LAYOUT AND SENSITIVITY MAP 144

18 APPENDIX C – COMBINED SITE LAYOUT AND SENSITIVITY MAP (INCLUDING POWERLINE) 145

TABLES

Table 1: A total of Seven Solar PV Facilities proposed by Mulilo near Kenhardt in the Northern Cape 3
Table 2: The EIA Management Team 9
Table 3: Impacts Identified in the EIA 10
Table 4: Compliance with Section 24N of NEMA 14
Table 5: Compliance with Appendix 4 of the 2014 NEMA EIA Regulations 16
Table 6: DEA Requirements for the EMPr 18

FIGURES

Figure 1: Locality of the seven proposed 75 MW PV Facilities and Transmission Line Corridor 5

1 INTRODUCTION

This Environmental Management Programme (EMPr) is prepared as part of the requirements of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations promulgated in Government Gazette 38282 and Government Notice (GN) R982, R983, R984 and R985 on 8 December 2014. This EMPr is being submitted to the National Department of Environmental Affairs (DEA) as part of the Application for Environmental Authorisation (EA) for the proposed construction of a 75 Megawatt (MW) Solar Photovoltaic (PV) power generation facility and associated infrastructure on the remaining Extent of Boven Rugzeer, Farm 169, approximately 80 km south of Upington and 30 km north-east of Kenhardt within the !Kheis Local Municipality, Northern Cape Province (Figure 1). The proposed project is referred to as Boven Solar PV4 and has been assigned the following DEA Reference Number: 14/12/16/3/3/2/847. The Project Applicant for this proposed 75 MW solar PV project is Boven Solar PV4 (PTY) Ltd (hereinafter referred to as the Boven Solar PV4, project applicant or project proponent).

Boven Solar PV4 intends to construct six other 75 MW Solar PV facilities in the same project area as the Gemsbok Solar PV4 facility, on the remaining Extent of Boven Rugzeer, Farm 169. Separate full Scoping and EIA Processes are being undertaken for each proposed Solar PV facility referred to as:

Table 1: A total of Seven Solar PV Facilities proposed by Mulilo near Kenhardt in the Northern Cape

No	Solar PV Project	Project Site	DEA Reference Number:
1.	**Gemsbok Solar PV3**	**Portion 3 of Gemsbok Bult Farm 120**	**14/12/16/3/3/2/841**
2.	Gemsbok Solar PV4	Portion 3 of Gemsbok Bult Farm 120	14/12/16/3/3/2/842
3.	Gemsbok Solar PV5	Portion 8 of Gemsbok Bult Farm 120	14/12/16/3/3/2/843
4.	Gemsbok Solar PV6	Portion 8 of Gemsbok Bult Farm 120	14/12/16/3/3/2/844
5.	Boven Solar PV2	Remaining Extent of Boven Rugzeer Farm 169	14/12/16/3/3/2/845
6.	Boven Solar PV3	Remaining Extent of Boven Rugzeer Farm 169	14/12/16/3/3/2/846
7.	Boven Solar PV4	Remaining Extent of Boven Rugzeer Farm 169	14/12/16/3/3/2/847

The Scoping and EIA Process is being undertaken for the development of the associated electrical infrastructure and transmission lines (to be constructed within an electrical corridor) that are required to connect the proposed PV facilities to the national grid via the Eskom Nieuwehoop Substation. Figure 1 shows the overall locality of the seven proposed 75 MW Solar PV facility projects and the electrical infrastructure corridor (within which the transmission lines and electrical infrastructure will be constructed to support each Solar PV project).

This EMPr is being made available to Interested and Affected Parties (I&APs), stakeholders and Organs of State, as part of the EIA Report, for a 30-day review period. Comments received from stakeholders during this aforementioned review period will be incorporated into the EMPr, where applicable. The finalised EIA Report, together with the updated EMPr (as applicable) will then be submitted to DEA for decision-making. Following the incorporation of comments from I&APs, stakeholders and Organs of State, this EMPr is intended as a "living" document and should continue to be updated regularly, as needed.

1.1 PROJECT DESCRIPTION

The proposed project will make use of PV solar technology to generate electricity from the sun's energy. The Applicant is proposing to develop a facility with a possible maximum installed capacity of 100 MW Direct Current (DC) which produces 75 MW Alternating Current (AC) of electricity from PV solar energy. Once a Power Purchase Agreement (PPA) is awarded, the proposed facility will generate electricity for a minimum period of 20 years. It is proposed that the project applicant will implement the Self-Build Option for the additional electrical infrastructure to be constructed (which has been assessed as part of this EIA Process). Following the construction phase, the proposed transmission line and associated supporting electrical infrastructure will either be transferred into the ownership of Eskom or remain in the ownership of the project applicant.

As mentioned above, the Eskom Nieuwehoop Substation will be used to connect the proposed PV facility to the national grid. An EA for the construction of the Eskom Nieuwehoop Substation was granted to Eskom Holdings SOC Limited on 21 February 2011 by the DEA (Reference Number: 12/12/20/1166). In addition, an EA (DEA Reference Number: 12/12/20/2606; NEAS Reference Number: DEA/EIA/0000785/2011), dated 14 February 2014, was also granted to Eskom Holdings SOC Limited to construct transformer feedback bays, transformers, busbars and 132 kV feeder bays and associated lines within the existing development footprint of the Nieuwehoop Substation.

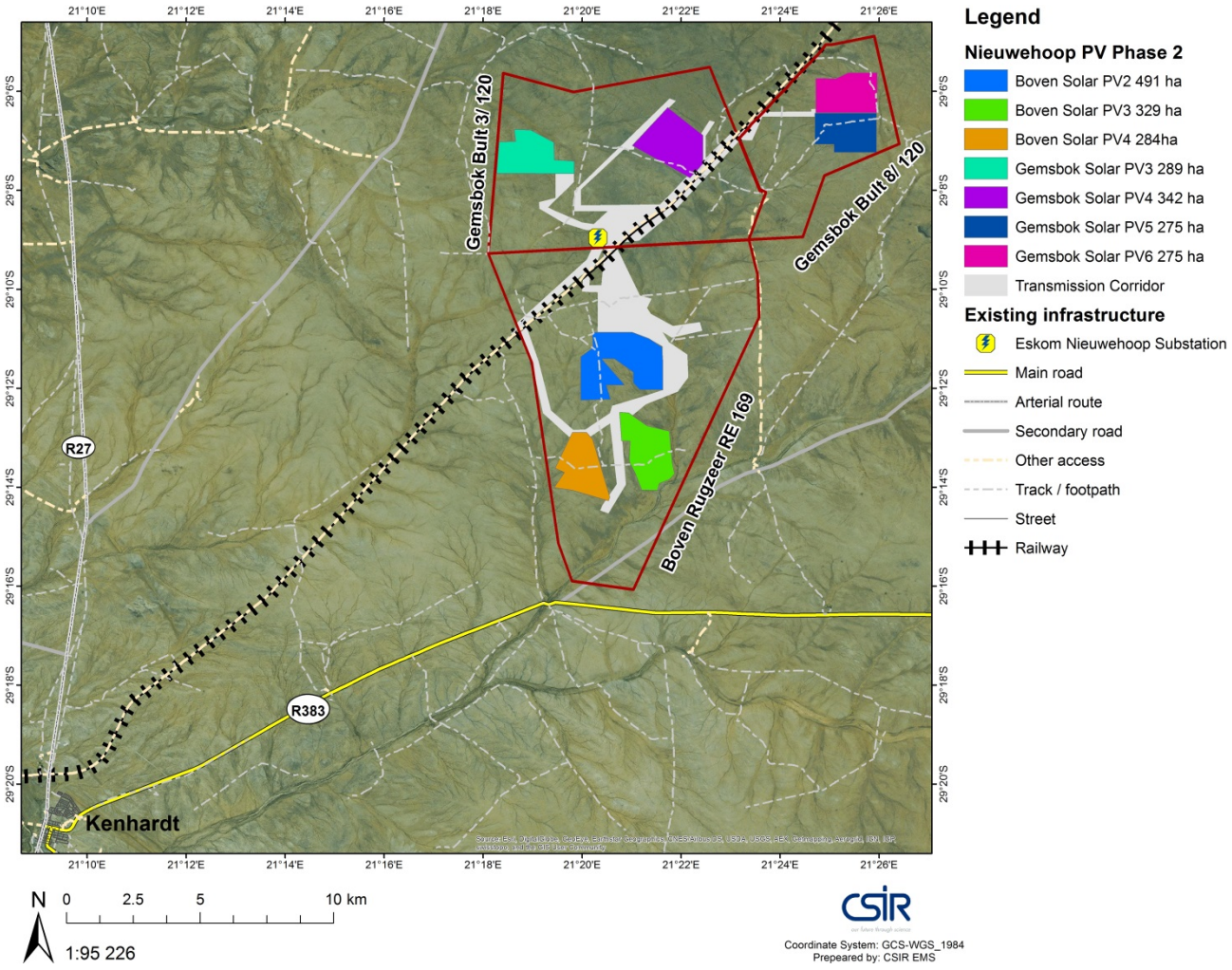


Figure 1: Locality of the seven proposed 75 MW PV Facilities and Transmission Line Corridor

The site for the proposed Boven Solar PV4 project includes approximately 284 ha of land (as shown in Figure 1), however the proposed solar facility and associated infrastructure requires a development area of approximately 220 ha only. The larger 284 ha area was considered and assessed by the specialists in order to ensure that any development constraints or environmental sensitivities can be avoided in the final siting and location of the proposed facility. Based on the findings of the specialist studies, an environmental sensitivity map has been produced (and included in Chapter 17 of the EIA Report and Appendix B of this EMPr). This map shows the sensitivities on site (terrestrial, aquatic, and sensitive heritage features) within the larger 284 ha buildable area that was assessed. Based on this map, the preferred location for the 220 ha Boven Solar PV4 facility, also known as the Development Envelope, avoids the sensitive features that were identified by the specialists within the original 284 ha buildable area. Based on the boundaries of the Development Envelope and the constraints of the environmental sensitivities, a site layout has also been prepared for this project (Appendix A of this EMPr). It is important to note that should the layout change subsequent to the issuing of an EA (should such authorisation be granted), any alternative layout or revisions to the layout occurring **within the boundaries of the Development Envelope** would not be regarded as a change to the scope of work or

the findings of the impact assessments undertaken during the EIA Phase. This is based on the understanding that the specialists have assessed the larger area and have identified sensitivities, which have been avoided in the siting of the proposed infrastructure. The Development Envelope is considered to be a "box" in which the project components can be constructed at whichever location without requiring an additional assessment or change in impact significance. Any changes to the layout **within the boundaries of the Development Envelope** following the issuing of the EA (should it be granted) will therefore be considered to be non-substantive.

Appendix B of this EMPr includes an environmental sensitivity map which indicates the environmental sensitive areas and features identified during the EIA Process (as described above). Appendix C of this EMPr includes a map combining the site layout and the environmental sensitivity map.

The proposed **Boven Solar PV4** project will consist of the following main components:

The Solar Facility will consist of the following components:

- **Solar Field**
  - Solar Arrays:
    - PV Modules;
    - Single Axis Tracking structures (aligned north-south) and Fixed Axis Mounting structures (aligned east-west);
    - Solar module mounting structures comprised of galvanised steel and aluminium;
    - Foundations which will likely be drilled and concreted into the ground; and a
    - Solar measuring station.

  - Building Infrastructure:
    - Offices;
    - Operational and maintenance control centre;
    - Warehouse/workshop;
    - Ablution facilities;
    - Converter station;
    - On-site substation building;
    - On-site workers accommodation camp; and a
    - Guard House.

- **Associated Infrastructure**
  - 132 kV overhead transmission line (Steel Monopole design);
  - On-site substation;
  - Additional feeder bay and Busbar at the Eskom Nieuwehoop Substation or extensions of the existing infrastructure;
  - A new 400/132kV transformer bay at the Eskom Nieuwehoop Substation;
  - 400/132kV Transformer at the Eskom Nieuwehoop Substation;
  - Extension of the 400kV busbar;
  - Extension of the 132kV Busbar;
  - 22/33 kV internal transmission lines/underground cables;
  - Solar resource measuring station;

- Access road;
- Internal gravel roads;
- Fencing;
- Panel maintenance and cleaning area;
- Stormwater channels; and a
- Temporary work area during the construction phase (i.e. laydown area).

The proposed project can be divided into the following three main phases:

- Construction Phase;
- Operational Phase; and
- Decommissioning Phase.

Activities will be undertaken during each phase which may cause an environmental impact. These activities have therefore been considered by the appointed specialists, and considered during the EIA and management and mitigation measures required to address all the impacts included within this EMPr. The construction phase will take place subsequent to the issuing of an EA from the DEA and a successful BID in terms of the REIPPPP (i.e. the issuing of a PPA from the DOE). The construction phase is expected to extend 15 months (however the construction period is subject to the final requirements of Eskom and the REIPPPP Request for Proposal provisions at that point in time). The proposed Boven Solar PV4 project is expected to become operational by 2020.

The main activities that will form part of the construction phase are:

- Transportation of personnel, construction material and equipment to the site, and personnel away from the site;
- Construction of the site camp and laydown areas, as well as dedicated access routes from the laydown areas to the working areas;
- Vegetation clearing in the areas required for building infrastructure and brush cutting in the solar field area where the panels will be installed;
- Excavations for infrastructure and associated infrastructure;
- Establishment of a laydown area for equipment;
- Construction of internal access roads, where required;
- Stockpiling of soil and cleared vegetation; and
- Construction of the solar field (consisting of the solar arrays and buildings) and additional infrastructure.

The following main activities will occur during the operational phase:

- Generation of 75 MW of electricity to add to the national grid; and
- Maintenance of the solar facility, including washing of panels.

The projected operations are expected to provide several services and added economic spin offs. The solar facility is expected to generate electricity for a minimum period of 20 years.

Should it be decided not to extend the operational lifespan of the project beyond 20 years, the project will be decommissioned. The main aim of decommissioning is to return the land to its original, pre-construction condition. Should the unlikely need for decommissioning arise (i.e. if the facility becomes outdated or the land needs to be used for other purposes), the decommissioning procedure will involve removing the solar panels and associated infrastructures, and covering the concrete footings with soil to a depth sufficient for the re-growth of natural vegetation. Whether all components of the solar facility will be removed still needs to be agreed upon with the landowner (some components may be useful for the landowner and therefore it could be decided that those remain on site). Any other supporting infrastructure no longer in use will be removed from the site and either disposed of at a registered disposal facility or recycled if possible.

It should be noted that a detailed project description (based on the conceptual design) is provided in Chapter 2 of the EIA Report.

1.2 AUTHORS OF THE EMPr

This EMPr has been compiled by the Environmental Assessment Practitioners (Paul Lochner, Minnelise Levendal, Surina Laurie and Rohaida Abed) and the various specialists on the team (as indicated in Table 2). The details and expertise of the Environmental Assessment Practitioners and the specialists are provided in Appendix A of the EIA Report.

Paul Lochner - Paul has 23 years of experience in environmental assessment and management studies, primarily in the leadership and integration functions. This has included SEAs, EIAs and Environmental Management Plans. In July 2003, he obtained certification as a registered EAP with the Interim Certification Board for EAPs of South Africa (EAPSA). He has been extensively involved in renewable energy projects over the last few years. He was the Project Leader for the Electrawinds Basic Assessment (BA) and EIA project at the Coega Industrial Development Zone (IDZ), and was the Project Leader for the EIA for the Mainstream Kouga wind energy project (Phase 1) at Jeffreys Bay. Phase 1 of this project was granted EA by the Eastern Cape Government in March 2009. He was part of the CSIR team that prepared the EIA and EMP for the Eskom wind energy demonstration facility at Klipheuwel (Western Cape), which was approved by the Western Cape provincial government. He is currently the Project Leader for the SEA for the location and placement of wind and solar energy projects in South Africa. He has also recently led EIAs for Solar PV projects in the Free State and Northern Cape for Mainstream Renewable Energy, Solaire Direct and Mulilo Renewable Project Developments. He has also authored several Guidelines for national and provincial government, such as the Guideline for EMPs published in 2005 by the Western Cape Government.

Minnelise Levendal – Minnelise is a Senior EAP in the EMS group of the CSIR and has a Master's degree in Biological Science (Botany). She has 16 years of experience in Environmental Management (which includes ten years working as an EAP). Before she joined the CSIR she was employed at the DEA&DP where she assessed EIAs, BAs and EMPs. Minnelise is currently managing various EIAs for wind and solar renewable energy projects in South Africa. Minnelise was the CSIR project manager for the 100 MW Ubuntu Wind Energy Facility near Jeffreys Bay (Environmental Authorisation granted in June 2012), as well as the 50 MW Banna Ba Pifhu Wind Energy Facility proposed by WKN Windcurrent near Humansdorp in the Eastern Cape (Environmental Authorisation granted in July 2014). She was the project manager of ten BAs for wind monitoring masts in South Africa as part of the National Wind Atlas Project of the

Department of Energy. Environmental Authorisation from the DEA for all the ten masts was obtained in 2010.

Surina Laurie – Surina is a Senior EAP in the EMS group of the CSIR and she has a Master's degree in Environmental Management and is a Registered Professional Natural Scientist (Registration Number: 400033/15) with the South African Council for Natural Scientific Professions (SACNASP). She has more than five years of experience in environmental assessment and management. Surina has experience in the management and integration of various types of environmental assessments in South Africa for various sectors, including renewable energy, industry and tourism. She has also been part of advisory teams advising on financing, real estate, corporate, construction, environmental and regulatory aspects for various sponsors, developers and lenders during the DOE's first and second bidding windows in 2012 and 2013. Surina is currently working on several Solar PV EIAs in the Northern Cape and Free State. Surina was the Project Manager for the proposed (adjacent) Nieuwehoop Phase 1 Solar PV Development EIA, which obtained an Environmental Authorisation from DEA on 11 November 2015.

Rohaida Abed has a Master's degree in Environmental Science and is a registered Professional Natural Scientist (Registration Number: 400247/14) with the SACNASP. She has experience in conducting Basic Assessments and Scoping and EIAs for various sectors, including Port infrastructure and Bulk Liquid Storage facilities, Renewable energy and has been involved in various transport infrastructure related projects as an Environmental Control Officer.

Table 2: The EIA Management Team

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
Environmental Assessment Practitioners		
Paul Lochner	CSIR	Technical Advisor and Quality Assurance (EAPSA) Certified
Minnelise Levendal	CSIR	Project Leader
Surina Laurie	CSIR	Project Reviewer (Pr. Sci. Nat.)
Specialists		
Lukas Niemand	Pachnoda Consulting CC and associates	Ecological Impact Assessment (including fauna and avifauna). Pachoda Consulting compiled the overall Ecological Impact Assessment with inputs from Kyllinga Consulting as indicated below)
Ina Venter	Kyllinga Consulting (sub-contracted by Pachnoda Consulting CC	Vegetation and Aquatic Impact Assessment
Henry Holland	Private	Visual Impact Assessment
Dr. Jayson Orton	ASHA Consulting (Pty) Ltd	Heritage Impact Assessment (Archaeology and Cultural Landscape)
Dr. John Almond	Natura Viva cc	Desktop Palaeontological Impact Assessment
Johann Lanz	Private	Soils and Agricultural Potential Assessment
Rudolph du Toit	CSIR	Socio-Economic Impact Assessment
Technical Studies to inform the EIA Process		
P. S. van der Merwe and A. J. Otto	MESA Solutions	Radio Frequency Interference (RFI) and Electromagnetic Interference (EMI)

It should be noted that the Socio-Economic Impact Assessment specialist study was subject to a peer review process by an external reviewer (Ms. Liza van der Merwe, a private consultant), as requested by the DEA in the Acceptance of the Scoping Report letter (Appendix G of this EIA Report).

1.3 IMPACTS IDENTIFIED DURING THE EIA PROCESS

Based on the specialist studies (as shown in Table 3), the following main direct potential impacts, as indicated in Table 3, have been identified and appropriate management and mitigation measures included within the EMPr (where required) as per the recommendations made in the specialist studies to ensure the potential impacts are suitably addressed and managed during all phases of the project. Indirect and cumulative impacts are noted in Section 4 to 12 of this EMPr.

It should be noted that other impacts for which specialist studies were not undertaken but where mitigation or management actions may be required, are also included in the EMPr.

