MONTANA 2 SOLAR ENERGY FACILITY
WESTERN CAPE PROVINCE

ENVIRONMENTAL MANAGEMENT PROGRAMME

August 2022

Prepared for
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PROJECT DETAILS

DFFE Reference	:	TBA
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DEFINITIONS AND TERMINOLOGY

The following definitions and terminology may be applicable to this project and may occur in the report below:

Alien species: A species that is not indigenous to the area or out of its natural distribution range.

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Ambient sound level: The reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes after such meter was put into operation.

Assessment: The process of collecting, organising, analysing, interpreting and communicating information which is relevant.

Biological diversity: The variables among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes they belong to.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity as per the EIA Regulations. Construction begins with any activity which requires Environmental Authorisation.

Cumulative impacts: The impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation, or maintenance of an activity and are generally obvious and quantifiable.

Disturbing noise: A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Ecosystem: A dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that is made up of:

i. The land, water and atmosphere of the earth;
ii. Micro-organisms, plant and animal life;
iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Authorisation (EA): means the authorisation issued by a competent authority (Department of Environmental Affairs) of a listed activity or specified activity in terms of the National Environmental Management Act (No 107 of 1998) and the EIA Regulations promulgated under the Act.

Environmental assessment practitioner (EAP): An individual responsible for the planning, management and coordinating of environmental management plan or any other appropriate environmental instruments introduced by legislation.

Environmental Control Officer (ECO): An individual appointed by the Owner prior to the commencement of any authorised activities, responsible for monitoring, reviewing and verifying compliance by the EPC Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment, as defined in the NEMA EIA Regulations, is a systematic process of identifying, assessing and reporting environmental impacts associated with an activity.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental Management Programme (EMPr): A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a project or facility and its ongoing maintenance after implementation.

Environmental Officer (EO): The Environmental Officer (EO), employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports. The EO must act as liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor.

Habitat: The place in which a species or ecological community occurs naturally.

Hazardous waste: Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800.

Incident: An unplanned occurrence that has caused, or has the potential to cause, environmental damage.

Indirect impacts: Indirect or induced changes that may occur because of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place because of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

Method Statement: a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.

Photovoltaic effect: Electricity can be generated using photovoltaic panels (semiconductors) which are comprised of individual photovoltaic cells that absorb solar energy to produce electricity. The absorbed solar radiation excites the electrons inside the cells and produces what is referred to as the Photovoltaic Effect.

Pre-construction: The period prior to the commencement of construction, which may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within

restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare."

Red Data Species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Site Ecological Importance (SEI): is a function of the Biodiversity Importance (BI) of the receptor (e.g., SCC, the vegetation/fauna community or habitat type present on the site) and Receptor Resilience (RR) (its resilience to impacts). An understanding of residual risk to SEI is important in determining acceptability of impact

Significant impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

Vulnerable species: A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future.

Waste: Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to the Waste Amendment Act (as amended on June 2014); or any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette.

ABBREVIATIONS

The following abbreviations may be applicable to this project and may occur in the report below:

BA	Basic Assessment
BAR	Basic Assessment Report
DFFE	Department of Forestry, Fisheries and the Environment
dB	Decibels
DAEARDLR	Western Cape Department Agriculture, Environmental Affairs, Rural Development and Land Reform
DMRE	Department of Mineral Resources, and Energy
EAP	Environmental Impact Practitioner
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
GPS	Global Positioning System
GWh	Giga Watt hour
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
kV	Kilo Volt
MW	Mega Watt
NFEPA	National Freshwater Ecosystem Priority Areas (NFEPA), 2011
NEMA	National Environmental Management Act , 1998 (Act 107 of 1998)
NEMAA	National Environmental Management Amendment Ac, 2008 (Act 62 of 2008)
NEMBA	National Environmental Management: Biodiversity Act, 2004
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NWA	National Water Act
PM	Post Meridiem; "Afternoon"
SAHRA	South African National Heritage Resources Agency
SWMP	Stormwater Management Plan
SCC	Species of Critical Concern
SEI	Site Ecological Importance