Table 3: Impacts Identified in the EIA

KEY IMPACT	IMPACTS IDENTIFIED
Terrestrial Ecology, Aquatic Ecology and Avifauna	**Construction Phase:** ▪ Loss of Species of Special Concern. ▪ Loss of primary vegetation. ▪ Soil compaction due to vehicles driving on site. ▪ Erosion and sedimentation resulting from clearance of vegetation. ▪ Establishment of alien and invasive species. ▪ The ousting of fauna through anthropogenic activities, disturbance of refugia and general change in habitat. ▪ Alteration of surface drainage patterns on account of construction activities leading to change in plant communities and general habitat structure. ▪ Alteration of the availability of water to plants within the site due to the introduction of water to site by import, which may lead to changes in habitat form and structure around areas that receive such import. ▪ Alteration of surface water quality that lead to change in water chemistry. ▪ Changes in edaphics (soils) on account of excavation and import of soils, leading to the alteration of plant communities and fossorial species in and around these points. ▪ Increased Electrical Light Pollution (ELP), leading to changes in nocturnal behavioural patterns amongst fauna. ▪ Exclusion or entrapment of in particular large fauna, on account of the fencing of the site. **Operational Phase:** ▪ Loss of Species of Conservation Concern. ▪ Loss of primary vegetation. ▪ Establishment of alien and invasive species. ▪ Alteration of ecological processes on account of the exclusion of certain fauna, inherent to the functional state of the land within the PV facility. ▪ Changes in plant water relations and possible changes in plant community structures within the site as a result of increased shading, as a consequence of the PV arrays. ▪ Changes in meteorological factors at a local scale, on account of the PV arrays. ▪ Alteration of avian behaviour as a result of overhead transmission lines, as well as

KEY IMPACT	IMPACTS IDENTIFIED
	subtle changes in habitat. ▪ Impact on faunal behaviour, leading to the exclusion of certain species and possible mortalities, due to the fencing of the site, possibly electric fencing. **Decommissioning Phase:** ▪ A reversion to the present seral stage, where continued grazing by livestock and herbivory by game will arise. ▪ A reversion of present faunal population states within the study area. ▪ Changes in the geomorphological state of drainage lines as hydraulic changes arise within the catchment. ▪ Exotic weed invasion as a consequence of abandonment of site and cessation of weed control measures.
Visual	**Construction Phase:** ▪ Potential visual intrusion of construction activities on existing views of sensitive visual receptors. ▪ Potential visual intrusion of construction activities associated with a 132 kV powerline or existing views of sensitive visual receptors. **Operational Phase:** ▪ Potential landscape impact of a large solar energy facility on a rural agricultura landscape; ▪ Potential landscape impact of a 132 kV powerline on a rural agricultural landscape; ▪ Potential visual intrusion of the proposed solar energy facility on the views of sensitive visual receptors; ▪ Potential visual intrusion of a 132 kV powerline on the views of sensitive visua receptors; and ▪ Potential impact of night lighting of a large solar energy facility on the nightscape of the region. **Decommissioning Phase:** ▪ Potential visual intrusion of decommissioning activities (discussed in Section 7.2.1 associated with a PV plant on views of sensitive visual receptors; and ▪ Potential visual intrusion of decommissioning activities related to a 132 kV powerline on the existing views of sensitive visual receptors.
Heritage (Archaeology and Cultural Landscape)	**Construction Phase:** ▪ Damage to or destruction of archaeological resources; ▪ Destruction of graves; and ▪ Impacts to the natural and cultural landscape. **Operational Phase:** ▪ Impacts to the natural and cultural landscape. **Decommissioning Phase:** ▪ Impacts to the natural and cultural landscape.
Palaeontology	**Construction Phase:** ▪ Loss of palaeontological heritage resources through disturbance, damage or destruction of fossils and fossil sites (including associated geological contextual data) through surface clearance and excavation activities during the construction phase.
Soils and Agricultural	**Construction Phase:** ▪ Degradation of veld vegetation beyond the direct footprint of the proposed PV facility

KEY IMPACT	IMPACTS IDENTIFIED
Potential	due to constructional disturbance and potential trampling by vehicles; ▪ Loss of topsoil due to poor topsoil management; ▪ Loss of agricultural land use; ▪ Soil erosion due to alteration of the land surface characteristics; and ▪ Additional land use income generation. **Operational Phase:** ▪ Loss of agricultural land use; ▪ Soil erosion due to alteration of the land surface characteristics; and ▪ Additional land use income generation. **Decommissioning Phase:** ▪ Degradation of veld vegetation beyond the direct footprint of the proposed PV facility due to constructional disturbance and potential trampling by vehicles; ▪ Loss of topsoil due to poor topsoil management; ▪ Loss of agricultural land use; ▪ Soil erosion due to alteration of the land surface characteristics; and ▪ Loss of Additional land use income generation.
Socio-Economic	**Construction Phase:** ▪ Influx of jobseekers; ▪ Increases in social deviance and increases in incidence of HIV/AIDS infections; ▪ Expectations regarding jobs; ▪ Local spending; ▪ Local employment; and ▪ Human development resulting from the proposed Economic Development Plan. **Operational Phase:** ▪ Influx of jobseekers; ▪ Increases in social deviance and increases in incidence of HIV/AIDS infections; ▪ Expectations regarding jobs; ▪ Local spending; ▪ Local employment; and ▪ Human development resulting from the proposed Economic Development Plan. **Decommissioning Phase:** ▪ Job losses at the end of the project life-cycle.
Traffic	▪ Increase in traffic generation; ▪ Accidents with pedestrians, animals and other drivers on the surrounding tarred/gravel roads; ▪ Impact on air quality due to noise and release of air pollutants from vehicles and construction equipment; and ▪ Decrease in quality of surface condition of the roads.
Square Kilometre Array (SKA) Impact	▪ Impact on the SKA project

In addition to the above-mentioned impacts identified in the Specialist studies undertaken in the EIA phase (Chapters 7-16) of the EIA Report, other impacts have also been identified in the EIA Report, including:

Impact on Geohydrology:

Construction Phase:

- Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages.
- Potential impact on the groundwater as a result of the construction of storage yards and temporary labour accommodation.

Operational Phase:

- Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages.
- Storage yards and labour accommodation facilities (it should be noted that the people who will be accommodate on site are minimal (less than 10). It will only be the security staff and a few management staff members).
- Potential impact of increased storm water outflows.

Decommissioning Phase:

Potential impact on groundwater quality as a result of accidental oil spillages and fuel leakages.

2 APPROACH TO PREPARING THE EMPr

2.1 COMPLIANCE WITH RELEVANT LEGISLATION

In terms of legal requirements, a crucial objective of the EMPr is to satisfy the requirements of Appendix 4 of the NEMA EIA Regulations promulgated in Government Gazette 38282 and GN R982 on 8 December 2014, and Section 24N of the NEMA. 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. An overview of where the requirements are addressed in this EMPr is presented in Tables 4 and 5.

Table 4: Compliance with Section 24N of NEMA

Requirements of Section 24N of NEMA	Where it is included in this EMPr?
2) The environmental management programme must contain- a) 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: (i) planning and design; (ii) pre-construction and construction activities; (iii) the operation or undertaking of the activity in question; (iv) the rehabilitation of the environment; and (v) (v) closure, if applicable;	Section 1.3 and the columns detailing the impact description, mitigation and management objectives, and mitigation and management actions in Sections 4 to 12 of this EMPr.
b) details of- (i) the person who prepared the environmental management programme; and (ii) the expertise of that person to prepare an environmental management programme;	Section 1.2 and Appendix A of the EIA Report
c) a detailed description of the aspects of the activity that are covered by the environmental management programme;	Section 1 and Section 1.1 and Section 1.3
d) information identifying the persons who will be responsible for the implementation of the measures contemplated in paragraph (a);	Columns in Section 4 to 12 of the EMPr regarding the monitoring responsibility, including the requirements for monitoring and reporting on compliance and the responsible parties noted in Section 3.
e) information in respect of the mechanisms proposed for monitoring compliance with the environmental management programme and for reporting on the compliance;	The columns detailing the mitigation and management actions, and the monitoring methodology, frequency and responsibility in Sections 4 to 12 of this EMPr.
f) 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	Sections 4 to 12 of this EMPr, as applicable to the post-construction, rehabilitation phase and the decommissioning phase.
g) 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	The columns detailing the mitigation and management objectives, mitigation and management actions, and the

Requirements of Section 24N of NEMA	Where it is included in this EMPr?
degradation; (ii) remedy the cause of pollution or degradation and migration of pollutants; and (iii) comply with any prescribed environmental management standards or practices.	monitoring methodology, frequency and responsibility in Sections 4 to 12 of this EMPr.
3) The environmental management programme must, where appropriate- a) set out time periods within which the measures contemplated in the environmental management programme must be implemented; b) 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 c) develop an environmental awareness plan describing the manner in which- (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.	The columns detailing the mitigation and management actions, and the monitoring methodology, frequency and responsibility in Sections 4 to 12 of this EMPr. Section 11 of this EMPr includes an Environmental Awareness Plan.
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- a) must at all times give effect to the general objectives of integrated environmental management laid down in section 23; b) must consider, investigate, assess and communicate the impact of his or her prospecting or mining on the environment; c) must manage all environmental impacts (i) in accordance with his or her approved environmental management programme, where appropriate; and (ii) as an integral part of the prospecting or mining, exploration or production operation, unless the Minister responsible for mineral resources directs otherwise; d) must monitor and audit compliance with the requirements of the environmental management programme; e) 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 f) 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

Requirements of Section 24N of NEMA	Where it is included in this 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 3 details the responsibility of the Project Applicant.

Table 5: Compliance with Appendix 4 of the 2014 NEMA EIA Regulations

Requirements of Appendix 4 of the 2014 NEMA EIA Regulations (Government Gazette Government Gazette 38282 and GN R982 on 8 December 2014)	Where it is included in this EMPr?
1. (1) An EMPr must comply with section 24N of the Act and include: a) details of: (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Section 1.2 and Appendix A of the EIA Report
b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 1, Section 1.1 and Section 1.3.
c) 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 any areas that should be avoided, including buffers;	Appendix A, Appendix B and Appendix C of this EMPr.
d) 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 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 (v) closure; and (vi) where relevant, operation activities;	Section 1.3 and the columns detailing the impact description, mitigation and management objectives, and mitigation and management actions in Sections 4 to 12 of this EMPr.
e) a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	The columns detailing the mitigation and management objectives in Sections 4 to 12 of this EMPr.
f) a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) 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 practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial	The columns detailing the mitigation and management actions in Sections 4 to 12 of this EMPr.

Requirements of Appendix 4 of the 2014 NEMA EIA Regulations (Government Gazette Government Gazette 38282 and GN R982 on 8 December 2014)	Where it is included in this EMPr?
provisions for rehabilitation, where applicable;	
g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	The columns detailing the monitoring methodology in Sections 4 to 12 of this EMPr.
h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	The columns detailing the monitoring frequency in Sections 4 to 12 of this EMPr.
i) an indication of the persons who will be responsible for the implementation of the impact management actions;	The columns detailing the monitoring responsibility in Sections 4 to 12 of this EMPr.
j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	The columns detailing the mitigation and management actions, and the monitoring methodology and frequency in Sections 4 to 12 of this EMPr.
k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	The columns detailing the mitigation and management actions, and the monitoring methodology, frequency and responsibility in Sections 4 to 12 of this EMPr.
l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 4 to 12 of the EMPr, including the requirements for monitoring and reporting on compliance and the responsible parties noted in Section 3.
m) an environmental awareness plan describing the manner in which: (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; and	Section 11 of this EMPr.
n) any specific information that may be required by the competent authority.	Section 2.2 and the management objectives and management actions in Sections 4 to 11.

2.2 COMPLIANCE WITH DEA REQUIREMENTS

The Scoping Report was submitted to the DEA in December 2015, in accordance with Regulation 21 (1) of the 2014 NEMA EIA Regulations, for decision-making in terms of Regulation 22 of the 2014 NEMA EIA Regulations. The DEA accepted the Scoping Report and Plan of Study for EIA on 28 January 2016, which marked the end of the Scoping Phase. The acceptance letter is included in Appendix G of the EIA Report.

The requirements listed in the acceptance letter from the DEA (dated 28 January 2016), stipulated certain plans that must be included in the EMPr. The EMPr is therefore structured in such a way to comply with the requirements of the DEA and to ensure that the mitigation and management measures that have been identified during the EIA Process are included in the respective plans. The requirements listed within the acceptance letter are detailed in Table 6.

It is important to note that other project specific aspects (such as the findings and recommendations of the specialist studies), in addition to those covered by the plans required by the DEA, have been included in Section 12 of the EMPr.

Table 6: DEA Requirements for the EMPr

No	DEA Requirements	Relevant Section in the EMPr
i	All recommendations and mitigation measures recorded in the EIA Report and the specialist studies conducted.	Recommended mitigation measures and monitoring actions as noted in the EIA Report and specialist studies have been included in this EMPr, where relevant.
ii	The final site layout map	Refer to Appendix A of this EMPr for the site layout map. Refer to Section 1.1 of this EMPr for a description of the approach followed to determine the site layout.
iii	Measures as dictated by the final site layout map and micro-siting.	Refer to Appendix A of this EMPr for the site layout map. Refer to Section 1.1 of this EMPr for a description of the approach followed to determine the site layout.
iv	An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA Process.	Refer to Appendix B of this EMPr for an environmental sensitivity map. Refer to Section 1.1 of this EMPr for a description of the approach followed to identify the environmental sensitivities.
v	A map combining the final layout map superimposed (overlain) on the environmental sensitivity map.	Refer to Appendix C of this EMPr for a combined environmental sensitivity and layout map. Refer to Section 1.1 of this EMPr for a description of the approach

No	DEA Requirements	Relevant Section in the EMPr
		followed to identify the environmental sensitivities and to determine the site layout.
vi	An alien invasive management plan to be implemented during the 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.	Refer to Section 4 of this EMPr.
vii	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 and be implemented prior to commencement of the construction phase.	Refer to Section 5 of this EMPr. It should be noted that faunal protection and habitat rehabilitation have also been included in this section.
viii	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 to natural habitats.	Refer to Section 5 of this EMPr. It should be noted that faunal protection and habitat rehabilitation have also been included in this section.
ix	An open space management plan to be implemented during the construction and operation of the facility.	Refer to Section 6 of this EMPr.
x	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 travelling on public roadways during the morning and late afternoon commute time and avoid using roads through densely populated built-up areas so as not to disturb existing retail and commercial operations.	Refer to Section 7 of this EMPr.
xi	A transportation plan for the transport of components, main assembly cranes and other large pieces of equipment.	Refer to Section 7 of this EMPr.
xii	A storm water management plan to be implemented during the construction and operation of the facility. The plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion. The plan must include the construction of appropriate design measures that 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 storm water run-off.	Refer to Section 8 of this EMPr.
xiii	A fire management plan to be implemented during the construction and operation of the facility.	Refer to Section 11 of this EMPr. It should be noted that this has been combined with an Environmental Awareness Plan.
xiv	An erosion management plan for monitoring and rehabilitating erosion events associated with the facility. Appropriate erosion mitigation must form part of this plan to prevent and reduce the risk of any potential erosion.	Refer to Section 9 of this EMPr.
xv	An effective monitoring system to detect any leakage or	Refer to Section 10 of this

No	DEA Requirements	Relevant Section in the EMPr
	spillage of all hazardous substances during their transportation, handling, use and storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems	EMPr.
xvi	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.	Measures to protect hydrological features such as streams, rivers, pans, wetlands, dams and their catchments have been included throughout the EMPr, such as Sections 8, 9, 10 and 12.

2.3 CONTENTS OF THE EMPr

Where applicable, each section of the EMPr is divided into the following four phases of the project cycle:

- Design Phase;
- Construction Phase;
- Operational Phase; and
- Decommissioning Phase.

The EMPr includes the findings and recommendations of the EIA Process and specialists studies. However, the EMPr is considered a "living" document and must be updated with additional information or actions during the design, construction, operational and decommissioning phases if applicable.

The EMPr follows an approach of identifying an over-arching goal and objectives, accompanied by management actions that are aimed at achieving these objectives. The management actions are presented in a table format in order to show the links between the goal and associated objectives, actions, responsibilities, and monitoring requirements and targets.

The management plans for the design, construction, operational and decommissioning phases consist of the following components:

- **Impact:** The potential positive or negative impact of the development that needs to be enhanced, mitigated or eliminated.
- **Objectives:** The objectives necessary in order to meet the goal; these take into account the findings of the specialist studies.
- **Mitigation/Management Actions**: The actions needed to achieve the objectives of enhancing, mitigating or eliminating impacts; taking into consideration factors such as responsibility, methods, frequency, resources required and prioritisation.
- **Monitoring**: The key monitoring actions required to check whether the objectives are being achieved, taking into consideration methodology, frequency and responsibility.

2.4 GOAL FOR ENVIRONMENTAL MANAGEMENT

The overall goal for environmental management for the proposed Boven Solar PV4 project is to construct and operate the project in a manner that:

- Minimises the ecological footprint of the project on the local environment;
- Minimises impacts on fauna, flora and freshwater ecosystems;
- Facilitates harmonious co-existence between the project and other land uses in the area; and
- Contributes to the environmental baseline and understanding of environmental impacts of solar energy facility in a South African context.

3 ROLES AND RESPONSIBILITIES

For the purposes of the EMPr, the generic roles that need to be defined are those of the:

- Project Developer;
- Environmental Control Officer;
- Construction Manager (Lead Contractor); and
- Facility Manager.

It is acknowledged that the specific titles for these functions will vary from project to project. The intent of this section is to give a generic outline of what these roles typically require. It is expected that this will be appropriately defined at a later stage.

3.1 PROJECT DEVELOPER

The Project Developer (i.e. Boven Solar PV4) is the 'owner' of the project and, as such, is responsible for ensuring that the conditions of the EA issued in terms of NEMA (should the project receive such authorisation) are fully adhered to, as well as ensuring that any other necessary permits or licenses are obtained and complied with. It is expected that the Project Developer will appoint the Environmental Control Officer and the Lead Contractor, and possibly an Environmental Manager (or Health, Safety and Environmental Manager).

As mentioned above, it is proposed that Boven Solar PV4 will implement the Self-Build Option for the transmission line and associated electrical infrastructure required to connect the PV facility to the Eskom Nieuwehoop Substation. Following the construction phase, the associated electrical infrastructure will either be transferred into the ownership of Eskom or otherwise remain in the ownership of Boven Solar PV4. This means that should Eskom take ownership of the electrical infrastructure, the operational, maintenance and decommissioning requirements will be their responsibility. The requirements are included in this EMPr and will be handed over to Eskom should they take ownership of the electrical infrastructure (See Section 13 of this EMPr).

3.2 ENVIRONMENTAL CONTROL OFFICER

An independent Environmental Control Officer (ECO) must be appointed to monitor the compliance of the proposed project with the conditions of EA (should such authorisation be granted by the DEA) during the construction and decommissioning phases (and possibly the operational phase, depending on the requirements of the DEA). The ECO must also monitor compliance of the proposed project with environmental legislation and recommendations of the EMPr, as well as oversee the implementation of the EMPr during the phases of the project, monitor environmental impacts, undertake record-keeping.

The ECO will be responsible for updating the EMPr as and when necessary, and compiling a monitoring checklist based on the EMPr. The roles and responsibilities of the ECO should include the following:

- The ECO must undertake periodic environmental audits during the relevant phases of the proposed project in order to monitor and record environmental impacts and non-conformances, and to monitor site activities to ensure adherence to the specifications contained in the EMPr, using a monitoring checklist. The timeframes for environmental audits will be indicated in the EA (should such authorisation be granted by the DEA).
- Environmental compliance/audit reports must be compiled and submitted by the ECO to the Competent Authority (i.e. DEA and/or Provincial Department of Environment and Nature Conservation) on a regular basis (i.e. at intervals as indicated in the EA (should such authorisation be granted by the DEA)).
- The ECO must maintain a diary of site visits and audits, a copy of the Environmental Authorisation (should such authorisation be granted by the DEA) and relevant permits for reference purposes, a non-conformance register, a public complaint register, and a copy of previous environmental audits undertaken.
- Prior to the commencement of construction, the ECO must meet on site with the Contractor to confirm the construction procedure and designated construction areas and work activity zones.
- Reporting of any non-conformances within 48 hours of identification of such non-conformance to the relevant agents.
- Conducting an environmental inspection on completion of the construction period and 'signing off' the construction process with the Contractor.
- Ensure that records are kept of all monitoring activities and results.
- Conducting an environmental inspection on completion of decommissioning and 'signing off' the site rehabilitation process.

The Lead Contractor and sub-contractors may have their own Environmental Officers, or designate Environmental Officer functions to certain personnel.

3.3 LEAD CONTRACTOR

The Lead Contractor will be responsible for the following:

- Ensure that all appointed contractors and sub-contractors are aware of the EMPr and their respective responsibilities;

- Prior to the commencement of construction, the Lead Contractor must meet on site with the ECO in order to confirm the construction procedure and designated construction areas and work activity zones.
- Ensure that each sub-contractor employs an Environmental Officer (or employs a designated suitably qualified individual to fulfil the role of an Environmental Officer) to monitor and report on the daily activities on-site during the construction period;
- Implementation of the overall construction programme, project delivery and quality control for the construction for the solar project;
- Overseeing compliance with the Health, Safety and Environmental Responsibilities specific to the project management related to project construction;
- Promoting total job safety and environmental awareness by employees, contractors and sub-contractors and stress to all employees and contractors and sub-contractors the importance that the project proponent attaches to safety and the environment;
- Ensuring that safe, environmentally acceptable working methods and practices are implemented and that sufficient plant and equipment is made available properly operated and maintained, to facilitate proper access and enable any operational to be carried out safely;
- Ensuring that all appointed contractors and sub-contractors repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in the EMPr, to the satisfaction of the Project Developer's ECO;
- Implement the Traffic Management Plan (Section 7), Transportation Plan (Section 7) and Storm Water Management Plan (Section 8).

3.4 FACILITY MANAGER

The Facility Manager will be responsible for the following:

- Operation of the 75 MW Solar PV facility;
- Required maintenance of the facility; and
- Overall compliance with the EMPr and EA.

4 ALIEN INVASIVE VEGETATION MANAGEMENT PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. DESIGN PHASE					
4.1. 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 and weedy species from the site due to the project activities.	4.1.1. Compile an alien and invasive species control and monitoring plan as required in the Alien and Invasive Species Regulations under the National Environmental Management Biodiversity Act (Act 10 of 2004). 4.1.2. Ensure compliance with relevant Environmental Specifications for the control and removal of alien invasive plant species. 4.1.3. Appoint a specialist or contact relevant authorities to seek guidance on the removal of the alien vegetation on site. 4.1.4. Compile and finalise an alien weed eradication programme.	▪ Ensure that this is done and taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports. ▪ 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. ▪ Once-off during the design phase. ▪ Once-off during the design phase.	▪ Project Developer ▪ Project Developer ▪ ECO
B. CONSTRUCTION PHASE					
4.2. Impacts due to the establishment of and increased spread of	Avoid establishment and reduce the spread of alien invasive plants due	4.2.1. Appoint a specialist or contractor to undertake a sweep and survey of the final development footprint site, with an alien	▪ Appoint a suitable vegetation contractor to inspect the site and remove any exotic weeds	▪ Prior to the commencement	▪ Project Developer ECO and Specialist

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
alien invasive plants	to the project activities. Populations of invasive species on site must be controlled according to the control plan.	invasive eradication team to remove exotic vegetation prior to the commencement of construction. 4.2.2. 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)).	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.	of construction ▪ Once-off	Contractor ▪ ECO and Contractor
		4.2.3. 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
		4.2.4. 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	▪ Rehabilitate disturbed areas and monitor the presence of alien invasive species on site.	▪ On-going	▪ ECO and Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
		allow the plants to rapidly re-colonise the bare soil areas.			
		4.2.5. 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 Contractor
		4.2.6. 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 Contractor
		4.2.7. 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	▪ On-going	▪ ECO and Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
			cleared from site.		
		4.2.8. 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
		4.2.9. 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 Contractor
C. OPERATIONAL PHASE					
4.3. 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	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.	4.3.1. 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

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
types.	Populations of invasive species on site must be controlled according to the control plan.	4.3.2. 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 needs 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	▪ Project Developer and Environmental Manager
D. DECOMMISSIONING PHASE					
4.4. 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.	4.4.1. 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	▪ Lead Contractor with advice from specialist
		4.4.2. 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.	▪ 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 ▪ Once-off	▪ Project Developer ▪ Project Developer ▪ Facility Manager and Specialist/ Contractor ▪ Facility Manager and Specialist/ Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			▪ Final external audit of area to confirm that area is free of alien invasive plants after 5 years.		

5 PLANT RESCUE AND PROTECTION PLAN INCLUDING RE-VEGETATION AND HABITAT REHABILITATION PLAN (INCLUDING FAUNA AND AVIFAUNA)

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. DESIGN PHASE					
5.1. The ousting of fauna through anthropogenic activities, disturbance of refugia and general change in habitat, with impacts on terrestrial and aquatic ecology as a result of the final site layout and routes of the access roads.	Avoidance of unnecessary disturbance to the site and surrounds, and to establish buffers as specified in the Avifaunal Impact Assessment (Chapter 9 of the EIA Report).	5.1.1. Avoid major drainage lines during the design and layout of the proposed PV facility. A buffer of 32 m from mayor drainage lines must be applied. Ensure that sensitive habitat and features (as defined in the Vegetation and Wetland Impact Assessment as well as the Avifaunal Assessment, Chapters 8 and 9 respectively of the EIA Report; Appendix B and C of this EMPr) are considered in the design. 5.1.2. Incorporate minor drainage lines into design and avoid unnecessary disturbance, where applicable. Refer to the Vegetation and Wetlands Impact Assessment, Chapter 8 of the EIA Report (which includes the buffers from minor drainage lines, i.e. 20 m), and Appendix B and C of this EMPr). 5.1.3. Consider the most applicable access road to site (i.e. the unnamed farm road or the Transnet Service Road (subject to the discussions between the Applicant and Transnet Freight Rail). 5.1.4. Appoint a specialist or suitable contractor to identify any plant species on site that	▪ Review the site plan with the ECO and an ecologist if necessary. ▪ Appoint a specialist to oversee the final development footprint area and undertake search and rescue, game sweep and alien removal. ▪ Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports.	▪ Once-off, prior to the commencement of construction. ▪ Appoint specialist once-off, prior to the commencement of construction. ▪ Once-off during the planning and design phase.	▪ Project Developer (Boven Solar PV4) and ECO ▪ Project Developer ▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		may require "rescue" as well as any exotic weeds/vegetation that require removal. Appoint a specialist team flush game from the construction area. 5.1.5. Consideration of the siting and layout of the temporary construction site and worker camp to avoid all sensitive areas as identified in the relevant specialist studies included in the EIA Report. 5.1.6. Consideration of the siting and layout of all project structures and infrastructure, including powerlines to avoid highly sensitive areas as identified in the Specialist studies (Chapter 8 for the Vegetation and Wetlands study, Chapter 8 for the Avifaunal study and Chapter 9 for the faunal study). Also refer to the sensitivity maps and layouts (Appendix B and C of this EMPr)			
5.2. Destruction of indigenous vegetation.	Ensure compliance with relevant Provincial and National legislation in respect of habitat and vegetation forms.	5.2.1. Ensure the necessary permits or licences are identified and applied for as applicable for removal of protected, indigenous vegetation. 5.2.2. Await response and provision of permit (as required) from the relevant Authorities prior to the removal of the indigenous species (if required). Once these permits are obtained, search and rescue must be undertaken for the indigenous species.	▪ Review the findings of the Vegetation and Wetlands Assessment and consider legislative requirements in respect of loss of indigenous vegetation etc. ▪ Appoint a suitable Search and Rescue Specialist/Contractor to undertake Search and Rescue. ▪ Ensure that this is taken into	▪ Once-off, prior to the commencement of construction ▪ Once-off, prior to the commencement of construction ▪ Once-off during the planning and	▪ Project Developer and ECO ▪ Project Developer, Specialist/ Contractor and ECO ▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
			consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports.	design phase.	
5.3. Loss of Species of Special Concern (SSC) and protected species and their habitats.	Minimise fragmentation and loss of SSC and protected species and their habitats through the careful siting and layout planning for the project.	5.3.1. Avoid the removal of listed SSC and protected species as far as possible.	▪ 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	▪ Project Developer
		5.3.2. A buffer zone of 32 m must be implemented from the edge of the major drainage lines on site (as shown in Appendix B and C of this EMPr), in which no development or activities should take place. A buffer of 20 m should be applied to the minor drainage lines on site.	▪ 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	▪ Project Developer
5.4. Impact on avian behaviour and avian species as a result of collision with infrastructure of the proposed PV facility	Reduce impact on avifauna.	5.4.1. Install BFDs across powerlines at appropriate points.	▪ Identify appropriate points within infrastructure for the installation of BFDs. ▪ Verify that this is undertaken by reviewing the signed approved designs.	▪ Once-off ▪ Once-off	▪ Project Developer and ECO ▪ ECO
5.5. Impact on ecological succession and animal re-colonisation	Allow for ecological succession and animal re-colonisation.	5.5.1. Apply appropriate space between consecutive PV panels to allow for sunlight to reach the basal vegetation and monitor ecological succession and animal re-colonisation.	▪ Implement appropriate spacing between consecutive PV panels and verify that this is undertaken by reviewing the signed approved designs	▪ Once-off during the design phase and before construction	▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
B. CONSTRUCTION PHASE					
5.6. 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.	5.6.1. 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. Workers should not be allowed outside the demarcated construction areas or camps or beyond the boundaries of the solar PV facility itself, i.e. they will not be allowed to wander across the undeveloped parts of each site. No development or activities should take place in the high sensitivity ecosystems (shown in Appendix B and Appendix C of this EMPr).	▪ 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. Fines should be issued for non-compliance and the payment of fines should be specified in the contract of the construction workers and in the contract of the ECO. ▪ 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
		5.6.2. 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
		5.6.3. The proposed project footprint must be demarcated to reduce unnecessary	▪ Carry out visual inspections to ensure strict control over the	▪ Weekly	▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		disturbance beyond the proposed project area.	behaviour of staff in order to restrict activities to within demarcated areas.		
		5.6.4. The Contractors and construction personnel must be made aware that indigenous vegetation must be not be removed or damaged. 5.6.5. Educate construction workers about the biodiversity importance of the area by means of environmental awareness programmes. 5.6.6. The staff should be educated not to collect and harvest plants or veldkos and not to collect firewood.	▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers. ▪ Issue fines where relevant as per specifications in their contracts. ▪ Ensure that environmental awareness programmes are implemented	▪ Once-off training and ensure that all new staff is inducted. ▪ Monthly ▪ During construction phase	▪ Contractor/ ECO ▪ ECO
		5.6.7. 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
		5.6.8. 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 demarcated areas for construction. ▪ Include periodical site inspection in environmental performance reporting that specifically records	▪ Daily	▪ ECO and Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
			occurrence of off-road vehicle tracks in specific areas.		
		5.6.9. 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 audits following the construction phase and report any non-compliance.	▪ Daily	▪ ECO and Contractor
		5.6.10. The following should be strictly forbidden on site and in the surrounding area during construction: • collection and harvesting of any plants or veldkos. • collection of fire wood.	▪ Strict control over the behaviour of construction workers, restricting activities to within demarcated areas for construction. ▪ Carry out Environmental Awareness Training. ▪ Issue fines where relevant as per specifications in their contracts. ▪ 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
		5.6.11. Fires should only be allowed within fire-safe demarcated areas. Open fires must be	▪ Strict control over the behaviour of construction workers,	▪ Daily	▪ ECO and Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		prohibited. Appropriate fire safety training should also be provided to staff that are to be on site for the duration of the construction phase.	restricting activities to within demarcated areas. ▪ Ensure fire safety requirements are well. understood and respected by workers (by providing basic fire safety training).		
		5.6.12. 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	▪ Project Developer and ECO
5.7. 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.	5.7.1. 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.	▪ Prior to the commencement of construction	▪ Project Developer Specialist and ECO
		5.7.2. 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. 5.7.3. 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	▪ ECO and Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		5.7.4. 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
		5.7.5. 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
		5.7.6. 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
5.8. 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.	5.8.1. The hunting and trapping of animals on-site or in the adjacent area should be strictly forbidden. 5.8.2. Fines must be issued for non-compliance as specified in their contracts 5.8.3. Conduct an Environmental Awareness Training and induction for all construction staff and personnel.	▪ Monitor activities and record and report non-compliance ▪ 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.	▪ Daily ▪ Prior to construction and as required by the ECO. Ensure that all new staff are inducted. ▪ Monthly	▪ ECO and Contractor ▪ ECO
5.9. 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.)	5.9.1. Establish a recording method in order to monitor the construction activities, including species presence within site, mortalities and sitings.	▪ Establish database of species, sitings etc. ▪ Construction personnel should advise on the findings and	▪ Daily to monthly	▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	in order to avoid repetition of fatality.		presence of fauna on site.		
	To remove species that may be found present in the construction footprint and laydown area.	5.9.2. 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 wildlife 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 Project Developer
		5.9.3. 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
		5.9.4. No animals (including snakes) shall be killed on site. The appointed ECO must receive snake handling training to enable him to remove and relocate any poisonous snakes during the construction phase. An expert or a suitable specialist should be appointed to remove and relocate any poisonous snakes during the construction phase.	▪ Ensure that the ECO receive the appropriate snake handling training. ▪ Monitor activities and record and report non-compliance.	▪ As required during construction	▪ ECO and Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
5.10. 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.	5.10.1. 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
		5.10.2. 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
5.11. 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.	5.11.1. Ensure that the live electrical fence wire is not placed at ground level. 5.11.2. 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 sitings indicating date of siting; species affected; position of species (specific or indicative) and other observations should be	▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
				established	
5.12. Impact and loss of avifauna as a result of operational activities.	To reduce the loss of and impact on avifauna. To minimize any induced ecological edge-effects and associated fragmentation during the construction and operation phases of the project	5.12.1. Adhere to the buffer specifications in the Avifauna impact assessment (Chapter 9 of the EIA Report): • Apply a buffer of 32 m from major drainage lines. • Apply a buffer of 100 m from sensitive areas, including dams and watering points. • Apply a buffer of 100 m from prominent outcrops, quartz outcrops and dolerite gravel plains) • If any breeding or nesting bird of prey is encountered during the construction phase, it must be buffered by at least 500 m. • All bustard/Korhaan observations should be buffered by 250 m.	▪ Ensure that the buffers are taken into consideration during the project design. ▪ Monitor the activities via visual inspections, and record and report any non-compliance. ▪ Strict control over the behaviour of staff/workers during the construction phase, restricting activities to within demarcated areas on-site.	▪ During the design phase ▪ Daily	▪ Project Developer and Project Applicant ▪ ECO and Contractor
5.13. Increased ELP, leading to changes in nocturnal behavioural patterns amongst fauna	The avoidance of electrical light pollution (ELP) through prudent positioning of external lighting.	5.13.1. 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.	▪ Project Developer Contractor and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
C. OPERATIONAL PHASE					
5.14. 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.	5.14.1. Identify protocol for pruning of vegetation and clearance where required. 5.14.2. Identify level of pruning and vegetation management required.	▪ Identify means of pruning and clearance of vegetation. For example, brushcutter, grazing etc.	▪ Ongoing and as required	▪ Environmental Manager
5.15. Impact and loss of protected species and SCC as a result of operational activities.	To reduce the loss of and impact on vegetation and watercourses.	5.15.1. Adhere to the buffer specifications in the Vegetation and Wetlands impact assessment (Chapter 8 of the EIA Report): • Apply a buffer of 32 m from major drainage lines. • Apply a buffer of 20 m from minor drainage lines.	▪ Audits to ensure that the specified buffers are adhered to. ▪ Monitor the activities via visual inspections, and record and report any non-compliance. ▪ Strict control over the behaviour of staff/workers during the operational phase, restricting activities to within demarcated areas on-site.	▪ Weekly and at the end of the construction phase. ▪ Daily ▪ Daily	▪ ECO and Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
5.16. 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.	5.16.1. 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
		5.16.2. 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. 5.16.3. Educate personnel and staff members about the biodiversity importance of the area by means of environmental awareness programmes. 5.16.4. Staff must remain within the boundaries of the PV facility at all times. The undeveloped portions of the site must be treated as conservation areas.	▪ Strict control over the behaviour of staff/workers during the operational phase, restricting activities to within demarcated areas on-site. ▪ Carry out Environmental Awareness Training. ▪ Issue fines for non-conformance as appropriate and as specified in the worker's contracts. ▪ Conduct audits of the signed attendance registers. ▪ Ensure that the awareness raising programmes are implemented.	▪ Daily ▪ Once-off training and ensure all new staff are inducted. ▪ As required ▪ As required during the operational phase.	▪ Facility Manager and Environmental Manager ▪ Facility Manager ▪ Environmental Manager
		5.16.5. 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. 5.16.6. All fuels, liquid chemicals (herbicides) must	▪ Monitor the activities via visual inspections, and record and report any non-compliance.	▪ Daily	▪ Environmental Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		be stored in bunded areas to contain spillages.			
		5.16.7. 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
		5.16.8. A storm-water management plan must be implemented during the operational phase. Regular inspections of stormwater infrastructure should be undertaken to ensure that it is kept clear of all debris and weeds.	▪ Verify that the stormwater management plan is being implemented and signed off prior the commencement of operations. ▪ Undertake regular inspections of the stormwater infrastructure (i.e. by implementing walk through inspections).	▪ Prior to commencement of operations. ▪ Weekly/Monthly	▪ Environmental Manager ▪ Facility Manager
		5.16.9. 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
		5.16.10. Continue with on-going monitoring programme to detect and quantify any alien species that may become established and identify the highly invasive species	▪ Monitor the presence of alien invasive species on the development site.	▪ Reporting frequency depends on legal compliance	▪ Facility Manager and Environmental

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
		during the operation phase.		framework	Manager
5.17. Impact and loss of fauna as a result of operational activities.	To reduce the loss of and impact on fauna.	5.17.1. 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. 5.17.2. Identify points of frequent 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. 5.17.3. No hunting or trapping of animals. 5.17.4. Reduction in speed limits in and around site. 5.17.5. Apply a buffer of 100m from water bodies such as dams and other surface water points as identified in the Faunal Specialist study (Chapter 10 of the EIA Report). 5.17.6. Minimise the use of construction and operational vehicles and apply road calming structures. 5.17.7. Apply appropriate space between consecutive PV panels to allow for sunlight to reach the basal vegetation and monitor ecological succession and animal re-colonisation.	▪ Establish reporting procedure. ▪ Monitor the presence of fauna during the operational phase via visual inspections and site visits. ▪ Carry out Environmental Awareness Training. ▪ Issue fines for non-conformance as appropriate and as specified in the worker's contracts. ▪ 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 and Environmental Manager ▪ Facility Manager ▪ Environmental Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
5.18. 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.	5.18.1. Avoidance of damage to infrastructure by faunal activity as well as impact on fauna as a result of the site infrastructure. 5.18.2. Identify impact of burrowing and other faunal activities on the fence line and operations activities. 5.18.3. Undertake the management of faunal intrusion through the fence, including possible mortalities. 5.18.4. Provide critter paths through the fence line to allow species access to site. 5.18.5. Ensure that the live electrical fence wire is not placed at ground level. 5.18.6. Conduct inspections of the fence line to address any animals that may be affected by the fence. 5.18.7. Promote and support faunal presence and activities within the proposed PV facility.	▪ 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 sitings indicating date of siting; species affected; position of species (specific or indicative) and other observations should be established. ▪	▪ Environmental Manager and Project Developer ▪ Environmental Manager and Project Developer ▪ Environmental Manager and Project Developer
5.19. Impact of ELP around the site.	The avoidance of electrical light pollution through prudent positioning of external lighting.	5.19.1. 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.	▪ Project Developer and Environmental Manager
5.20. Faunal and avifaunal road mortality as a result of increased vehicles travelling to and	Minimise loss of fauna as a result of road mortalities.	5.20.1. 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	▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers.	▪ Once-off training and ensure that all new staff are inducted.	▪ Facility Manager ▪ Environmental Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
within the site.		on site and must be alert at all times for potential crossings.		▪ Monthly	
		5.20.2. 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
5.21. Impact and loss of avifauna as a result of operational activities.	To reduce the loss of and impact on avifauna. To minimize any induced ecological edge-effects and associated fragmentation during the construction and operation phases of the project	5.21.1. Adhere to the buffer specifications in the Avifauna impact assessment (Chapter 9 of the EIA Report): • Apply a buffer of 32 m from major drainage lines. • Apply a buffer of 100 m from sensitive areas, including dams and watering points. • Apply a buffer of 100 m from prominent outcrops, quartz outcrops and dolerite gravel plains)	▪ Monitor the activities via visual inspections, and record and report any non-compliance. ▪ Strict control over the behaviour of staff/workers during the operational phase, restricting activities to within demarcated areas on-site.	▪ Daily	▪ ECO and Contractor
D. DECOMMISSIONING PHASE					
5.22. Rehabilitation of flora on site	Re-vegetation of the disturbed site is aimed at rehabilitating the site to the natural vegetative conditions prevailing prior to operation.	5.22.1. All damaged areas shall be rehabilitated upon completion of the contract. 5.22.2. All natural areas must be rehabilitated with species indigenous to the area. Re-seed with locally-sourced seed of indigenous grass species that were	▪ Conduct a final external audit to confirm that area is rehabilitated to an acceptable level.	▪ Once off	▪ Project Developer with feedback and input from an appropriate specialist. with advice from

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
		recorded on site pre-construction. 5.22.3. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.			specialist

6 OPEN SPACE MANAGEMENT PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. DESIGN PHASE					
6.1. Loss of vegetation and habitat fragmentation	Keeping clearing of vegetation to a minimum.	6.1.1. Clearing of vegetation should be kept to a minimum and take into consideration the sensitivities on site shown in Appendices A and B of this EMPr.	▪ 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	▪ Project Developer
6.2. 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.	6.2.1. Ensure compliance with relevant Environmental Specifications for the control and removal of alien invasive plant species. 6.2.2. Appoint a specialist or contact relevant authorities to seek guidance on the removal of the alien vegetation on site. 6.2.3. 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. ▪ Once-off during the design phase. ▪ Once-off during the design phase.	▪ Project Developer ▪ Project Developer ▪ ECO
6.3. Permanent barriers to animal movement and habitat fragmentation	The reduction in the impact that barrier will have on animal movement within the area.	6.3.1. Fencing should allow for the passage of small and medium sized mammals (e.g. meerkats and tortoises) (at least 20 cm openings or gaps at regular intervals or the fence should be erected 15 cm from	▪ 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	▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		the ground).			
		6.3.2. BFDs should be installed on the overhead powerlines where known bird flight paths occur.	▪ Identify appropriate points within infrastructure for the installation of BFDs. ▪ Verify that this is undertaken by reviewing the signed approved designs.	▪ Once-off ▪ Once-off	▪ Project Developer and ECO ▪ ECO
B. CONSTRUCTION PHASE					
6.4. Permanent barriers to animal movement and habitat fragmentation	The reduction in the impact that barriers will have on animal movement within the area.	6.4.1. BFDs should be installed on the overhead powerlines where known flight paths of birds occur.	▪ It is recommended that the ECO notes down birds observed in the area and flight paths 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
		6.4.2. Fencing should allow for the passage of small and medium sized mammals (e.g. meerkats and tortoises) (at least 20 cm openings or gaps at regular intervals or the fence should be erected 15 cm from the ground).	▪ This should be monitored by the ECO to determine whether this is effective.	▪ Daily	▪ ECO and Contractor
6.5. Loss of vegetation and habitat	Keeping the area cleared of vegetation to a	6.5.1. Clearing of vegetation should be kept to a minimum, keeping the width and length	▪ Monitor activities and record and report non-compliance.	▪ Daily	▪ ECO and Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
fragmentation	minimum	of the earthworks to a minimum.			
C. OPERATIONAL PHASE					
6.6. Increased risk of alien plant invasion	Ensure that the site is kept free from alien invasive species.	6.6.1. Continuously monitor the site and remove alien invasive species that are found.	▪ Monitor and eradicate alien invasive species on the development site.	▪ Eradicate alien invasive species as soon as possible	▪ Facility Manager and Environmental Manager
6.7. Increased animal road mortality	Minimise loss of fauna as a result of road mortalities.	6.7.1. 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
6.8. Permanent barriers to animal movement and habitat fragmentation	Avoid or reduce bird collisions due to project infrastructure	6.8.1. 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	▪ Project Developer
		6.8.2. The relevant requirements and methodology for post construction bird monitoring in terms of the applicable and most recent Best practice Guideline at the time, e.g. "Birds and Solar Energy, Best	▪ Ensure that the relevant requirements for the post-construction bird monitoring in terms of the applicable Birds and Solar Energy Best Practice Guidelines	▪ As prescribed in the relevant Guidelines	▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		Practice Guidelines" must be adhered to.	are adhered to.		
		6.8.3. 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	▪ Project Developer
D. DECOMMISSIONING PHASE					
6.9. 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 decommissioning phase.	6.9.1. 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	▪ Project Developer
		6.9.2. 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	▪ Project Developer
		6.9.3. 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	▪ Project Developer