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APPENDICES

CHAPTER 1: INTRODUCTION

This Environmental Management Programme (EMPr) has been compiled for Montana 2 Solar Energy Facility (Pty) Ltd (the developer/proponent) for the development of the Montana 2 Solar Energy Facility and associated infrastructure. The project is proposed on Portion 2 of the Farm Belvedere Nr. 63 and Farm Poortje No. 66, which are located approximately 15km north-west of Nelspoort and 60km south-west of Beaufort West within the Central Karoo District Municipality in the Western Cape Province.

Montana 2 Solar Energy Facility will be designed to have a contracted capacity of 140MW_{AC} and will make use of either fixed-tilt or tracking photovoltaic (PV) solar technology for the generation of electricity. This EMPr has been developed on the basis of the findings of the Basic Assessment (BA), and must be implemented to protect sensitive on-site and off-site features through controlling construction, operation and decommissioning activities that could have a detrimental effect on the environment, and through avoiding or minimising potential impacts. This EMPr is applicable to all employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the project. In terms of the Duty of Care provision in S28(1) of NEMA, the project developer must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, halted or minimised. The document must therefore be adhered to and updated as relevant throughout the project life cycle. Any updates must be undertaken in accordance with the requirements of the relevant legislation. This document fulfils the requirement of the EIA Regulations, 2014 (as amended) and forms part of the BA Report for the project.

CHAPTER 2: PROJECT DETAILS

Montana 2 Solar Energy Facility (Pty) Ltd is proposing the development of a solar PV facility and associated infrastructure on a site located approximately 15km north-west of Nelspoort and 60km south-west of Beaufort West within the Central Karoo District Municipality in the Western Cape Province. The project is to be known as Montana 2 Solar Energy Facility and will have a contracted capacity of up to 140MW.

A preferred project site with an extent of ~415ha and a development footprint of 315~ha within the project site has been identified by Montana 2 Solar Energy Facility (Pty) Ltd as a technically suitable area for the development of the Montana 2 Solar Energy Facility. The development area for the PV facility is located on the remainder Portion 3 of the Farm Montana No 123. The project site can be accessed via existing Provincial gravel roads (i.e.MR587, DR2396, OP9213 OP9212).

The table below provides an overview of the Montana 2 Solar Energy Facility. The key infrastructure components associated with the development of Montana 2 Solar Energy Facility are described in greater detail within Chapter 3 of this BA Report.

Table 2.1: Overview of the Montana 2 Solar Energy Facility development area

Province	**Western Cape Province**
District Municipality	Central Karoo District Municipality
Local Municipality	Beaufort West Local Municipality
Ward number(s)	Ward 2
Nearest town(s)	15km north-west of Nelspoort and 60km south-west of Beaufort West
Affected property of the PV development area: Farm name(s), number(s) and portion numbers	» Portion 3 of the Farm Montana No 123
SG 21 Digit Code (s)	C09000000000012300000
Current zoning of the study area	Agricultural (grazing) and Open Natural Area
Site Co-ordinates (corner co-ordinates of Montana 1 Solar Energy Facility and associated infrastructure)	Respective surface areas to be covered by different components of the project (including associated infrastructure such as roads, buildings, etc.) which when combined make up the full development footprint amounts to 315 Ha. **Facility Footprint including solar fields:** **Panel Area:** 199 Ha Corner 1: 32° 9'2.57"S 23° 7'11.45"E Corner 2: 32° 8'36.10"S 23° 7'36.70"E Corner 3: 32° 9'56.68"S 23° 8'22.45"E Corner 4: 32° 9'25.35"S 23° 8'49.05"E **BESS:** **BESS Area:** 1.23 ha Corner 1: 32° 9'6.37"S 23° 8'23.30"E Corner 2: 32° 9'3.25"S 23° 8'25.20"E Corner 3: 32° 9'5.78"S 23° 8'28.88"E Corner 4: 32° 9'8.94"S 23° 8'26.91"E **Substation:** **Substation Area:** 0.92 ha Corner 1: 32° 9'1.09"S 23° 8'21.14"E Corner 2: 32° 9'3.30"S 23° 8'19.68"E