7 TRAFFIC MANAGEMENT PLAN INCLUDING TRANSPORTATION PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. DESIGN PHASE					
7.1. Increased traffic generation	Manage impact that additional traffic generation will have on road network	7.1.1. If abnormal loads need to be transported to the site by road, a permit needs to be obtained from the Provincial Government Northern Cape (PGNC) Department of Public Works, Roads and Transport.	▪ Ensure that the permits are applied for and obtained prior to commencement. ▪ Verify that this has been undertaken by reviewing approved permits.	▪ Once-off during the design phase ▪ Once-off during the design phase.	▪ Contractor ▪ ECO
		7.1.2. If the Transnet Service Road will be used as the designated access road to site, discussions must be held with Transnet Freight Rail prior to commencement to confirm requirements and details of the agreement.	▪ 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.	▪ Project Developer and ECO
		7.1.3. Ensure that the requirements for use of the Transnet Service Road are addressed and considered in the design, as and where applicable.	▪ 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.	▪ Project Developer and ECO
		7.1.4. If the Transnet Service Road will be used as the designated access road, the registration details of all vehicles that will make use of the road during the construction and operational	▪ Ensure that the permits are applied for and obtained prior to commencement. ▪ Verify that this has been	▪ Once-off during the design phase ▪ Once-off during	▪ Contractor ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
		phases must be provided to Transnet Freight Rail, in order to obtain official permits.	undertaken by reviewing approved permits.	the design phase.	
		7.1.5. Provide a Transport Traffic Plan to SANRAL (if required).	▪ Ensure that the plan is compiled and submitted prior to commencement. ▪ Verify that this has been undertaken by reviewing approved plans.	▪ Once-off during the design phase ▪ Once-off during the design phase.	▪ Contractor ▪ ECO
7.2. Accelerated degradation of road structure due to construction and operational traffic.	Limit the deterioration of the road condition due to construction and operational traffic.	7.2.1. A Road Maintenance Plan should be developed for the section of the Transnet Service Road that will be used or the unnamed farm road should that be used. The plan should address the requirements of Transnet Freight Rail, including but not limited to, grading, dust suppressant mechanisms, drainage, signage, and speed limits.	▪ Ensure that the plan is compiled and submitted prior to commencement. ▪ Verify that this has been undertaken by reviewing approved plans.	▪ Once-off during the design phase ▪ Once-off during the design phase.	▪ Contractor ▪ ECO
B. CONSTRUCTION PHASE					
7.3. Increased traffic generation during the construction phase resulting in a reduction of road based level of service	Reduce the amount of road based traffic during the construction phase.	7.3.1. Well maintained vehicles should be used together with well-trained drivers during the construction phase. Vehicle maintenance and driver competency should be monitored. Proof of driver competency as well as the vehicle checks should be verified and undertaken to ensure that	▪ Carry out random checks of driver licences and conduct random visual inspections of construction vehicles for roadworthiness.	▪ Random visual inspection of vehicles weekly.	▪ Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		vehicles are roadworthy and hence, do not pose a safety risk. The Contractors must ensure that construction vehicles are roadworthy, properly serviced and maintained, and respect the vehicle safety standards implemented by the Project Developer.			
		7.3.2. During the construction phase, suitable parking areas should be designated for trucks and vehicles.	▪ Monitor the placement of the designated parking area for trucks and vehicles via visual inspections and record and report any non-compliance.	▪ Once-off prior to construction and as required during the construction phase.	▪ Project Developer and ECO
		7.3.3. The use of public transport (buses and/or minibus taxis) to convey construction personnel to the site should be encouraged.	▪ Contractor may record arrival and departure times as well as number of workers using minibuses.	▪ Once a month on a randomly selected day.	▪ Appointed Contractor
		7.3.4. Vehicles must not carry loads in excess of those for which the vehicle is in order to reduce impacts on the road structures, particularly the access roads leading to the site. Random visual inspection of vehicles should be undertaken in order to monitor for overloading. The inspections should also verify if the trucks are covered with appropriate material (such as tarpaulin) if and	▪ Perform visual inspection of vehicles during the construction phase.	▪ Random visual inspection of vehicles weekly.	▪ Appointed Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		where possible.			
7.4. Increased level of road accidents (involving pedestrians, animals, other motorists on the surrounding tarred/ gravel road network) due to increased traffic during construction.	Minimise the impact of the construction activities on the local traffic and avoid accidents with pedestrians, animals and other drivers on the surrounding tarred/ gravel roads. Reduce number of road accidents due to increased traffic during construction.	7.4.1. Well maintained vehicles should be used together with well-trained drivers during the construction phase. Vehicle maintenance and driver competency should be monitored. Proof of driver competency as well as the vehicle checks should be verified and undertaken to ensure that vehicles are roadworthy and hence, do not pose a safety risk. The Contractors must ensure that construction vehicles are roadworthy, properly serviced and maintained, and respect the vehicle safety standards implemented by the Project Developer.	▪ Carry out random checks of driver licenses and conduct random visual inspections of construction vehicles for roadworthiness.	▪ Random visual inspection of vehicles weekly.	▪ Contractor
		7.4.2. Road kill monitoring programme (inclusive of wildlife collisions record keeping) should be established and a product such as Animex fences installed, if needed, to direct animals to safe road crossings.	▪ Appropriate monitoring should be undertaken and Animex fences installed, if needed to direct animals to safe road crossings.	▪ Weekly	▪ Contractor and ECO
		7.4.3. Adhere to all speed limits applicable to all roads used. All heavy load vehicles should maintain a speed limit of 40 km/hour in the proposed section of the Transnet Service Road.	▪ Ensure that speed limits are adhered to. ▪ Carry out random visual inspections to verify adherence to speed limits and general	▪ Daily ▪ Random during the construction phase	▪ Contractor and ECO ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
			awareness of vehicle drivers.		
		7.4.4. Implement clear and visible signage and signals indicating movement of vehicles at the intersection with the Transnet Service Road to ensure safe entry and exit.	▪ Implement clear signalisation. ▪ Carry out random inspections to verify whether proper construction signage is being implemented.	▪ On-going ▪ Random during the construction phase	▪ Contractor and ECO ▪ ECO
7.5. Accelerated degradation of road structure due to construction traffic.	Limit the deterioration of the road condition due to construction traffic.	7.5.1. Construction activities will have a higher impact than the normal road activity and therefore the main access roads to site should be inspected on a weekly basis for structural damage.	▪ Ensure that the main access road to site maintains current condition through photographic surveys and monitoring.	▪ Weekly	▪ Contractor and ECO
		7.5.2. Implement management strategies for dust generation e.g. apply dust suppressant on the Transnet Service Road, exposed areas and stockpiles.	▪ Ensure dust management measures are in place to adequately decrease the generation of dust.	▪ On-going	▪ Contractor and ECO
		7.5.3. Vehicles must not carry loads in excess of those for which the vehicle is designed in order to reduce impacts on the road structures, particularly the access roads leading to the site. Random visual inspection of vehicles should be undertaken in order to monitor for overloading. The inspections should also verify if the trucks are covered with appropriate material (such as tarpaulin) if and where possible.	▪ Perform visual inspection of vehicles during the construction phase.	▪ Random visual inspection of vehicles weekly.	▪ Appointed Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		7.5.4. Make provision for the repairing of subgrade deterioration (i.e. pot holes, dust holes) that could possibly result due to loading of heavy construction vehicles on the Transnet Service Road.	▪ Make provision for repairs required to road	▪ Agree to with Transnet	▪ Contractor and ECO
7.6. Impact on air quality due to dust generation, noise and exhaust emissions from construction vehicles and equipment.	Limit the release of noise, pollutants and dust emissions	7.6.1. Implement management strategies for dust generation e.g. apply dust suppressant on the Transnet Service Road, exposed areas and stockpiles.	▪ Ensure dust management measures are in place to adequately decrease the generation of dust.	▪ On-going	▪ Contractor and ECO
		7.6.2. Construction vehicles must have their lights on at all times. Lights to be properly set to not blind train drivers who may then miss important signal, e.g stop signal (Signal Passed At Danger (SPAD)	▪ Ensure lights are on and properly set.	▪ On-going	▪ Contractor and ECO
		7.6.3. Postpone or reduce dust-generating activities during periods with strong wind. Earthworks may need to be rescheduled or the frequency of application of dust control/suppressant increased.	▪ Ensure dust management measures are in place to decrease the dust generated	▪ On-going	▪ Contractor and ECO
		7.6.4. Avoid using old and unmaintained construction equipment (which generate high sound levels) and ensure equipment is well maintained.	▪ Manage the air pollutants form construction vehicles through checking the condition of vehicles	▪ On-going	▪ Contractor and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
C. OPERATIONAL PHASE					
7.7. Increased level of road accidents (involving pedestrians, animals, other motorists on the surrounding tarred/ gravel road network) due to increased traffic during the operational phase.	Minimise the impact of the operational activities on the local traffic and avoid accidents with pedestrians, animals and other drivers on the surrounding tarred/ gravel roads. Reduce number of road accidents due to increased traffic during the operational phase.	7.7.1. Well maintained vehicles should be used together with well-trained drivers during the operational phase, as required. Vehicle maintenance and driver competency should be monitored. Proof of driver competency as well as the vehicle checks should be verified and undertaken to ensure that vehicles are roadworthy and hence, do not pose a safety risk. Vehicles must be roadworthy, properly serviced and maintained.	▪ Carry out random checks of driver licences and conduct random visual inspections of vehicles for roadworthiness.	▪ Random visual inspection of vehicles weekly.	▪ Facility Manager
		7.7.2. Adhere to all speed limits applicable to all roads used. All heavy load vehicles should maintain a speed limit of 40 km/hour in the proposed section of the Transnet Service Road.	▪ Ensure that speed limits are adhered to. ▪ Carry out random visual inspections to verify speed limits and general awareness of vehicle drivers.	▪ Daily ▪ Random during the operational phase	▪ Facility Manager ▪ Facility Manager
		7.7.3. Implement clear and visible signage and signals indicating movement of vehicles at the intersection with the Transnet Service Road to ensure safe entry and exit.	▪ Implement clear signalisation. ▪ Carry out random inspections to verify whether proper construction signage is being implemented.	▪ Ongoing ▪ Random during the operational phase	▪ Facility Manager ▪ Facility Manager
		7.7.4. The use of public transport (buses and/or minibus taxis) or carpooling to	▪ Monitor the requirements	▪ On-going	▪ Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		convey operational personnel to the site should be encouraged.			
		7.7.5. Adhere to requirements made within Transport Traffic Plan.	▪ Monitor the requirements as set out in the Plan as ensure that it is adhered to	▪ On-going	▪ Facility Manager
		7.7.6. Limit access to the site to personnel.	▪ Maintain a register of visitors and staff that enter site and restrict access to personnel.	▪ On-going	▪ Facility Manager
7.8. Accelerated degradation of road structure due to operational traffic.	Limit the deterioration of the road condition due to operational phase traffic.	7.8.1. The main access roads to site should be inspected on a weekly basis for structural damage.	▪ Ensure that the main access road to site maintains current condition through photographic surveys and monitoring.	▪ Weekly	▪ Facility Manager
		7.8.2. Implement management strategies for dust generation e.g. apply dust suppressant on the Transnet Service Road, exposed areas and stockpiles.	▪ Ensure dust management measures are in place to adequately decrease the generation of dust.	▪ On-going	▪ Facility Manager
		7.8.3. Vehicles must not carry loads in excess of those for which the vehicle is designed in order to reduce impacts on the road structures, particularly the access roads leading to the site. Random visual inspection of vehicles should be undertaken in order to monitor for overloading (where applicable).	▪ Perform visual inspection of vehicles during the construction phase.	▪ Random visual inspection of vehicles weekly.	▪ Facility Manager
		7.8.4. Make provision for the repairing of subgrade deterioration (i.e. pot holes,	▪ Make provision for repairs	▪ Agree to with	▪ Project

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
		dust holes) that could possibly result due to overloading of vehicles (where applicable) on the Transnet Service Road.	required to road.	Transnet	Developer
		7.8.5. Implement requirements of the Road Maintenance Plan.	▪ Adhere to requirements of the Road Maintenance Plan.	▪ On-going	▪ Facility Manager
D. DECOMMISSIONING PHASE					
7.9. Ensure that the construction mitigation and management measures are adhered to during the decommissioning phase.					

8 STORM WATER MANAGEMENT PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. DESIGN PHASE					
8.1. Impact of the project if a detailed storm water management plan is not correctly prepared and implemented.	To limit the impact of uncontrolled storm water run-off from developed areas onto natural areas	8.1.1. 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 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 from their natural flow pathways, thus depriving downstream watercourses of water.	▪ 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
B. CONSTRUCTION PHASE					
8.2. 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.	8.2.1. 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
		8.2.2. Stormwater and any run-off generated by the hard surfaces should be discharged into retention swales or areas with rock rip-rap (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
		8.2.3. 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
		8.2.4. 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	▪ 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
		within these systems i.e. hydrological regime (water quantity and quality) is maintained.			
		8.2.5. Reinforce soil slopes to minimise erosion during rehabilitation (as needed, and once construction in a specific area has been completed).	▪ Monitor activities and record and report non-compliance.	▪ As needed during the construction phase	▪ ECO
		8.2.6. 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
		8.2.7. 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
		8.2.8. 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

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
8.3. 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.	8.3.1. 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
		8.3.2. 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 clearly marked and stored safely on site and in bunded areas. The bunded areas should be capable of holding storm water as well as spillages. 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
		8.3.3. 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	▪ 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**
		take place within a watercourse. 8.3.4. Stockpiles must be located away from river channels i.e. further than 32 m from the edges of such channels.			
		8.3.5. 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
		8.3.6. 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
		8.3.7. 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
		8.3.8. 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
		8.3.9. 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	▪ 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
		to minimise impacts on drainage lines.			
		8.3.10. Ensure that no waste materials or sediments are left in the surrounding drainage lines (as a result of the construction).	▪ Check compliance with specified conditions of the Stormwater Management Plan and Method Statement.	▪ Weekly or Bi-weekly	▪ ECO
		8.3.11. 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
C. OPERATIONAL PHASE					
8.4. Stormwater discharge into the surrounding environment during operations	To minimise the contamination of stormwater by uncontrolled release of contaminated or grey water. To protect soil resources and prevent soil erosion.	8.4.1. 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.	▪ Project Developer
		8.4.2. 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	▪ Project Developer
		8.4.3. Regular inspections of stormwater infrastructure should be undertaken to	▪ Undertake regular inspections of the stormwater infrastructure	▪ Weekly/Monthly	▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		ensure that it is kept clear of all debris and weeds.	(i.e. by implementing walk through inspections).		
D. DECOMMISSIONING PHASE					
8.5. 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 licence. Should the plant be decommissioned, the solar field would be rehabilitated to as close to its original (pre-development) state as practicable. 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.					

9 EROSION MANAGEMENT PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. CONSTRUCTION PHASE					
9.1. Increased wind erosion and resultant deposition of dust	Prevent wind erosion and resultant deposition of dust on surrounding indigenous vegetation.	9.1.1. 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
		9.1.2. During construction, efforts should be made to retain as much natural vegetation as possible on the site, to reduce disturbed areas and maintain plant cover, thus reducing erosion risks.	▪ Monitor activities via site inspections and record and report non-compliance.	▪ Daily	▪ ECO and Contractor
		9.1.3. 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
9.2. Excessive loss of natural vegetation within the development footprint area	Prevent loss of natural vegetation through erosion.	9.2.1. 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.	▪ Daily ▪ Daily	▪ ECO and Contractor ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			▪ Undertake regular monitoring for erosion to ensure is reduced and rectified as soon as possible.		
		9.2.2. 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 top soil layer	▪ ECO and Contractor
		9.2.3. 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)
		9.2.4. 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
9.3. Erosion of surface soils, rilling and	Measures to be implemented that address or avoid the loss of surface soils and	9.3.1. Identify cause of erosion and possible means of redress (i.e. implement erosion control measures, where applicable), such as the use	▪ Monitor the erosion on site during construction, as well as the implementation and	▪ Ongoing and as required during	▪ ECO and Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
gulleys due to water erosion.	exacerbates gulley formation.	of geofabric, stone gabions and re-vegetation or similar measures. 9.3.2. Erosion control measures should seek to reduce surface flow velocity and allow for settlement on site of silt laden surface waters. Washaways, excessive loss of soils and gulleys can be considered to be indicative of excessive erosion. 9.3.3. Remove the topsoil from the proposed tower base locations and solar panel bases and store it temporarily for later use. 9.3.4. Use the subsoil for shaping during the reinstatement phase and place topsoil on top. 9.3.5. Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the run-off control system and to specifically record the 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	effectiveness of erosion control on site (such as the use of geofabric, stone gabions and re-vegetation or similar measures). ▪ Monitor all disturbed areas and new vehicle tracks on site for signs of erosion. ▪ Establish an effective record keeping system for each area where soil is disturbed for construction and decommissioning purposes.	erosion events.	
B. OPERATIONAL PHASE					
9.4. Excessive loss of natural vegetation in the	Prevent loss of natural vegetation and minimise habitat fragmentation and the loss of connectivity as a	9.4.1. 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.	▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
development footprint area and resulting impacts on SSC, faunal habitat and habitat fragmentation.	result of erosion.	9.4.2. The use of silt fences, sand bags or other suitable methods must be implemented in areas that are susceptible to erosion. Other erosion control measures that can be implemented are as follow: 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	▪ Project Developer
		9.4.3. 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	▪ Project Developer
9.5. Increased water erosion as a result of run-off water from hardened surfaces.	Manage run-off water to prevent down slope water erosion.	9.5.1. 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	▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
C. DECOMMISSIONING PHASE					
9.6. 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).					

10 HAZARDOUS SUBSTANCES LEAKAGE OR SPILLAGE MONITORING SYSTEM

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. CONSTRUCTION PHASE					
10.1. 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.	10.1.1. 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	▪ Project Developer, Contractor and ECO
		10.1.2. 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	▪ Project Developer, Contractor and ECO
		10.1.3. 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	▪ Project Developer, Contractor and ECO
		10.1.4. 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	▪ Daily ▪ Monthly	▪ Project Developer Contractor and ECO ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
			incidents.		
		10.1.5. 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	▪ Project Developer Contractor and ECO
		10.1.6. 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	▪ Project Developer Contractor and ECO ▪ ECO
10.2. 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.	10.2.1. 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 bunded areas must be provided for the storage of these materials at the site camp. Bunded areas should contain an impervious surface in order to prevent spillages from entering	▪ Monitor the storage and handling of dangerous goods and hazardous materials on site via site audits and record non-compliance and incidents.	▪ Weekly	▪ Contractor and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		the ground. Absorbent materials should be available on site to mop up spills. The used materials must be disposed of at an appropriate waste disposal site. Bunded areas should have a capacity of 110 % of the volume of the largest tank in the bund (tanks include storage of fuel/diesel).			
		10.2.2. 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	▪ Contractor and ECO ▪ ECO
		10.2.3. 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 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 ▪ ECO
		10.2.4. Spilled fuel, oil or grease must be retrieved and contaminated soil removed, cleaned	▪ Monitor the handling and storage of fuels and	▪ Daily (or during spills)	▪ Contractor and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		and replaced.	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.		
		10.2.5. Contaminated soil to be collected by the Contractor (under observation of the ECO) and disposed of at a registered waste facility designated for this purpose. Proof of disposal (i.e. waste disposal slips or waybills) should be retained on file for auditing purposes.	▪ Monitor the correct removal of contaminated soil. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.	▪ Daily (or during spills)	▪ Contractor and ECO
		10.2.6. 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	▪ Contractor and Project Developer ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
				phase).	
		10.2.7. 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 Contractor
		10.2.8. 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	▪ Contractor and ECO
		10.2.9. 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	▪ 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	▪ During spill events	▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		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. 331).	significantly contaminated, then compliance with Part 8 of the NEMWA should be achieved by the Applicant.		
		10.2.10. 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
B. OPERATIONAL PHASE					
10.3. 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.	10.3.1. 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	▪ Project Developer
		10.3.2. 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	▪ During spills	▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			slips and waybills via site audits and record non-compliance and incidents.		
		10.3.3. 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	▪ Project Developer
		10.3.4. 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). ▪ Once-off (and thereafter as required).	▪ Project Developer ▪ Facility Manager
		10.3.5. 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

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.3.6. 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. 331).	▪ 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	▪ Project Developer
		10.3.7. 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	▪ 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
		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).			
10.4. Impacts due to management solid and liquid wastes disposed of on the site during operation phase.	Prevent environmental impacts as a result of the operational phase such as pollution.	10.4.1. 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
		10.4.2. 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	▪ Project Developer
		10.4.3. 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
C. DECOMMISSIONING PHASE					
10.5. 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 ENVIRONMENTAL AWARENESS AND FIRE MANAGEMENT PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. DESIGN PHASE					
11.1. 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).	11.1.1. Audit the implementation of the EMPr requirements.	▪ Audit report on compliance with actions and monitoring requirements.	▪ Weekly	▪ Project Developer
		11.1.2. 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	▪ Project Developer
B. CONSTRUCTION PHASE					
11.2. 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).	11.2.1. 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
		11.2.2. 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
		11.2.3. Open fires must be prohibited. Appropriate fire safety training	▪ Ensure fire safety requirements are well understood and respected by	▪ On-going	▪ ECO and

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
		should also be provided to staff that are to be on the site for the duration of the construction phase.	construction personnel. Provide basic fire safety training.		Contractor
		11.2.4. Ensure that cooking takes place in a designated area shown on the site map. Ensure that no firewood or kindling may be gathered from the site or surrounds.	▪ Check compliance with specified conditions using a report card, and allocate fines when necessary.	▪ On-going	▪ ECO and Contractors
		11.2.5. 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
11.3. Inappropriate behaviour of civil contractors and sub-contractors during the construction phase	Prevent unnecessary impacts on the surrounding environment by ensuring that contractors are aware of the requirements of the EMPr. Ensure that contractors and sub-contractors do	11.3.1. Ensure that the EMPr and the EA are included in all tender documentation and contractors and sub-contractors contracts.	▪ Check compliance with specified conditions using a report card, and allocate fines when necessary.	▪ On-going	▪ ECO and Contractors
		11.3.2. Contractors and sub-contractors must use the ablution facilities situated in a designated area within the site; and no bathing/washing should be permitted outside the designated area.	▪ Check compliance with specified conditions using a report card, and allocate fines when necessary.	▪ On-going	▪ ECO and Contractors

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	not induce impacts on the surrounding environment as a result of unplanned pollution on site. Ensure that actions by on-site contractors and sub-contractors and workers are properly managed in order to minimise impacts to surrounding environment	11.3.3. All litter will be deposited in a clearly labelled, closed, animal-proof disposal bin in the construction area; particular attention needs to be paid to food waste.	▪ Check compliance with specified conditions using a report card, and allocate fines when necessary.	▪ On-going	▪ ECO and Contractors
		11.3.4. No person other than a qualified specialist or personnel authorised by the Project Developer, will disturb or remove plants outside the demarcated construction area.	▪ Check compliance with specified conditions using a report card, and allocate fines when necessary.	▪ On-going	▪ ECO and Contractors
		11.3.5. 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
		11.3.6. 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. 11.3.7. No workers should be allowed to enter the site areas outside the fenced PV facility except in emergencies, e.g. to fight bush fires.	▪ 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
11.4. Inappropriate planning and of site camp establishment.	Ensure that environmental issues are taken into consideration in the planning for site	11.4.1. All construction activities, materials, equipment and personnel must be restricted to the actual construction area specified (as required to	▪ Monitor compliance and record non-compliance and incidents.	▪ Before construction	▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	establishment.	undertake the construction work). The construction area must be demarcated by the Contractor.			
		11.4.2. 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
		11.4.3. 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
11.5. Increased animal road mortality	Reduction in animal mortality	11.5.1. The construction staff should be made aware of the presence of fauna and 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, and should be trained on how to react in these situations.	▪ 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
		11.5.2. 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	▪ Monitor the activities via visual inspections, and record and report any non-compliance.	▪ Daily	▪ Contractor and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		material, where appropriate, and the site camp must be kept clean on a daily basis.			
		11.5.3. Establish a monitoring programme to record the number of faunal road mortalities and collisions. If it is established that the number of collisions and faunal fatalities increase within an area, particularly with regards to smaller species (reptiles), then measures such as exclusion fences within these areas only (e.g. Animex fencing or similar) should be installed.	▪ Appropriate monitoring and recording should be undertaken. ▪ Exclusion fences should be installed, if needed to direct animals to safe road crossings.	▪ Weekly ▪ As required	▪ ECO ▪ ECO and Contractor
11.6. Increased energy consumption during the construction phase.	Reduce energy consumption where possible.	11.6.1. Encourage the use of energy saving equipment at the site camp site (such as low voltage lights and low pressure taps) and promote recycling. Construction personnel must be made aware of energy conservation practices as part of the Environmental Awareness Training programme.	▪ Contractor to monitor energy usage via audits. ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers.	▪ Monthly ▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly	▪ Contractor ▪ Contractor/ ECO ▪ ECO
11.7. Impact on the regional water balance as a result of increased water usage.	Reduce water usage during the construction phase.	11.7.1. Water conservation should be practiced as follows: ▪ Cleaning methods utilised for cleaning vehicles, floors, etc. should aim to minimise water use (e.g. sweep before wash-	▪ Monitor via site audits and record non-compliance and incidents.	▪ Monthly	▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
		down). ▪ Ensure that regular audits of water systems are conducted to identify possible water leakages. 11.7.2. Avoid the use of potable water for dust suppression during construction and consider the use of alternative approved sources, where possible.			
		11.7.3. Make construction personnel aware of the importance of limiting water wastage, as well as reducing water use.	▪ Carry out Environmental Awareness Training with a discussion on water usage and conservation. ▪ Conduct audits of the signed attendance registers.	▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly	▪ Contractor/ ECO ▪ ECO
C. OPERATIONAL PHASE					
11.8. 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.	11.8.1. 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
		11.8.2. 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. ▪ Conduct audits of the signed	▪ 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**
			attendance registers.		
		11.8.3. 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	▪ Project Developer
		11.8.4. 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	▪ Facility Manager ▪ Project Developer
11.9. Increased energy consumption during the operational phase.	Reduce energy consumption where possible.	11.9.1. Encourage the use of energy saving equipment at the PV facility (such as low voltage lights and low pressure taps) and promote recycling. Operational personnel must be made aware of energy conservation practices as part of the environmental awareness training programme.	▪ Monitor energy usage via site investigations. ▪ Conduct training for all operational personnel.	▪ Monthly ▪ As and when required and ensure that all new staff are inducted.	▪ Facility Manager ▪ Project Developer
11.10. Impact on the regional water balance as a result of increased water	Reduce water usage during operations.	11.10.1. Water conservation to be practiced in line with Energy Saving Policies as follows: ▪ Cleaning methods utilised for	▪ Record water usage during the operational phase, conduct audits and record non-compliance and incidents.	▪ Monthly	▪ Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
usage.		cleaning vehicles, floors, the offices etc. should aim to minimise water use (e.g. sweep before wash-down). ▪ Where possible, encourage the re-use of water. ▪ Ensure that regular audits of water systems are conducted to identify possible water leakages. ▪ Consider installing water saving devices (e.g. dual flush toilets, automatic shut-off taps, etc.).			
		11.10.2. Carry out environmental awareness training with a discussion on water usage and conservation, and make operational personnel aware of the importance of limiting water wastage.	▪ Conduct training for all operational personnel.	▪ As and when required during operations and ensure that all new staff are inducted.	▪ Facility Manager
11.11. Non respect of waste management practices	Minimise the production of general waste. Ensure compliance with relevant waste management legislation. Minimise pollution of the environment.	11.11.1. Control and implement waste management plans. Ensure that relevant legislative requirements are respected. 11.11.2. Determine specific areas on site for temporary management of waste.	▪ Control of waste management practices throughout operation phase.	▪ Monthly	▪ Facility Manager
		11.11.3. Promote waste reduction, re-use, and recycling opportunities on site during the operation phase.	▪ Monitor waste generation and collection throughout operation.	▪ Monthly	▪ Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
		11.11.4. Ensure an adequate and sustainable use of resources.			
11.12. Excessive generation of waste water on site during the operation phase	Maintain reasonable levels of waste water generation	11.12.1. Waste water 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.	▪ Waste water generation to be monitored throughout the operational phase. ▪ Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.	▪ Quarterly	▪ Facility Manager
D. DECOMMISSIONING PHASE					
11.13. Ensure that the construction mitigation and management measures are adhered to during the decommissioning phase.					

12 Specific Project Related Environmental Impacts

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. DESIGN PHASE					
A.1. VISUAL IMPACTS					
12.1. Potential visual intrusion of construction activities on existing views of sensitive visual receptors	Reduce visual intrusion of construction activities project wide.	12.1.1. Ensure plans are in place to minimise fire hazards and dust generation. 12.1.2. Ensure plans are in place to rehabilitate temporary cleared areas as soon as possible.	▪ Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports.	▪ During design cycle and before construction commences.	▪ Project Developer ▪ ECO
		12.1.3. Clearance of the area for the solar field should be phased in such a way that the exposed area is always at a minimum.	▪ Ensure that this is taken into consideration prior to the commencement of construction by reviewing signed minutes of meetings or signed reports.	▪ Once-off during the design phase.	▪ Project Developer
	Reduce visual intrusion of the solar energy facility	12.1.4. A maintenance plan for buildings and structures should be in place. 12.1.5. Colours of buildings and structures should blend in with the landscape background where this is technically feasible and where it will not affect the functionality of the structures. 12.1.6. Materials, coatings and paints should be chosen based on minimal reflectivity. 12.1.7. Grouped structures should be painted in the same colour where this will not affect	▪ Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports.	▪ During design cycle and before construction commences.	▪ Project Developer and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		the functionality of the structures, to reduce visual complexity and contrast. 12.1.8. Appropriate coloured materials should be used for structures to blend in with the backdrop of the project where technically feasible. 12.1.9. Appropriate colours for smooth surfaces often need to be two to three shades darker than the background colour to compensate for shadows that darken most textured natural surfaces (apply where technically feasible).			
12.2. Potential impact of night lighting of the Solar PV Facility on the nightscape of the region.	Reduce the impact of night lighting of structures and buildings associated with the solar energy facility on the surrounding nightscape and visual receptors.	12.2.1. A lighting plan for the proposed Solar PV plant that documents the design, layout and technology used for lighting purposes should be prepared, indicating how nightscape impacts will be minimised and that also demonstrates that project lighting is effectively shielded from surrounding and adjacent properties must be prepared with the design plans of the plant. The plan should minimize light spill onto neighbouring properties and glare which can affect visual receptors in the surrounding landscape. 12.2.2. The lighting plan should also minimize contribution to light pollution (night glow) of the regional nightscape. 12.2.3. The lighting plan should include a process	▪ A lighting specialist should be contracted to design the lighting plan for the project. The plan should provide for temporary lighting during the construction and decommissioning phases of all components of the project. ▪ Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports.	▪ During design cycle and before construction commences. ▪ Once-off during the design phase.	▪ Project Developer ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		for promptly addressing and mitigating complaints about potential lighting impacts. 12.2.4. Lighting of the facility should not exceed, in number of lights and brightness, the minimum required for safety and security. 12.2.5. Uplighting and glare (bright light) should be minimised using appropriate screening. 12.2.6. Low-pressure sodium light sources should be used to reduce light pollution. 12.2.7. Light fixtures should not spill light beyond the project boundary. 12.2.8. Timer switches or motion detectors (within safety requirements) should be used to control lighting in areas that are not occupied continuously.			
A.2. HERITAGE IMPACTS (ARCHAEOLOGY AND CULTURAL LANDSCAPE)					
12.3. Impacts to archaeology and graves (note that none are expected).	Achieve a layout that minimizes the potential later impacts to archaeological resources and/or graves.	12.3.1. Ensure that project layout avoids as many known archaeological resources and/or graves as possible.	▪ Take cognizance of the archaeological sites and graves reported in the HIA when designing facility layout.	▪ Once-off	▪ Project Developer
12.4. Impacts to the natural and cultural landscape (note that none are expected).	Reduce the degree of visual contrast in the landscape.	12.4.1. Use an earth-coloured paint on the built elements of the facility where technically feasible.	▪ Include earth-coloured paint in the design specifications for the facility where technically feasible.	▪ Once-off	▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A.3. SOCIAL IMPACTS					
12.5. In-migration of potential job seekers into the Kenhardt area	Proactively manage the in-migration of potential employment seekers and in so doing mitigate impacts on existing social structures. Manage expectations. Make clear the difference between the number of temporary/construction workers and the number required for the operational phase.	12.5.1. Develop and implement a Workforce Recruitment Plan 12.5.2. Reserve employment, where practical, for local residents 12.5.3. Clearly define and agree upon the Project Affected People (PAP) 12.5.4. Develop a database of PAP and their relevant skills and experience 12.5.5. Develop and implement a Stakeholder Engagement Plan	▪ Mitigation measures (14.5.1); (14.5.4) and (14.5.5) require the drafting of a document which would in each instance serve as the method through which the mitigation actions are monitored. ▪ Mitigation measures (14.5.2) and (14.5.3) require clear statements regarding for whom work would be reserved (i.e. mitigation measure (14.5.2)) and who the PAP is (i.e. mitigation measure (14.5.3)).	▪ Once-off during the design phase.	▪ Project Developer
12.6. Economic Development	Draft an Economic Development Plan to align local investment with bona fide local needs.	12.6.1. The proponent should engage with local NGOs, CBOs and local government structures to identify and agree upon relevant skills and competencies required in the Kenhardt community. 12.6.2. Such skills and competencies should then be included in the Economic Development Plan. 12.6.3. Where possible, align Economic development Plan with Local Municipality's IDP. 12.6.4. Delivery on the Economic development Plan must be contractually binding on the	▪ Mitigation measures 14.6.1; 14.6.3; 14.6.4 and 14.6.5 require the drafting of a document (i.e. the Economic development Plan) which would in each instance serve as the method through which the mitigation actions are monitored.	▪ Once-off during the design phase.	▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		proponent.			
A.4. ELECTROMAGNETIC AND RADIO FREQUENCY INTERFERENCE					
12.7. Impact on the nearest and surrounding Square Kilometer Array (SKA) telescopes and the overall SKA project	To reduce the impact of the proposed PV project on the SKA. To implement the mitigation measures correctly and achieve an improvement of between 20 and 40 dB in emissions levels.	12.7.1. The inverter units, transformers, communication and control units for an array of panels should all be housed in a single shielded environment. For shielding of such an environment it must be ensured that: ▪ Radio Frequency Interference (RFI) gasketting is placed on all the seams and doors. ▪ RFI Honeycomb filtering should be placed on all ventilation openings. 12.7.2. It is important to ensure that the cables are laid directly in the soil or properly grounded cable trays (not plastic sleeves). 12.7.3. The use of bare copper directly in the soil for earthing is recommended to shunt Common Mode (CM) interference currents to ground. 12.7.4. In the case of a tracking PV plant design, care will need to be taken to shield the noise associated with the relays, contactors and hydraulic pumps/motors of the tracking units. 12.7.5. Data communications to and from the plants should be via fibre optic.	▪ Ensure that the requirements and mitigation practices are incorporated into the design of the proposed PV plant during the planning and design phase by reviewing signed minutes of meetings or signed reports.	▪ Once-off during the design phase.	▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
		12.7.6. AC brushless motors to be used for tracking motors. 12.7.7. Contingency plan to be developed and implemented when necessary.			
A.5. **ECOLOGICAL IMPACTS (TERRESTRIAL, AQUATIC AND AVIFAUNA)**					
12.8. Loss of sensitive species on site	Avoidance of undue disturbance to Sensitive species	12.8.1. Search for and collect individuals of *Aloe dichotoma* and *Hoodia gordonii* that will be affected by the proposed activities and relocate to suitable habitat. This job has to be supervised by a suitably qualified horticulturist who understands dryland species. Relocation of *Boscia albitrunca* and *B. foetida* is not considered to be necessary. 12.8.2. These species may have to be temporarily planted in a nursery. Species must be planted out during the rainy season.	▪ Relocation of species to a suitable habitat. ▪ Regularly monitor the species for establishment.	▪ Once before construction ▪ Weekly for two months	▪ ECO ▪ Project Developer
12.9. Disturbance to vegetation, fauna and avifauna as well as watercourses (ecology)	To reduce the impact of the proposed PV project on ecology.	12.9.1. Apply a buffer of 32 m from major drainage lines and watercourses on site. 12.9.2. Apply a buffer of 20 m from minor drainage lines. 12.9.3. Apply a buffer of 100 m from water points, e.g. dams. 12.9.4. Apply a buffer of 100 m from NFEPA rivers and wetlands (National priority). 12.9.5. Dangerous goods may not be stored within 100 m of a watercourse. 12.9.6. The site camp must be located outside the watercourse area and buffers.	• Monitor the implementation of the buffer zone • The layout, including the buffer areas must be clearly marked on a map and clearly displayed	▪ Prior to construction	▪ Project Applicant, Project Developer and ECO.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		12.9.7. All project structures and infrastructure must be located outside the buffer zones. 12.9.8. No construction related activities, such as the site camp, storage of materials, temporary roads or ablution facilities may be located within watercourses and their buffer zones. 12.9.9. All key habitat features should have a buffer of at least 100 m (from the edge of the key habitat feature) and all major watercourses by at least 32 m to minimize any induced ecological edge-effects and associated disturbance of fauna during the construction and operation of the project (as specified in the Avifauna and Fauna studies in Chapters 9 and 10 respectively of the EIA Report).			
12.10. Impact on avifauna	Reduce impact on avifauna	12.10.1. BFDs should be installed on the overhead powerlines where known bird flight paths occur.	▪ Identify appropriate points within infrastructure for the installation of BFDs.	▪ BFDs should be installed on the overhead powerlines where known bird flight paths occur.	▪ Identify appropriate points within infrastructure for the installation of BFDs.
12.11. Loss of species due to access routes to site	Use of existing access routes as far as possible	12.11.1. Avoid impacts on watercourses while upgrading the existing access roads.Clearly mark the edge of the watercourse buffer zones on site. 12.11.2. Regularly check these areas to ensure that the signage is in place and vehicle crossing	▪ Monitor road upgrades to ensure that it does not impact on water courses. ▪ Monitor the movement of vehicles on access roads and around buffer zones.	▪ During construction activities. ▪ Prior to construction	▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
		are not taking place through the watercourses.	▪ Vehicle tracks must be rehabilitated according to the rehabilitation plan.	▪ Monthly ▪ Monitoring must take place to ensure that tracks are no longer used. ▪ The site must be monitored until vegetation establishment is sufficient.	
12.12. Disturbance of birds	To reduce the impact of the proposed PV project on sensitive bird species in the area and on site.	12.12.1. The implementation of a pre-construction monitoring programme (e.g. Jenkins *et al.,* 2015) to obtain additional long term data on the distribution and abundance of birds. Undertake monitoring in the wet and dry seasons. 12.12.2. Implement vantage point surveys to identify and quantify bird flyways in the region. 12.12.3. Apply buffer zones (32 m from the edge of the habitat) to habitat with high ecological sensitivity	▪ Assessment of data from monitoring programme to determine impact on bird species.	▪ Twice prior to construction	▪ ECO
B. CONSTRUCTION PHASE					
B.1. ECOLOGICAL IMPACTS (TERRESTRIAL, AQUATIC AND AVIFAUNA)					
12.13. Loss of	Avoid loss of Species of	12.13.1. The project area must be fenced off and no	▪ Monitor during the construction	▪ Ongoing	▪

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Species of Conservation Concern	Special Concern	movement of vehicles or people is allowed outside the fenced or demarcated construction areas. 12.13.2. Workers must not be allowed to wander across the undeveloped parts of each site. 12.13.3. No construction related activities, such as the site camp, storage of materials, temporary roads or ablution facilities may be located in the moderate to high or the high sensitivity areas. 12.13.4. The sensitive areas and the buffer zones should be avoided (buffer areas as indicated in 12.9).	period		
12.14. Changes in edaphics (soils) on account of excavation and import of soils, resulting in changes in soil state, compaction, and alteration of plant communities and fossorial species in and around these points etc.	Avoidance of undue disturbance to soils	12.14.1. Ripping of compact soils to be considered according to site specifics and impact (i.e. either manual or machine driven ripping of compact soils to loosen surface material and improve percolation). 12.14.2. Must ensure that soil compaction is only done when necessary and the rest of the undisturbed land is not used as thoroughfares so as to avoid reduction of soil infiltration capacity and increase in soil erosion.	▪ If deemed applicable, Monitor the manual or machine driven ripping of compact soils. ▪ Undertake site and visual inspections and report any non-compliance	▪ Intermittent and upon identification of excess compaction or option of ripping is considered necessary (i.e. when and where extensive compaction arises). ▪ Ongoing	▪ Contractor Project Developer ▪ ECO
12.15. Alteration of	To manage construction	12.15.1. Avoidance of significant earthworks with	▪ Undertake site and visual	▪ Ongoing	▪ Contractors,

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
surface water quality leading to changes in water chemistry.	activities that may impact on surface and subsurface water quality	concomitant risk of increasing silt mobility. 12.15.2. Conduct judicious excavation and clearance. 12.15.3. Undertake stabilisation of disturbed soils. 12.15.4. Implement the use of surface flow attenuators or energy dissipaters (if required). 12.15.5. Management of potential liquid material that may be classified as hazardous. 12.15.6. Management of hazardous waste. 12.15.7. Avoid significant sculpting of land and maintenance of the general topography of site.	inspections and reporting any non-compliance. ▪ Containment of hazardous waste and hazardous materials.		Project Developer and ECO
12.16. Alteration of surface drainage patterns on account of construction activities leading to change in plant communities and general habitat structure	Limit alteration of surface drainage, leading to changes in plant communities and general habitat structure, patters due to construction activities.	12.16.1. Avoidance of major drainage features during construction. The proposed project footprint must be demarcated to reduce unnecessary disturbance beyond the proposed project area. Demarcate as no-go areas. 12.16.2. Undertaking and completion of earthworks and road construction outside of the high rainfall period (if possible). 12.16.3. Avoidance of significant sculpting of land and maintenance of the general topography of the site. 12.16.4. Maintenance of a high level of housekeeping on site during the construction phase.	▪ Carry out visual inspections to ensure strict control over the behaviour of staff in order to restrict activities to within demarcated areas. ▪ Monitor the construction period to verify if this is being undertaken (where possible). ▪ Carry out visual inspections to ensure minimal impact on soils and erosion. ▪ Monitor the condition of the site camp throughout the construction phase via visual site inspections. Record non-	▪ Ongoing ▪ Ongoing ▪ Ongoing ▪ Ongoing ▪ Ongoing	▪ ECO ▪ Contractor, Project Developer and ECO ▪ Contractor, Project Developer and ECO ▪ ECO ▪ Contractor, Project Developer and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
			compliance and incidents. ▪ Monitor the condition of the construction area throughout the construction phase via visual site inspections. Record non-compliance and incidents.		
B.2. VISUAL IMPACTS					
12.17. Potential visual intrusion of construction activities on existing views of sensitive visual receptors	Prevent unnecessary visual clutter and focusing attention of surrounding visual receptors on the proposed development.	12.17.1. Preparation of the solar field area (i.e. clearance of vegetation, grading, contouring and compacting) and solar field construction should be phased in a way that makes practical sense in order to minimise the area of soil exposed and the shortest duration of exposure.	▪ Ensure that this is taken into consideration prior to the commencement of construction. ▪ Conduct site inspections to monitor the phasing of construction to verify unnecessary soil disturbance and clearing and report any non-compliance.	▪ Once-off during the construction phase. ▪ Weekly	▪ Project Developer ▪ ECO
		12.17.2. Parking areas should be demarcated and strictly controlled so that vehicles are limited to specific areas only.	▪ Carry out visual inspections to ensure the construction area and parking area is demarcated clearly, and record and report any non-compliance. ▪ Carry out visual inspections to ensure strict control over the parking of construction vehicles and access routes in order to restrict activities to within demarcated areas.	▪ Weekly ▪ Weekly	▪ ECO ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		12.17.3. Night time construction should be avoided where possible.	▪ Construction operation times to be monitored and managed (as well as included in the tender contract).	▪ Weekly	▪ ECO
		12.17.4. Night lighting of the construction sites should be minimised within requirements of safety and efficiency. A lighting plan should be developed and implemented to minimize light pollution, light trespass and glare during construction	▪ Complaints about night lights should be investigated and documented in a register.	▪ Weekly or bi-weekly	▪ Contractor and ECO
	Reduce the visual impact of construction activities project wide	12.17.5. Maintain good housekeeping on site to avoid litter and minimize waste. 12.17.6. Monitor construction sites for strict adherence to demarcated boundaries. 12.17.7. Monitor adherence to lighting plan. 12.17.8. Monitor adherence to rehabilitation plan. 12.17.9. Monitor adherence to erosion control plan. 12.17.10. Monitor adherence to dust and fire control plans. 12.17.11. Rehabilitation of temporary cleared areas should commence as soon as possible.	▪ Carry out site visits and inspections of the construction sites and ensure good housekeeping is maintained. Record and report any non-compliance. ▪ Carry out site visits and record and report any non-compliance. ▪ Complaints about night lights should be investigated and documented in a register. Investigate any complaints about night lights and document it in a register. ▪ Visit sites requiring rehabilitation. ▪ Carry out site visits and record and report any non-compliance.	▪ Daily ▪ Daily ▪ Daily and as complaints arise. ▪ Daily ▪ Daily ▪ Daily ▪ Daily	▪ Construction Manager, ECO and EO.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
			▪ Carry out site visits and record and report any non-compliance. ▪ The rehabilitation process should be regularly monitored by the Environmental Officer.		
B.3. HERITAGE IMPACTS (ARCHAEOLOGY AND CULTURAL LANDSCAPE)					
12.18. Construction vehicles and activities could result in damage to or destruction of archaeological sites and/or graves.	Minimise the chances of significant archaeological sites and/or graves being disturbed.	12.18.1. Ensure that all heritage resources requiring mitigation are mitigated prior to the start of construction. 12.18.2. Ensure that no activity takes place outside of the authorized construction footprint.	▪ Carry out visual inspections to ensure strict control over the behaviour of construction staff in order to restrict activities to within demarcated areas.	▪ Weekly	▪ ECO
		12.18.3. The Contractor and ECO must be informed of the possibility of archaeological resources and graves (i.e. ensure that all personnel are aware of the potential of encountering graves and what to do if this occurs (i.e. to report any suspicious stone features prior to disturbance)). 12.18.4. Alternatively commission an archaeologist to examine the final development footprint at least six months prior to the commencement of construction.	▪ Carry out Environmental Awareness Training to ensure that the Contractors are informed of the possible type of heritage features that may be encountered during the construction phase. ▪ Conduct audits of the signed attendance registers. ▪ Appoint a professional archaeologist to examine the construction footprint. ▪ Conduct an audit to verify that the necessary permits are obtained by the archaeologist, if required.	▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly ▪ Once-off six months prior to construction. ▪ As required/ necessary during the construction phase.	▪ Contractor/ ECO ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		12.18.5. If archaeological sites and potential graves cannot be avoided, the buffers as stipulated in the HIA should be implemented during the construction phase.	▪ Carry out visual inspections to ensure strict control over the behaviour of construction staff in order to restrict activities to within demarcated areas and outside of the buffer area.	▪ Weekly	▪ ECO
		12.18.6. If any of the graves or potential graves found on site cannot be avoided then an archaeologist should be contracted to conduct a test excavation to determine the status of the feature. If it is determined to be a grave, then exhumation would need to occur (if necessary) with the permission of SAHRA (and in accordance with any requirements that SAHRA might impose at the time).	▪ Appoint a professional archaeologist to conduct a test excavation to determine if the sites are graves. ▪ Conduct an audit to verify that the necessary permits are obtained by the archaeologist for the test excavation, if required.	▪ As potential graves are encountered	▪ Project Developer
		12.18.7. If any concentrations of archaeological material, graves or stone features are uncovered during the proposed construction, work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution. Sufficient time should be allowed to remove/collect such material.	▪ Monitor excavations and construction activities for archaeological materials via visual inspections and report the finds accordingly. ▪ Contact the heritage authorities and the identified archaeologist if any heritage features are uncovered.	▪ Daily or during excavations. ▪ As required/ necessary during the construction phase.	▪ Contractor and ECO ▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
12.19. Alteration of the landscape from rural to industrial in nature.	Reduce visual contrast of the development in the landscape.	12.19.1. Use earthy-coloured paint on built elements where technically feasible.	▪ Monitor the paint colour via visual inspections and report non-compliance where relevant.	▪ Once-off, at an appropriate time during construction period.	▪ ECO
B.4. PALAEONTOLOGICAL HERITAGE IMPACTS					
12.20. Loss of legally-protected palaeontological heritage resources at or beneath ground surface within development footprint (fossils, fossil sites and contextual geological data).	Reporting, conservation, recording and judicious sampling of scientifically important fossil material exposed during the construction phase of development.	12.20.1. Reporting chance fossil finds to SAHRA for possible professional mitigation.	▪ Monitoring of all substantial excavations into sedimentary bedrocks for fossil material (e.g. vertebrate bones & teeth, fossilized wood, shells) ▪ Safeguarding of chance fossil finds, preferably *in situ*.	▪ Throughout the construction phase ▪ Throughout the construction phase	▪ ECO ▪ ECO
		12.20.2. Recording and sampling of fossil material and associated geological data (only necessary for chance fossil finds made during the proposed development).	▪ Application by a qualified palaeontologist for fossil collection permit from SAHRA. ▪ Palaeontologist to undertake field study of fossil finds in situ on site. Photography and sampling of important finds. ▪ Curation of fossils collected in an approved repository (museum/ university collection).	▪ Following alert of chance fossil finds on site (It is important to note that there is no need for on-site palaeontological monitoring unless new fossil finds are made during development).	▪ Qualified palaeontologist appointed and commissioned by the Project Developer. ▪ Qualified palaeontologist appointed and commissioned by the Project Developer ▪ Qualified

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
					palaeontologist appointed and commissioned by the Project Developer
B.5. SOILS AND AGRICULTURAL POTENTIAL IMPACTS					
12.21. Degradation of veld vegetation beyond the direct footprint of the proposed PV facility due to constructional disturbance and potential trampling by vehicles	To conserve the surrounding natural veld vegetation.	12.21.1. Minimize footprint of disturbance during the construction phase and ensure that construction work is undertaken within the demarcated area only. 12.21.2. Confine vehicle access on roads only. 12.21.3. Control dust generation during construction activities by implementing standard construction site dust control measures (dampening with water) where required. Because of water scarcity, this should only be done where and when dust generation is a significant problem.	▪ Monitor the construction activities via site audits to ensure that they are undertaken within the demarcated construction area, and record non-compliance and incidents. ▪ Include periodic site inspection in environmental performance reporting that specifically records occurrence or not of off-road vehicle tracks surrounding the site. Monitor via site audits and record non-compliance and incidents. ▪ Monitor dust suppression mechanisms via visual inspections and record non-compliances. Maintain an incidents/ complaints register. The date, time, nature of complaint, name of	▪ Daily ▪ Monthly during the construction phase ▪ Monthly and during complaints/incidents	▪ Contractor and ECO ▪ ECO ▪ Contractor and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
			complainant and corrective actions must be logged for all complaints. Complaints must be investigated and, if appropriate, acted upon.		
12.22. Loss of topsoil due to poor topsoil management	Ensure effective topsoil covering to conserve soil fertility on all disturbed areas, after they have been rehabilitated.	12.22.1. Strip and stockpile topsoil from all areas where soil (below surface) will be disturbed. It should be remembered that you can only stockpile topsoil for a limited time i.e. for use at the end of construction. 12.22.2. After cessation of disturbance, re-spread topsoil over the surface. 12.22.3. Dispose of any sub-surface spoils from excavations where they will not impact on land that supports vegetation, or where they can be effectively covered with topsoil.	▪ Establish an effective record keeping system for each area where soil is disturbed for construction purposes. These records should be included in environmental performance reports, and should include all the records below: ○ Record the GPS coordinates of each area. ○ Record the date of topsoil stripping. ○ Record the GPS coordinates of where the topsoil is stockpiled. ○ Record the date of cessation of construction activities at the particular site. ○ Photograph the area on cessation of construction activities. ○ Record date and depth of re-spreading of topsoil. ○ Photograph the area on	▪ As needed, dependent on the specifics of construction activities.	▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
			completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.		
12.23. Soil erosion due to alteration of the land surface characteristics	To reduce erosion on site and downstream of the site as a result of run-off from the site, or due to wind erosion.	12.23.1. 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 inspection in environmental performance reporting that inspects the effectiveness and integrity of the run-off control system and specifically records the 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 during the construction phase.	▪ ECO
B.6. SOCIAL IMPACTS					
12.24. Influx of job seekers into the Kenhardt area.	Control influx of job seekers into the Kenhardt area with the aim of protecting local social structures.	12.24.1. Implement the Workforce Recruitment Plan. 12.24.2. Ensure employment is reserved, where practical, for local residents. 12.24.3. Actively use the database of PAP and their relevant skills and experience to guide local employment. 12.24.4. Implement the Stakeholder Engagement Plan.	▪ Verify that local labour is, as far as practically possible, being used, by cross-referencing the Workforce Recruitment Plan with current recruitment practices, as well as cross-referencing employed personnel with PAP database; ▪ Verify that Stakeholder Engagement Plan is being implemented with written proof	▪ Three times during the estimated 14 month construction period (i.e. at 3 months, 6 months, and 9 months).	▪ Construction Manager and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			of such engagement with the PAP.		
12.25. Social impacts of outsiders moving into the Kenhardt area	Social deviance in the Kenhardt area is limited, managed or controlled by engaging with the municipality or police to see where they can assist to achieve this goal.	12.25.1. Implement the Workforce Recruitment Plan 12.25.2. Ensure employment is reserved, where practical, for local residents 12.25.3. Actively use the database of PAP and their relevant skills and experience to guide local employment 12.25.4. Implement the Stakeholder Engagement Plan 12.25.5. Project Applicant to engage with the municipality and the police to see where they can assist in limiting social deviance.	▪ Verify that local labour is, as far as practically possible, being used, by cross-referencing the Workforce Recruitment Plan with current recruitment practices, as well as cross-referencing employed personnel with PAP database; ▪ Verify that Stakeholder Engagement Plan is being implemented with written proof of such engagement with the PAP.	▪ Three times during the estimated 14 month construction period (i.e. at 3 months, 6 months, and 9 months).	▪ Construction Manager and ECO
12.26. Expectations created regarding possible employment	Prevent frustration resulting from miscommunication of employment opportunities and project-related benefits in the local community.	12.26.1. Implement the Stakeholder Engagement Plan	▪ Verify that Stakeholder Engagement Plan is being implemented with written proof of such engagement with the PAP.	▪ Three times during the estimated 14 month construction period (i.e. at 3 months, 6 months, and 9 months).	▪ Construction Manager and ECO
12.27. Local spending	Ensure the generation of socio-economic benefits as a result of the multiplier effect.	12.27.1. Procure goods and services, where practical, within the study area 12.27.2. Obtain regularly required goods and services from as large a selection of local service providers as possible	▪ Verify purchase of local goods and services through proof of purchase.	▪ Three times during the estimated 14 month construction period (i.e. at 3 months, 6 months,	▪ Construction Manager and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
				and 9 months).	
12.28. Local employment	Ensure optimum employment creation while taking cognizance of the local levels of experience and education.	12.28.1. Implement the Workforce Recruitment Plan	▪ Verify that local labour is, as far as practically possible, being used, by cross-referencing the Workforce Recruitment Plan with current recruitment practices, as well as cross-referencing employed personnel with PAP database.	▪ Three times during the estimated 14 month construction period (i.e. at 3 months, 6 months, and 9 months).	▪ Construction Manager and ECO
12.29. Economic Development Plan	Ensure contribution to local employment, local spending and human capacity development is being made.	12.29.1. Implement the Economic Development Plan	▪ Verify that the Economic development Plan is being implemented.	▪ Three times during the estimated 14 month construction period (i.e. at 3 months, 6 months, and 9 months).	▪ Construction Manager and ECO
B.7. GEOHYDROLOGY IMPACTS					
12.30. Potential impact on groundwater as a result of the construction of storage yards and labour accommodation (a few security and management staff) (i.e.	To prevent unnecessary infiltration of polluted surface water	12.30.1. Waste water from labour accommodation and storage yards must be collected in a designated container and disposed of at a suitable disposal point off site (i.e. a licenced waste disposal facility). A suitable waste contractor must be appointed to collect waste from site on a regular basis for correct disposal. Proof of disposal (waybills or waste disposal slips) must be retained and kept on file for auditing purposes. 12.30.2. Other non-hazardous solid waste (e.g.	▪ Monitor the placement of structures, e.g. storage yards and infrastructure during the construction phase to ensure existing wind pumps / boreholes are not damaged. ▪ Waste removal and disposal to be monitored. Monitor via site audits and record non-compliance and incidents. Monitor waste disposal slips	▪ Once off prior to the commencement of construction. ▪ Weekly ▪ Four times per annum for the construction period, i.e. at 3 months, 6 months, 9 months and 12	▪ Project Developer ▪ Project Developer and ECO ▪ Project Developer and ECO ▪ Project Developer and

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
wastewater from construction activities disposed of on the site leading to environmental impacts (e.g. groundwater pollution))		refuse) to be disposed of at a licensed landfill. A suitable waste contractor must be appointed to collect waste from site on a regular basis for correct disposal. Proof of disposal (waybills or waste disposal slips) must be retained and kept on file for auditing purposes. 12.30.3. Avoid using old or damaged construction equipment and vehicles and ensure that they are well maintained and regularly serviced in order to ensure no leakages. 12.30.4. Any engines that stand in one place must have drip trays, fuel storage tanks should be above ground on an impermeable surface (within a bunded area) and construction vehicles and equipment should also be refuelled on an impermeable surface. A designated area should be established at the construction site camp for refuelling activities and drip trays or similar impervious materials must be used during these procedures. Absorbent material to mop up oil spills must be kept on site. Vehicle and washing areas must also be on paved surfaces and the by-products correctly managed.	and waybills via site audits and record non-compliance and incidents. ▪ Construction vehicles need to be monitored throughout the construction phase. Monitor via site audits and record non-compliance and incidents. ▪ Monitor the placement and designation of the area for refuelling at the site camp via visual inspections. Monitor the usage of spill containment measures and record and report non-compliance.	months. ▪ Weekly	ECO
12.31. Potential impact on groundwater as a result of	To prevent unnecessary infiltration of polluted storm water	12.31.1. Ensure the storm water runoff is not contaminated. All reasonable measures must be taken to prevent the contamination of storm water outflows.	▪ Monitor the quality of the storm water ▪ ECO to verify that measures are in place to reduce the	▪ If possible do this during or shortly after a storm event, at the start	▪ Project Developer and ECO.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
stormwater outflows			contamination of storm water and to monitor the quality of storm water by undertaking site visits and visual inspections.	of the rainy season. ▪ Weekly	▪ ECO
12.32. Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages.	To reduce the potential of groundwater pollution.	12.32.1. Avoid using old or damaged construction equipment and vehicles and ensure that they are well maintained and regularly serviced in order to ensure no leakages. 12.32.2. Any engines that stand in one place for an extended length of time, must have drip trays, fuel storage tanks should be above ground on an impermeable surface (within a bunded area) and construction vehicles and equipment should also be refuelled on an impermeable surface. A designated area should be established at the construction site camp for refuelling activities and drip trays or similar impervious materials must be used during these procedures. If liquid product is being transported it must be ensured this does not spill during transit. 12.32.3. If spillages occur during refuelling, they should be contained and removed as rapidly as possible, with correct disposal of the spilled material. Absorbent material to mop up oil spills must be kept on site. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes. During the operational phase, the same principles should be	▪ Construction vehicles need to be monitored throughout the construction phase. Monitor via site audits and record non-compliance and incidents. ▪ Monitor the placement and designation of the area for refuelling at the site camp via visual inspections. Monitor the usage of spill containment measures and record and report non-compliance. ▪ Monitor the refuelling/ servicing process and record the occurrence of any spillages.	▪ Four times per annum for the construction period, i.e. at 3 months, 6 months, 9 months and 12 months. ▪ Weekly ▪ Weekly	▪ Project Developer and ECO ▪ Project Developer and ECO ▪ Project Developer and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		adhered to. Emergency measures and plans must be put in place and rehearsed in order to prepare for accidental spillage.			
B.8. WASTE MANAGEMENT					
12.33. Pollution of the surrounding environment (including drainage lines) as a result of the handling, temporary stockpiling and disposal of general waste.	Reduce environmental impacts such as soil, surface water and groundwater contamination as a result of incorrect storage, handling and disposal of general waste. Minimise the production of waste. Prevent environmental problems (e.g. pollution / change in soil pH) due to solid and liquid wastes disposed of on the site. Ensure compliance with waste management legislation.	12.33.1. General waste (i.e. construction waste, building rubble, discarded concrete, bricks, tiles, wood, glass, window panes, air conditioners, plastic, metal, excavated material, packaging material, paper and domestic waste (kitchen waste, banana peels) etc.) generated during the construction phase should be stockpiled temporarily (i.e. once-off) on site in a designated area within suitable waste collection bins and skips (or similar). Waste collection bins and skips should be covered with suitable material, where appropriate. The bins should not be accessible by rats and other animals.	▪ Monitor the strategic placement of the temporary, designated waste stockpiling area at the site camp via visual inspections, and record and report any non-compliance. ▪ Monitor the temporary storage and handling of general waste on site via site audits and record non-compliance and incidents (i.e. conduct visual inspections of the temporary waste storage area).	▪ Once-off prior to the commencement of the construction phase and as required as the construction phase process evolves. ▪ Daily	▪ ECO and Contractor ▪ ECO
		12.33.2. Should the on-site stockpiling of general waste exceed 100 m^3 and a period of 90 days, then the National Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) must be adhered to.	▪ Record the amount of general waste that is temporarily stockpiled at the designated area on site, as well as the duration and record non-compliance and incidents. ▪ Monitor the duration and amounts of general waste that is temporarily stockpiled at the designated area on site via site	▪ Daily ▪ Weekly ▪ Monthly	▪ Contractor ▪ ECO ▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
			audits and record non-compliance and incidents (i.e. conduct visual inspections of the temporary waste storage area). ▪ Audit compliance with the Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) if the storage amounts are exceeded (i.e. only if required).		
		12.33.3. Ensure that the designated stockpiling area for general waste (i.e. skips and waste collection bins) is inspected on a daily basis to verify its condition and integrity, particularly after rainfall events.	▪ Monitor the temporary, designated waste stockpiling area at the site camp, as well as the handling of general waste on site via site audits and record non-compliance and incidents.	▪ Daily	▪ ECO
		12.33.4. Ensure that general waste generated during the construction phase is removed from the site on a regular basis, and safely disposed of at an appropriate, licenced waste disposal facility by an approved waste management Contractor. Waste disposal slips or waybills should be kept on file as proof of disposal. As a general principle, waste manifests must be obtained to prove legal disposal of waste.	▪ Ensure that a suitable Waste Management Contractor is appointed to remove and dispose the general waste at an appropriate, licenced waste disposal facility. ▪ Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents. ▪ Audit the chosen waste disposal site to ensure that it is	▪ Once-off prior to the construction phase. ▪ Weekly ▪ Bi-annually	▪ Project Developer Contractor ▪ ECO ▪ Project Developer/ Contractor

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			functioning correctly.		
		12.33.5. Ensure that the construction site is kept clean at all times and that construction personnel are made aware of correct waste disposal methods. Littering must be prevented through effective site camp management.	▪ Monitor the condition of the site camp throughout the construction phase via visual site inspections. Record non-compliance and incidents. ▪ 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 ▪ ECO and Contractor ▪ ECO
		12.33.6. Sufficient general waste disposal bins must also be provided for use by construction personnel throughout the site. These bins must be emptied on a regular basis.	▪ Monitor general waste generation by construction staff and collection via audits throughout the construction phase.	▪ Daily or Weekly	▪ ECO and Contractor.
		12.33.7. Ensure that all general waste emanating from the construction phase is removed from site prior to the commencement of the rehabilitation and operational phases.	▪ Undertake a final inspection at the end of the construction phase in order to verify and ensure that all general waste is removed from site and correctly disposed, prior to the commencement of the rehabilitation and operational phases.	▪ At the end of the construction phase.	▪ ECO and Contractor.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		12.33.8. Promote waste reduction, re-use, and recycling opportunities on site during the construction phase.	▪ Monitor waste generation and collection throughout construction. ▪ Investigate if any complaints have been expressed by the surrounding community regarding waste handling.	▪ Weekly or bi-weekly	▪ ECO and Contractor
		12.33.9. Ensure an adequate and sustainable use of resources.	▪ Monitor waste generation and collection throughout construction.	▪ Weekly or bi-weekly	▪ ECO and Contractor
		12.33.10. Control and implement waste management plans provided by contractors. Ensure that relevant legislative requirements are respected.	▪ Control of waste management practices throughout construction phase	▪ Weekly or bi-weekly	▪ ECO and Contractor
12.34. Pollution of the surrounding environment as a result of the handling, temporary stockpiling and disposal of hazardous waste.	Reduce environmental impacts such as soil, surface water and groundwater contamination as a result of incorrect storage, handling and disposal of hazardous waste.	12.34.1. Hazardous waste (i.e. empty tins, oils, fuel spillages, spilled materials and chemicals etc.) generated during the construction phase should be stockpiled temporarily (i.e. once-off) on site in a designated area in suitable waste collection bins and leak-proof storage skips (or similar). Waste collection bins and skips should be covered with suitable material, where appropriate. Hazardous waste must be stored separately from all other general waste. The designated stockpiling area must be labelled correctly.	▪ Monitor the strategic placement of the temporary, designated waste stockpiling area at the site camp via visual inspections, and record and report any non-compliance. ▪ Monitor the temporary storage and handling of hazardous waste on site via site audits and record non-compliance and incidents (i.e. conduct visual inspections of the temporary waste storage area).	▪ Once-off prior to the commencement of the construction phase and as required as the construction process evolves. ▪ Daily	▪ ECO and Contractor ▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		12.34.2. Should the on-site stockpiling of hazardous waste exceed 80 m^3, then the National Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) must be adhered to.	▪ Record the amount of hazardous waste that is temporarily stockpiled at the designated area on site, as well as the duration and record non-compliance and incidents. ▪ Monitor the duration and amounts of hazardous waste that is temporarily stockpiled at the designated area on site via site audits and record non-compliance and incidents (i.e. conduct visual inspections of the temporary waste storage area). ▪ Audit compliance with the Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) if the storage amounts are exceeded (i.e. only if required).	▪ Daily ▪ Weekly ▪ Monthly	▪ Contractor ▪ ECO ▪ Project Developer
		12.34.3. Ensure that the designated stockpiling area for hazardous waste (i.e. leak proof skips and waste collection bins) is inspected on a daily basis to verify its condition and integrity, particularly after rainfall events.	▪ Monitor the temporary, designated waste stockpiling area at the site camp, as well as the handling of hazardous waste on site via site audits and record non-compliance and incidents.	▪ Daily	▪ ECO
		12.34.4. Ensure that all hazardous waste is removed	▪ Ensure that a suitable Waste	▪ Once-off prior to	▪ Project

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		from the site on a regular basis, and safely disposed at an appropriate, licenced hazardous waste disposal facility by an approved waste management Contractor.	Management Contractor is appointed to remove and dispose the hazardous waste at an appropriate, licenced hazardous waste disposal facility. ▪ Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.	the construction phase. ▪ Weekly	Developer Contractor ▪ ECO
		12.34.5. Ensure that the construction site is kept clean at all times and that construction personnel are made aware of correct waste disposal methods. Littering must be prevented through effective site camp management.	▪ Monitor the condition of the site camp throughout the construction phase via visual site inspections. Record non-compliance and incidents. ▪ 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 ▪ ECO and Contractor ▪ ECO
		12.34.6. Ensure that all hazardous waste emanating from the construction phase is removed from site prior to the commencement of the rehabilitation and operational phases.	▪ Undertake a final inspection at the end of the construction phase in order to verify and ensure that all general waste is removed from site and correctly disposed, prior to the commencement of the rehabilitation and operational phases.	▪ At the end of the construction phase.	▪ ECO and Contractor.

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		12.34.7. All liquid waste (used oil, paints, lubricating compounds and grease) to be packaged and disposed of by appropriate means.	▪ Waste removal and disposal to be monitored throughout construction	▪ Weekly or bi-weekly	▪ ECO and Contractor
		12.34.8. Adequate containers for the cleaning of equipment and materials (paint, solvent) must be provided as to avoid spillages.	▪ Waste removal and disposal to be monitored throughout construction	▪ Weekly or bi-weekly	▪ ECO and Contractor
		12.34.9. Waste water from construction and painting activities must be collected in a designated container and disposed of at a suitable disposal point off site.	▪ Waste removal and disposal to be monitored throughout construction	▪ Weekly or bi-weekly	▪ ECO and Contractor
		12.34.10. Control and implement waste management plans provided by contractors. Ensure that relevant legislative requirements are respected.	▪ Control of waste management practices throughout construction phase	▪ Weekly or bi-weekly	▪ ECO and Contractor
C. OPERATIONAL PHASE					
C.1. ECOLOGICAL IMPACTS (TERRESTRIAL, AQUATIC AND AVIFAUNA)					
12.35. Loss of Species of Conservation Concern (vegetation, fauna and avifauna)	Avoid loss of Species of Special Concern	12.35.1. No movement of vehicles or people is allowed outside the fenced or demarcated area during operation, unless it is absolutely necessary, e.g. during routine maintenance of the powerlines. 12.35.2. The sensitive areas and the buffer zones should be avoided (buffer areas as indicated in 12.13). 12.35.3. Workers will not be allowed to wander	▪ Monitor during the operational period	▪ During the operational phase of the project	▪ Project Developer and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		across the undeveloped parts of the site. 12.35.4. Workers are not allowed to collect plants for firewood or veldkos or set snares or otherwise trap and kill animals (mammals/birds/reptiles). 12.35.5. No random movement of workers on site should be allowed-everything should done in organised (routine) way. Movement of staff should be along specific paths to reduce disturbance to birds. 12.35.6. The undeveloped areas need to be managed carefully to allow birds to move into these areas and disturbance of these areas should be avoided at all cost.			
12.36. Impact of lightning on fauna and avifauna		12.36.1. Minimize exterior lighting, use lights/globes of appropriate wavelength and make use of down-lighting.	▪ Monitor via site audits	▪ During the operational phase	▪ Project Developer and ECO
12.37. Erosion control measures. The impact of wind and water erosion results in loss of surface soils and degradation of land.	To mitigate and manage the site to prevent any soil loss arising from wind and water.	12.37.1. Where appropriate and within the general drainage of the site, attenuators (or similar) should serve to reduce flow energy, while the maintenance of general vegetation cover to avoid excessive aeolian impacts should be implemented.	▪ Monitor the erosion on site during operations, as well as the implementation and effectiveness of erosion control on site (such as the use of gabions and geofabric materials or similar) at appropriate points.	▪ Ongoing and as required	▪ Project Developer and Environmental Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
12.38. Alteration of the state of subsurface water resources due to excessive abstraction of groundwater for the cleaning of the PV panels, as well as for operational use.	To reduce excessive abstraction of sub surface waters and impacts on groundwater.	12.38.1. Identify alternative water sources (such as municipal supply) based on the recommendations made in the Geohydrology Assessment). 12.38.2. Preferential use of recycled water sources for operational phase requirements (instead of groundwater). 12.38.3. Ensure the prudent use of surface water resources. 12.38.4. Adopt "dry" cleaning methods, such as dusting and sweeping the site before washing down. 12.38.5. Increased monitoring of the impact of dust generation and implement a more judicious cleaning protocol. 12.38.6. Low level and ongoing cleaning of PV panels over time to reduce demand on aquifers.	▪ Ensure that Municipal Supply or alternate supply is arranged prior to the commencement of the operational phase. ▪ Monitor via site audits and record non-compliance and incidents.	▪ During the operational phase.	▪ Project Developer and ECO
C.2. VISUAL IMPACTS					
12.39. Potential visual intrusion of the proposed Solar Energy Facility on the views of sensitive visual receptors.	Reduce visual intrusion of the solar energy facility on the views of sensitive visual receptors as well as its impact on the surrounding landscape	12.39.1. Monitor effectiveness of the rehabilitation plan for temporarily cleared areas and erosion scarring. 12.39.2. Monitor building and façade maintenance. Painted features should be maintained and repainted when colour fades or paint flakes. 12.39.3. A maintenance plan for buildings and structures should be followed to ensure that structures remain as non-reflective as	▪ Carry out visual inspections during site audits to verify the effectiveness of the rehabilitation, and record and report any non-compliance. ▪ Carry out an inspection of solar energy facility to ensure that it is being maintained in a good condition.	▪ Monthly ▪ Bi-Annually ▪ Bi-Annually	▪ Project Developer and Environmental Manager ▪ Project Developer and Environmental Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		possible, and buildings remain as unobtrusive as possible.	▪ Carry out an inspection of solar energy facility to ensure that it is being maintained in a good condition.		
		12.39.4. Maintain re-vegetated surfaces until a self-sustaining stand of vegetation is established and visually adapted to the undisturbed surrounding vegetation. No new disturbance should be created during operations without approval from the Environmental Manager. 12.39.5. Restoration of disturbed land should commence as soon after disturbance as possible. 12.39.6. Road maintenance activities should avoid damaging or disturbing vegetation. 12.39.7. Dust and noxious weed control should be part of maintenance activities.	▪ Carry out visual inspections during site audits to verify the effectiveness of the rehabilitation and the progress of rehabilitation, and record and report any non-compliance. ▪ Ensure that all vegetation removal outside of the project footprint is approved by the Environmental Manager. ▪ Monitor the road maintenance process to ensure limited damage to vegetation. Record and report any non-compliance. ▪ Monitor the presence of alien vegetation on site. ▪ Monitor dust suppression mechanisms and record non-compliances. Maintain an incidents/ complaints register, in which any complaints from the public must be logged. The date, time, nature of complaint, name of complainant and corrective actions must be	▪ Weekly during the rehabilitation phase ▪ Throughout the operational phase ▪ During road maintenance activities. ▪ Throughout the operational phase ▪ During complaints/ incidents	▪ Environmental Manager ▪ Project Developer and Environmental Manager ▪ Project Developer and Environmental Manager ▪ Project Developer and Environmental Manager ▪ Project Developer and Environmental Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
			logged for all complaints. Complaints must be investigated and, if appropriate, acted upon.		
12.40. Potential impact of night lighting of the proposed Solar Energy Facility on the nightscape of the region.	Reduce the impact of night lighting of the proposed PV facility on the surrounding nightscape and sensitive visual receptors.	12.40.1. Monitor the effectiveness of the lighting plan to minimize light spill and glare.	▪ Visit surrounding neighbouring farmsteads and ensure that residents in the surrounding landscape are not affected by glaring lights from the plant. ▪ Complaints about night lights should be investigated and documented in a register. Investigate any complaints about night lights and document it in a register.	▪ Once off at the end of the construction phase or the start of the operational Phase. ▪ As complaints arise.	▪ Project Developer and Environmental Manager ▪ Project Developer and Environmental Manager
		12.40.2. Lights should be switched off when not in use whenever it is in line with safety and security.	▪ Carry out visual inspections during site audits to monitor lighting, and record and report any non-compliance.	▪ Weekly	▪ Project Developer and Environmental Manager
C.3. HERITAGE IMPACTS (ARCHAEOLOGY AND CULTURAL LANDSCAPE)					
12.41. Maintenance vehicles and activities could result in damage to or destruction of archaeological sites and/or	Minimise the chances of significant archaeological sites and/or graves being disturbed.	12.41.1. Ensure that no activity takes place outside of the authorized operational footprint.	▪ Carry out visual inspections to ensure strict control over the behaviour of operational staff in order to restrict activities to within demarcated areas.	▪ Weekly	▪ Environmental Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
graves.					
C.4. SOILS AND AGRICULTURAL POTENTIAL IMPACTS					
12.42. Soil erosion due to alteration of the land surface characteristics	To reduce erosion on site and downstream of the site as a result of run-off from the site, or due to wind erosion.	12.42.1. 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 inspection in environmental performance reporting that inspects the effectiveness and integrity of the run-off control system and specifically records the 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.	▪ Quarterly during the Operational Phase.	▪ Environmental Manager
C.5. SOCIAL IMPACTS					
12.43. Influx of job seekers into the Kenhardt area.	Control influx of job seekers into the Kenhardt area with the aim of protecting local social structures.	12.43.1. Implement the Workforce Recruitment Plan. 12.43.2. Ensure employment is reserved, where practical, for local residents. 12.43.3. Actively use the database of PAP and their relevant skills and experience to guide local employment 12.43.4. Implement the Stakeholder Engagement Plan	▪ Verify that local labour is, as far as practically possible, being used, by cross-referencing the Workforce Recruitment Plan with current recruitment practices, as well as cross-referencing employed personnel with PAP database; ▪ Verify that Stakeholder Engagement Plan is being implemented with written proof of such engagement with the PAP.	▪ Once a year during the operational phase.	▪ Environmental Manager/ Officer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
12.44. Outsiders moves into the Kenhardt area	Limit incidences of in social deviance in the Kenhardt area.	12.44.1. Implement the Workforce Recruitment Plan 12.44.2. Ensure employment is reserved, where practical, for local residents 12.44.3. Actively use the database of PAP and their relevant skills and experience to guide local employment 12.44.4. Implement the Stakeholder Engagement Plan	▪ Verify that local labour is, as far as practically possible, being used, by cross-referencing the Workforce Recruitment Plan with current recruitment practices, as well as cross-referencing employed personnel with PAP database; ▪ Verify that Stakeholder Engagement Plan is being implemented with written proof of such engagement with the PAP.	▪ Once a year during the operational phase.	▪ Environmental Manager/ Officer
12.45. Expectations created regarding possible employment	Prevent frustration resulting from miscommunication of employment opportunities and project-related benefits in the local community.	12.45.1. Implement the Stakeholder Engagement Plan	▪ Verify that Stakeholder Engagement Plan is being implemented with written proof of such engagement with the PAP.	▪ Once a year during the operational phase.	▪ Environmental Manager/ Officer
12.46. Local spending	Ensure the generation of socio-economic benefits as a result of the multiplier effect.	12.46.1. Procure goods and services, where practical, within the study area 12.46.2. Obtain regularly required goods and services from as large a selection of local service providers as possible	▪ Verify purchase of local goods and services through proof of purchase.	▪ Once a year during the operational phase.	▪ Environmental Manager/ Officer
12.47. Local employment	Ensure optimum employment creation while taking cognizance of	12.47.1. Implement the Workforce Recruitment Plan	▪ Verify that local labour is, as far as practically possible, being used, by cross-referencing the	▪ Once a year during the operational phase.	▪ Environmental Manager/ Officer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	the local levels of experience and education.		Workforce Recruitment Plan with current recruitment practices, as well as cross-referencing employed personnel with PAP database.		
12.48. Economic Development	Ensure contribution to local employment, local spending and human capacity development is being made.	12.48.1. Implement the Economic Development Plan	▪ Verify that the Economic development Plan is being implemented.	▪ Once a year during the operational phase.	▪ Environmental Manager/ Officer
C.6. GEOHYDROLOGY IMPACTS					
12.49. Potential impact on groundwater as a result of stormwater outflows	To prevent unnecessary infiltration of polluted storm water	12.49.1. Ensure the storm water runoff is not contaminated. All reasonable measures must be taken to prevent the contamination of storm water outflows.	▪ Monitor the quality of the storm water. Facility Manager to verify that measures are in place to reduce the contamination of storm water and to monitor the quality of storm water by undertaking site visits and visual inspections.	▪ If possible do this during or shortly after a storm event, at the start of the rain season.	▪ Project Developer
12.50. Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages.	To reduce the potential of groundwater pollution.	12.50.1. Avoid using old or damaged equipment and vehicles and ensure that they are well maintained and regularly serviced in order to ensure no leakages. 12.50.2. Any engines that stand in one place for an extended length of time, must have drip trays, fuel storage tanks should be above ground on an impermeable surface (within a bunded area) and vehicles and equipment	▪ Vehicles need to be monitored throughout the operational phase. Monitor via site audits and record non-compliance and incidents. ▪ Monitor the placement and designation of the area for refuelling at the site camp via visual inspections. Monitor the	▪ Monthly during operations. ▪ Weekly ▪ Weekly	▪ Project Developer ▪ Project Developer ▪ Project Developer

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		should also be refuelled on an impermeable surface. Absorbent material to mop up oil spills must be kept on site. A designated area should be established at the PV facility for refuelling activities and drip trays or similar impervious materials must be used during these procedures. If liquid product is being transported it must be ensured this does not spill during transit. 12.50.3. If spillages occur during refuelling, they should be contained and removed as rapidly as possible, with correct disposal of the spilled material. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes. During the operational phase, the same principles should be adhered to. Emergency measures and plans must be put in place and rehearsed in order to prepare for accidental spillage.	usage of spill containment measures and record and report non-compliance. ▪ Monitor the refuelling/ servicing process and record the occurrence of any spillages.		
12.51. Potential impact on groundwater as a result of contaminated run-off from the solar panels	To prevent groundwater pollution	12.51.1. Ensure the water run-off is not contaminated. Chemicals that are used to treat the water before washing the panels, shouldn't contain hazardous substances that can impact negatively on groundwater.	▪ Monitor the quality of the run-off ▪ ECO to verify that measures are in place to prevent the contamination of run-off	▪ Bi-annually when solar panels are washed	▪ Project Developer and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
C.7. WASTE MANAGEMENT					
12.52. Pollution of the surrounding environment as a result of the handling, temporary storage and disposal of solid waste (general and hazardous).	Reduce soil and groundwater contamination as a result of incorrect storage, handling and disposal of general and hazardous waste.	12.52.1. Sufficient waste collection bins and skips (or similar) should be provided at the PV facility. Waste collection bins and skips should be covered with suitable material and correctly labelled, and should be kept in a designated, demarcated area, where access control is monitored and managed.	▪ Monitor waste generation and collection throughout the operational phase.	▪ Weekly	▪ Facility Manager
		12.52.2. Segregation of hazardous waste from general waste to be in place. Waste separation is encouraged and therefore receptacles should be labelled to reflect the different waste types.	▪ On-site inspection of waste segregation. ▪ Control of waste management practices throughout operational phase.	▪ Weekly ▪ Weekly	▪ Facility Manager ▪ Facility Manager
		12.52.3. General waste and hazardous waste should be removed from the site on a regular basis and disposed of at an appropriate, licenced waste disposal facility. Hazardous waste should be removed by an approved waste management Contractor. General solid waste could be removed from the site by municipal services. Waste disposal slips or waybills should be kept on file for auditing purposes as proof of disposal, as applicable	▪ Inspection of the waste storage area. ▪ Monitor via site audits and record non-compliance and incidents. Facility Manager to monitor and audit disposal slips.	▪ Daily ▪ Monthly	▪ Facility Manager
		12.52.4. Ensure that the PV facility is kept clean at all times and that operational personnel are made aware of correct waste disposal methods.	▪ Conduct training for all operational personnel. ▪ Monitor the state of PV facility via site audits and record non-	▪ Once-off during operations and ensure that all new staff are inducted.	▪ Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			compliance and incidents.	▪ Daily	
		12.52.5. No solid waste may be burned or buried on site.	▪ Monitor via site audits and record non-compliance and incidents.	▪ Daily	▪ Facility Manager
		12.52.6. Waste amounts shall be recorded on a monthly basis.	▪ Waste amounts to be documented.	▪ Monthly	▪ Facility Manager
		12.52.7. All operational waste (concrete, steel, rubble etc.) to be removed from the site and waste hierarchy of prevention, as the preferred option, followed by reuse, recycling, recovery must be implemented, where possible.	▪ Waste removal and disposal to be monitored	▪ Monthly	▪ Facility Manager
		12.52.8. Other non-hazardous solid waste (e.g. packaging material) to be disposed of at a licensed landfill.	▪ Waste removal and disposal to be monitored	▪ Monthly	▪ Facility Manager
		12.52.9. All liquid waste (used oil, paints, lubricating compounds and grease) to be packaged and disposed of by appropriate means.	▪ Waste removal and disposal to be monitored	▪ Monthly	▪ Facility Manager
		12.52.10. Adequate containers for the cleaning of equipment and materials (paint, solvent) must be provided as to avoid spillages.	▪ Waste removal and disposal to be monitored	▪ Monthly	▪ Facility Manager
		12.52.11. Waste water from operations and painting activities must be collected in a designated container and disposed of at a suitable disposal point off site.	▪ Waste removal and disposal to be monitored	▪ Monthly	▪ Facility Manager

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
D. DECOMMISSIONING PHASE					
D.1. ECOLOGICAL IMPACTS (TERRESTRIAL, AQUATIC AND AVIFAUNA)					
12.53. Exotic weed invasion of abandoned site resulting in ecological change	To prevent the excessive growth and propagation of exotic weeds on disturbed lands that formed portion of the PV facility	12.53.1. Exotic weed control measures to be instituted through weed control programme. 12.53.2. Regular removal/eradication of exotic weed through use of herbicide and manual removal.	▪ Compile weed eradication programme for period of 12 months post the decommissioning exercise. ▪ Appoint contractor to undertake weed eradication programme.	▪ Weed eradication exercise to be undertaken every 6 months for a period of 12 months following decommissioning	▪ Project Developer
D.2. VISUAL IMPACTS					
12.54. Potential visual intrusion of decommissioning activities on existing views of sensitive visual receptors.	Prevent unnecessary visual clutter and focusing attention of surrounding visual receptors on the proposed development.	12.54.1. Disturbed and transformed areas should be contoured to approximate naturally occurring slopes to avoid lines and forms that will contrast with the existing landscapes. 12.54.2. Edges of re-vegetated areas should be feathered to reduce form and line contrasts with surrounding undisturbed landscape.	▪ Conduct visual inspections to ensure that landscaping is following the rehabilitation plan.	▪ Weekly	▪ ECO
		12.54.3. Night lighting of decommissioning sites should be minimised within requirements of safety and efficiency.	▪ Complaints about night lights should be investigated and documented in a register.	▪ Weekly or bi-weekly	▪ Contractor and ECO
		12.54.4. Working at night should be avoided where possible.	▪ Operation times for decommissioning activities to be monitored and managed (as well as included in the tender	▪ Weekly	▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
			contract).		
	Reduce the visual impact of decommissioning activities project wide.	12.54.5. Maintain good housekeeping on site to avoid litter and minimize waste. 12.54.6. Monitor sites for strict adherence to demarcated boundaries. 12.54.7. Monitor adherence to lighting plan. 12.54.8. Monitor adherence to rehabilitation plan. 12.54.9. Monitor adherence to erosion control plan. 12.54.10. Monitor adherence to dust and fire control plans.	▪ Carry out site visits and inspections of the sites and ensure good housekeeping is maintained. Record and report any non-compliance. ▪ Carry out site visits and record and report any non-compliance. ▪ Complaints about night lights should be investigated and documented in a register. Investigate any complaints about night lights and document it in a register. ▪ Visit sites requiring rehabilitation. ▪ Carry out site visits and record and report any non-compliance. ▪ Carry out site visits and record and report any non-compliance.	▪ Daily ▪ Daily ▪ Daily and as complaints arise. ▪ Daily ▪ Daily ▪ Daily	▪ Construction Manager and ECO
D.3. HERITAGE IMPACTS (ARCHAEOLOGY AND CULTURAL LANDSCAPE)					
12.55. Construction vehicles and activities could result in damage to or destruction of archaeological	Minimise the chances of significant archaeological sites and/or graves being disturbed.	12.55.1. Ensure that no activity takes place outside of the authorized construction footprint.	▪ Carry out visual inspections to ensure strict control over the behaviour of construction staff in order to restrict activities to within demarcated areas.	▪ Weekly	▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
sites and/or graves.					
12.56. Scarring of the landscape once infrastructure has been removed.	Ensure that the landscape within the development footprint has a similar appearance to that around it.	12.56.1. Ensure removal of all foundations, construction materials and foreign matter. 12.56.2. Ensure rehabilitation of the site in accordance with environmental guidelines.	▪ Follow the relevant environmental guidelines.	▪ Throughout the decommissioning phase.	▪ ECO
D.4. SOILS AND AGRICULTURAL POTENTIAL IMPACTS					
12.57. Degradation of veld vegetation beyond the direct footprint of the proposed PV facility due to decommissioning disturbance and potential trampling by vehicles	To conserve the surrounding natural veld vegetation.	12.57.1. Minimize footprint of disturbance during the decommissioning phase and ensure that work is undertaken within the demarcated area only. 12.57.2. Confine vehicle access to roads only 12.57.3. Control dust generation during decommissioning activities by implementing standard construction site dust control measures (dampening with water) where required. Because of water scarcity, this should only be done where and when dust generation is a significant problem.	▪ Monitor the decommissioning activities via site audits to ensure that they are undertaken within the demarcated decommissioning area, and record non-compliance and incidents. ▪ Include periodic site inspection in environmental performance reporting that specifically records occurrence or not of off-road vehicle tracks surrounding the site. Monitor via site audits and record non-compliance and incidents. ▪ Monitor dust suppression mechanisms via visual inspections and record non-compliances. Maintain an incidents/ complaints register.	▪ Daily ▪ Monthly during the decommissioning phase ▪ Monthly and during complaints/incidents	▪ Contractor and ECO ▪ ECO ▪ Contractor and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
			The date, time, nature of complaint, name of complainant and corrective actions must be logged for all complaints. Complaints must be investigated and, if appropriate, acted upon.		
12.58. Loss of topsoil due to poor topsoil management	Ensure effective topsoil covering to conserve soil fertility on all disturbed areas, after they have been rehabilitated.	12.58.1. Strip and stockpile topsoil from all areas where soil (below surface) will be disturbed. 12.58.2. After cessation of disturbance, re-spread topsoil over the surface. 12.58.3. Dispose of any sub-surface spoils from excavations where they will not impact on land that supports vegetation, or where they can be effectively covered with topsoil.	▪ Establish an effective record keeping system for each area where soil is disturbed for decommissioning purposes. These records should be included in environmental performance reports, and should include all the records below: ○ Record the GPS coordinates of each area. ○ Record the date of topsoil stripping. ○ Record the GPS coordinates of where the topsoil is stockpiled. ○ Record the date of cessation of decommissioning activities at the particular site. ○ Photograph the area on cessation of decommissioning activities. ○ Record date and depth of re-	▪ As needed, dependent on the specifics of decommissioning activities.	▪ ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
			spreading of topsoil. ○ Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.		
12.59. Soil erosion due to alteration of the land surface characteristics	To reduce erosion on site and downstream of the site as a result of run-off from the site, or due to wind erosion.	12.59.1. 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 inspection in environmental performance reporting that inspects the effectiveness and integrity of the run-off control system and specifically records the 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 during the decommissioning phase.	▪ ECO
D.5. SOCIAL IMPACTS					
12.60. Decommissioning of the proposed development	Minimize job losses	12.60.1. The proponent should comply with relevant South African labour legislation when retrenching employees. 12.60.2. Boven Solar PV4 must implement appropriate succession training of locally employed staff earmarked for retrenchment during decommissioning. 12.60.3. All project infrastructures should be	▪ Verify that retrenchment practices are compliant with south African labour legislation ▪ Verify that the project applicant implemented succession training of locally employed staff before the plant is decommissioned	▪ Once-off during the decommissioning phase (for mitigation measures (12.52.1) and (12.52.2) and once-off after decommissioning is	▪ Contractor and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
		decommissioned appropriately and thoroughly to avoid misuse.	▪ Verify that decommissioned infrastructure does not pose any significant risk to the environment or the people living in the environment.	completed (for mitigation measure (12.52.3)).	
D.6. GEOHYDROLOGY IMPACTS					
12.61. Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages.	To reduce the potential of groundwater pollution.	12.61.1. Avoid using old or damaged equipment and vehicles and ensure that they are well maintained and regularly serviced in order to ensure no leakages. 12.61.2. Any engines that stand in one place for an extended length of time, must have drip trays, fuel storage tanks should be above ground on an impermeable surface (within a bunded area) and vehicles and equipment should also be refuelled on an impermeable surface. Absorbent material to mop up oil spills must be kept on site. A designated area should be established at the site camp for refuelling activities and drip trays or similar impervious materials must be used during these procedures. If liquid product is being transported it must be ensured this does not spill during transit. 12.61.3. If spillages occur during refuelling, they should be contained and removed as rapidly as possible, with correct disposal of the spilled material. Proof of disposal (waste disposal slips or waybills) should be	▪ Vehicles need to be monitored throughout the decommissioning phase. Monitor via site audits and record non-compliance and incidents. ▪ Monitor the placement and designation of the area for refuelling at the site camp via visual inspections. Monitor the usage of spill containment measures and record and report non-compliance. ▪ Monitor the refuelling/ servicing process and record the occurrence of any spillages.	▪ Four times per annum for the decommissioning period, i.e. at 3 months, 6 months, 9 months and 12 months. ▪ Weekly ▪ Weekly	▪ Project Developer and ECO. ▪ Project Developer and ECO ▪ Project Developer and ECO

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		obtained and retained on file for auditing purposes. During the operational phase, the same principles should be adhered to. Emergency measures and plans must be put in place and rehearsed in order to prepare for accidental spillage.			
D.7. WASTE MANAGEMENT					
12.62. Generation of waste due to disassembly of the solar facility.	Avoid substantial negative impacts at the decommissioning phase due to insufficient planning.	12.62.1. Suitable receptacles must be provided for the temporary storage of various waste types such as scrap metal and concrete, until it is removed to the nearest licensed landfill.	▪ Audit the implementation of mitigation measures recommended for the decommissioning phase.	▪ During the decommissioning phase	▪ ECO
		12.62.2. Waste separation is encouraged and therefore receptacles should be labelled to reflect the different waste types.	▪ Audit the implementation of mitigation measures recommended for the decommissioning phase.	▪ During the decommissioning phase	▪ ECO
		12.62.3. Waste should be recycled or re-used where possible	▪ Audit the implementation of mitigation measures recommended for the decommissioning phase.	▪ During the decommissioning phase	▪ ECO

13 INDEPENDENT ENVIRONMENTAL MANAGEMENT PLAN FOR THE ASSOCIATED ELECTRICAL INFRASTRUCTURE

In the event that the ownership of the associated electrical infrastructure connecting the Boven Solar PV4 project to the Nieuwehoop Solar Substation is transferred to Eskom SOC Ltd following the construction phase, this section of the EMPr will be transferred to the responsibility of Eskom. Eskom will be responsible for ensuring that the goal and associated objectives, actions, responsibilities, monitoring requirements and targets of the section pertaining to the newly constructed associated electrical infrastructure are implemented. Since the associated electrical infrastructure will be constructed already, this section specifically addresses the operational and decommissioning impacts on the electrical infrastructure.

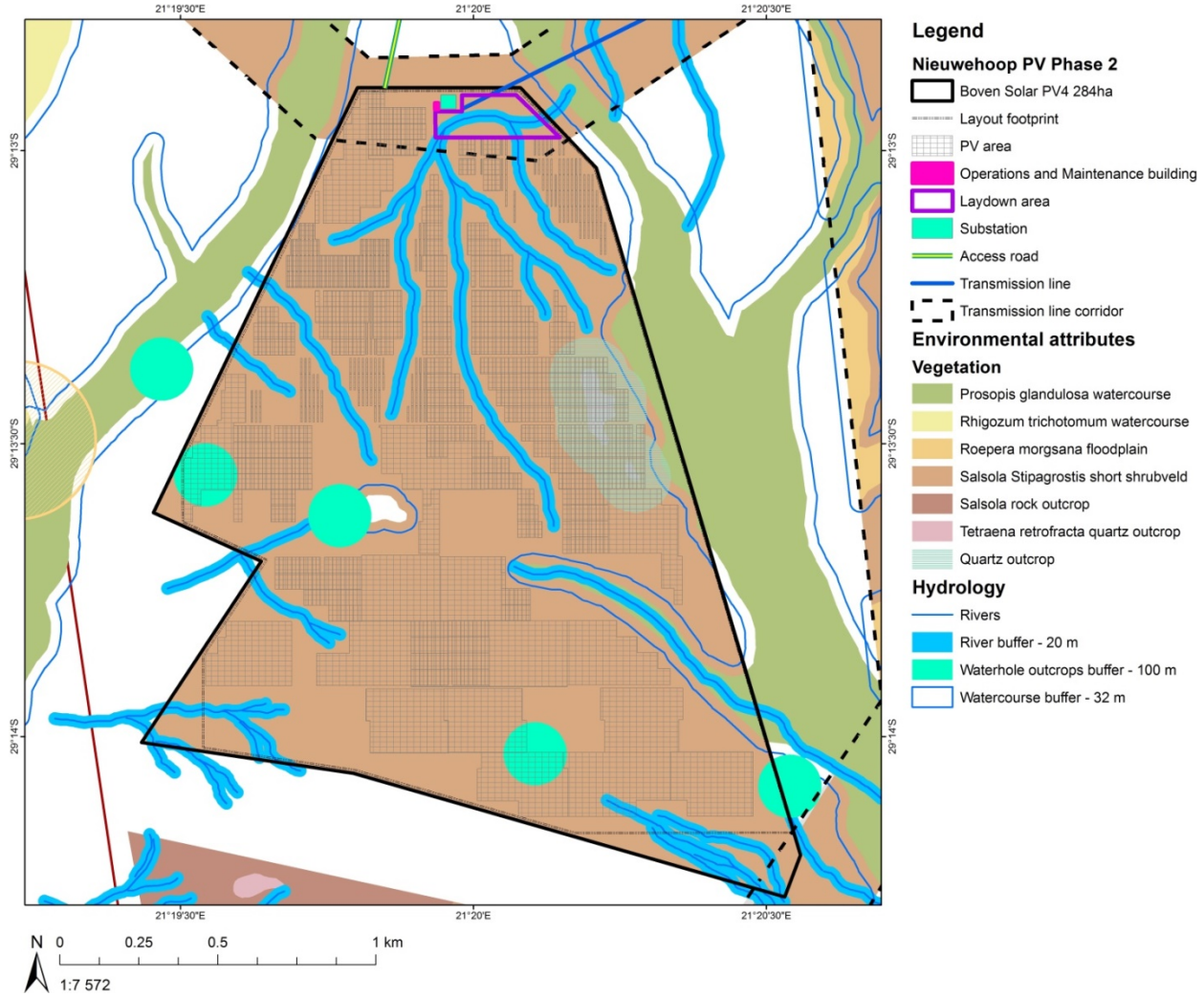
Nature of the management activity	Mitigation Objectives	Mitigation/Management action	Monitoring		
			Methodology	Frequency	Responsibility
13.1 Risk of bird collisions with electrical infrastructure	Minimise the chance that the associated electrical infrastructure, specifically the transmission line, cause avifaunal collisions	Pigtails and/or flappers should be installed on the overhead cables where known flight paths occur.	During construction, flappers will be installed at known flight paths. The effectivity of this should be monitored, and adjusted, if required.	As needed	Eskom
		The impact on birds must be monitored by environmental staff member during the first six months of the operational phases for each of the projects and in conjunction with any efforts made by Eskom through management measures included in their Operational EMP (OEMP) in minimising bird collisions.	• 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	Eskom

Nature of the management activity	Mitigation Objectives	Mitigation/Management action	Monitoring		
			Methodology	**Frequency**	**Responsibility**
		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	Eskom
		Any avian mortality or injury at the facility should be duly recorded and reported.	Record any bird fatalities and undertake the necessary reporting to EWT or relevant authority	When required	Eskom
13.2 Loss of Species of Special Concern and their habitats	Control loss of natural vegetation during operational phase. Prevent impacts on natural vegetation in sensitive habitats and species of special concern.	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.	Strict control over the behaviour of operational workers, restricting activities to within demarcated areas	On-going when maintenance work is being undertaken	Eskom
13.3 Impact of traffic causing dust and deterioration in road surface condition	Manage dust generation and reduce the deterioration of the condition of specifically the Transnet Service Road	Vehicle drivers shall drive at moderate speed on site access roads to minimise or eliminate dust generation.	Ensure generation of dust to an adequate level during operational activities	On-going	Eskom

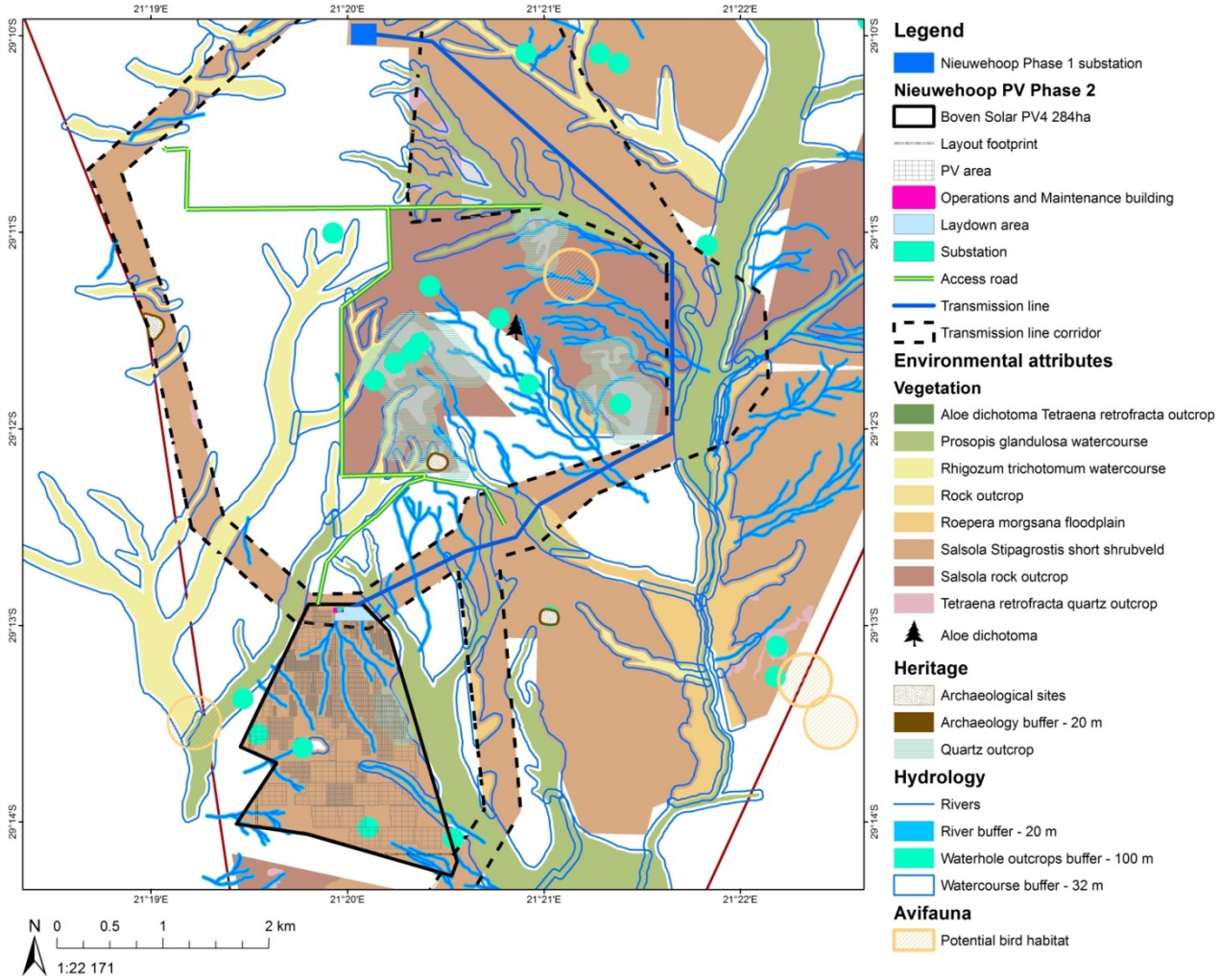
Nature of the management activity	Mitigation Objectives	Mitigation/Management action	Monitoring		
			Methodology	Frequency	Responsibility
13.4 Visual impacts due to the intrusion of electrical infrastructure in a rural area	Manage the visual impact that the electrical infrastructure may have	Painted features should be maintained and repainted when colour fades or paint flakes.	Ensure that all electrical infrastructure are well maintained	When required	Eskom
13.5 Generation of waste during operational of the solar facility	Minimise the production of waste	Ensure that waste generated during this phase is taken to an appropriate registered landfill.	Control of waste management practices throughout operational phase	Weekly	Eskom
	Ensure compliance with waste management legislation	Burning of waste material such as vegetation and old cleaning materials resulting from operational/maintenance activities at a site is strictly prohibited	Control of waste management practices throughout operational phase	Weekly	Eskom
DECOMMISSIONING PHASE					
13.6 Generation of waste during the decommissioning of the electrical infrastructure	Minimise the production of waste	Ensure that waste generated during this phase is taken to an appropriate registered landfill.	Control of waste management practices throughout decommissioning phase	On-going	Eskom
	Ensure compliance with waste management	Burning of waste material such as vegetation and old cleaning materials resulting from decommissioning activities at a site is strictly prohibited	Control of waste management practices throughout decommissioning phase	On-going	Eskom

Nature of the management activity	Mitigation Objectives	Mitigation/Management action	Monitoring		
			Methodology	Frequency	Responsibility
	legislation	No waste materials or sediments from the electrical infrastructure are to be left in the watercourse or on site after decommissioning.	Control of waste management practices throughout decommissioning phase	On-going	Eskom
13.7 Impact of traffic causing dust and deterioration in road surface condition	Manage dust generation and reduce the deterioration of the condition of specifically the Transnet Service Road	Vehicle drivers shall drive at moderate speed on site access roads to minimise or eliminate dust generation.	Ensure generation of dust to an adequate level during operational activities	On-going	Eskom
13.8 Visual impacts due following the decommissioning phase	Minimise the residual impact on structures that were constructed on site	Disturbed and transformed areas should be contoured 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	Eskom
		Working at night should be avoided, where possible.	Monitoring of adherence to requirement	On-going	Eskom
		Night lighting of reclamation sites should be minimised within requirements of safety and efficiency.	Monitoring of adherence to requirement	On-going	Eskom

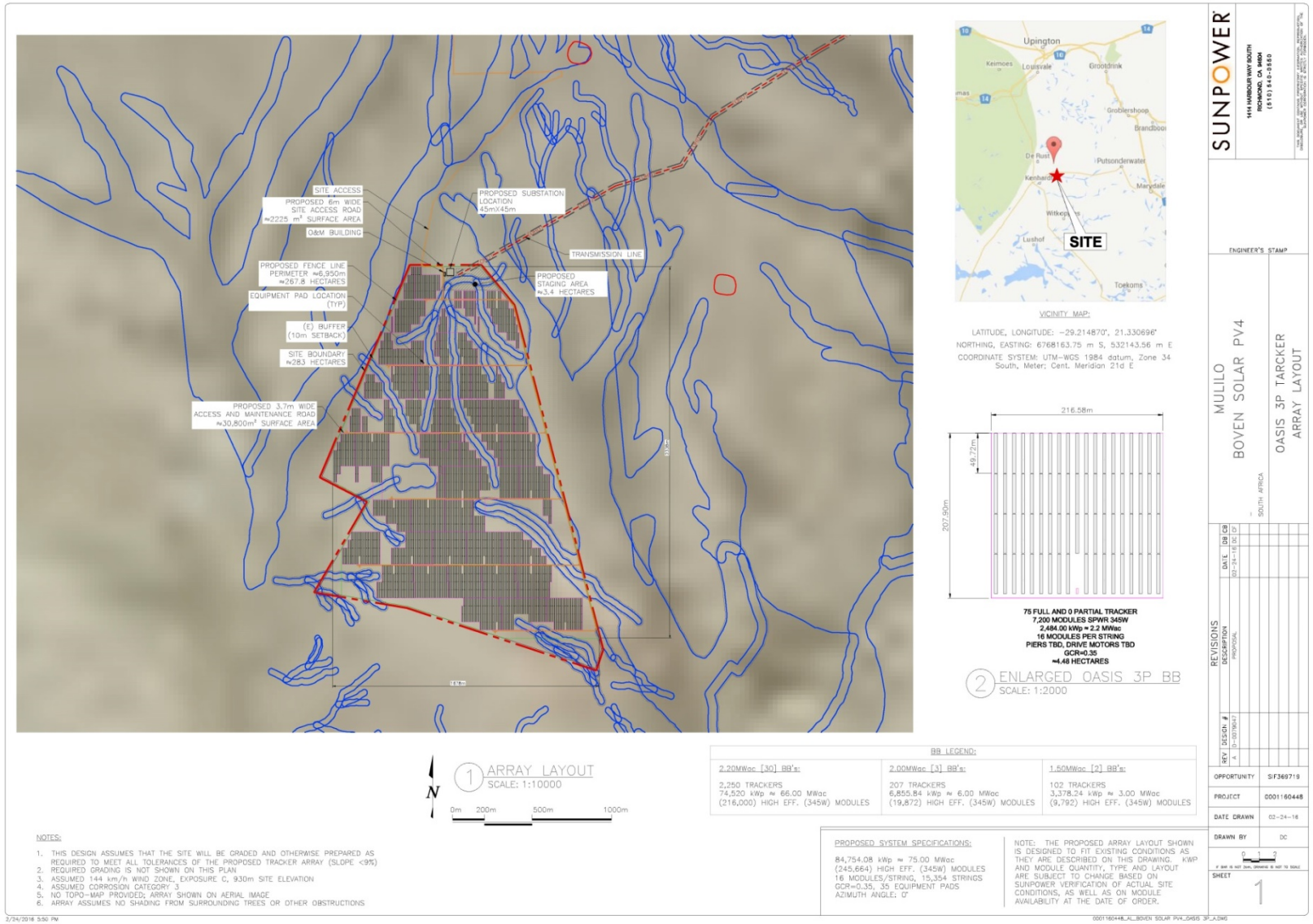
14 APPENDIX A – ENVIRONMENTAL SENSITIVITY MAP



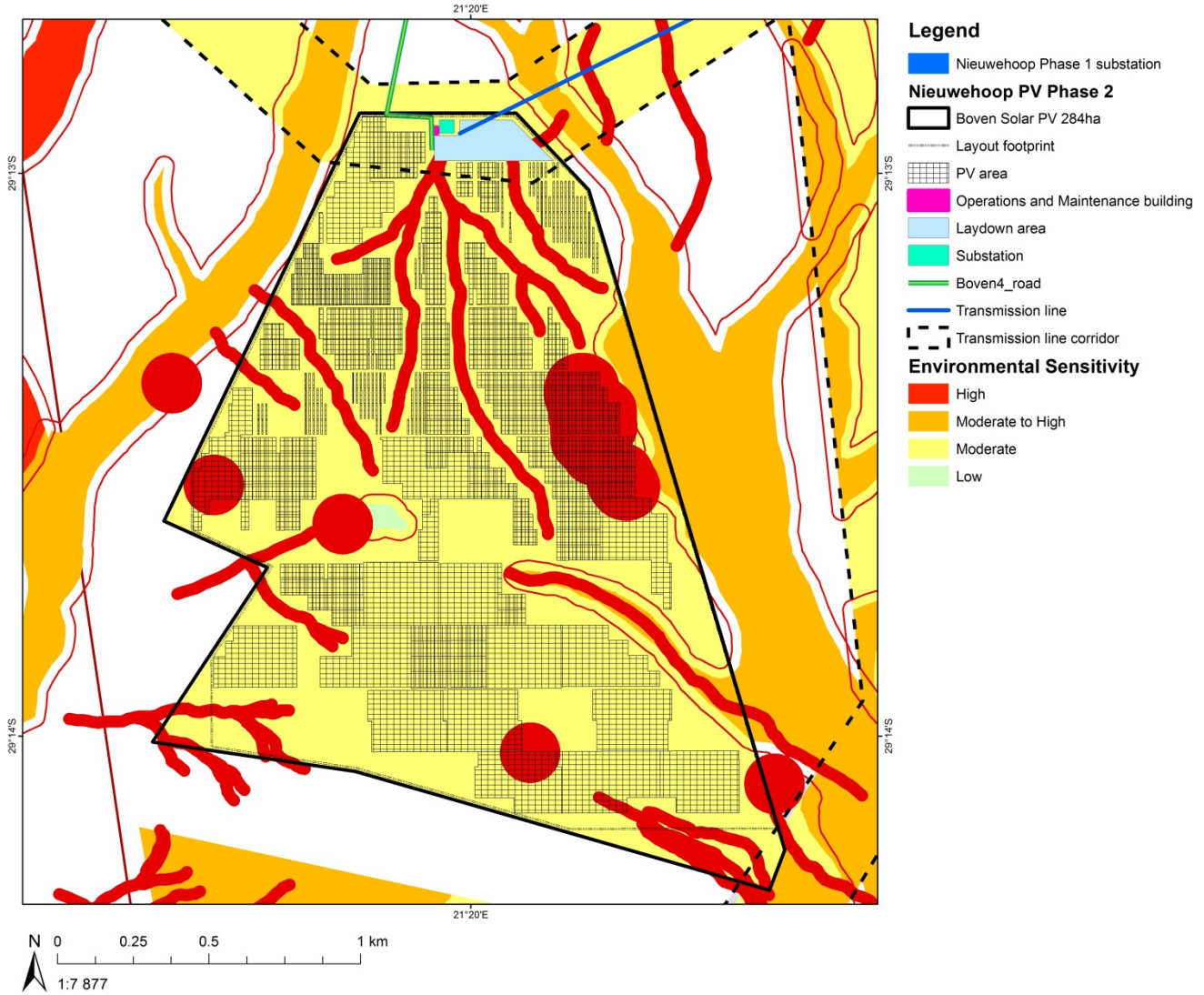
15 APPENDIX A – ENVIRONMENTAL SENSITIVITY MAP (INCLUDING POWERLINE)



16 APPENDIX B – SITE LAYOUT MAP



17 APPENDIX C – COMBINED SITE LAYOUT AND SENSITIVITY MAP



18 APPENDIX C – COMBINED SITE LAYOUT AND SENSITIVITY MAP (INCLUDING POWERLINE)