	Corner 3: 32° 9'5.69"S 23° 8'23.40"E Corner 4: 32° 9'3.67"S 23° 8'24.93"E **33kv line:** 33kV Start: -32.153312°, 23.134615° 33kV End: -32.151748°, 23.139780

2.2 Project Description

The development footprint for the facility allowing the facility to generate 160Mwac will be approximately 395ha and will contain the following infrastructure: The

(1) Solar Facility
- » PV modules (mono or bifacial);
- » Single or dual axis tracking structures, Fixed Axis Tracking, or Fixed Panels;
- » Fixed tilt mounting structure (to be considered during the design phase of the facility);
- » Galvanised steel and/or aluminium solar module mounting structures;
- » Solar module substructure foundations. These will likely be drilled into the ground, filled with concrete and then have posts fixed inside them. Alternately, ramming may be used; and
- » 45 to 50 Central Inverter stations.

(2) Building Infrastructure
- » Offices;
- » Operational and maintenance control centre;
- » Warehouse/workshop;
- » Panel maintenance and cleaning area;
- » Ablution facilities;
- » A conservancy tank for storage of sewage underground with a capacity of up to 35m³; and
- » Guard Houses.

(3) Associated Infrastructure
- » On-site substation building - IPP owned (including lightening conductor poles);
- » Eskom switching station, to be handed over to Eskom at Commercial Operation Date ("COD") (this forms part of a separate BA);
- » Battery storage (500MW/500MWh);
- » Internal distribution lines of up to 33 kV;
- » Underground low voltage cables or cable trays;
- » Internal gravel roads;
- » Fencing;
- » Stormwater channels;
- » Temporary work area during the construction phase; and
- » An access road to site from an existing district gravel road.

Part of the grid infrastructure to be built by each of the six RE facilities will be owned and operated by Eskom Holdings (SOC) Ltd. ("Eskom"). This includes:
- » an onsite Switching Station; and
- » a 132kV OHL from each onsite Switching Station to the new Collector Switching Station
- » gravel service road beneath the 132 kV power line.

This forms part of a separate Basic Assessment Process and EMPr.

Table 2.2 provides the details of Montana 2 Solar Energy facility, including the main infrastructure components and services that will be required during the project life cycle.

Table 2.2: Overview of the project and associated infrastructure for Montana 2 Solar Energy facility

Total extent of the Development area (including associated infrastructure)	**~415ha**
Contracted capacity of the facility	140 MW
Technology	Solar PV using: » Static or Tracking Photovoltaic Systems » Bifacial or monofacial
PV panels	» Height: ~2.2m from ground level (installed). » Approximately 296240 panels required. » Fixed tilt, single axis or double axis tracking systems.
Grid connection	On-site inverter (step up facility) to convert power from Direct Current (DC) to an Alternative (AC) and step up the electricity current from 33kV to 132kV that will connect to the on-site substation via underground cables. The electricity will be evacuated via a collector switching station and 132kV power line to the new Poortjie Wes 400/132kV LILO MTS via a 132kV OHL (approximately 7km). This OHL will cross the 400kV Droërivier power line.
Site access	The main access points for the site will be obtained via DR2383, an existing Provincial gravel road. This road is accessed off MR587 shortly after the railway crossing in Nelspoort. The first section along the main access road is very narrow and the road surface is poor due to erosion caused by cross-drainage. The road will need to be upgraded to provide a proper driving surface and required side-drains and culverts. An internal site road network will also be required to provide access to the solar field and associated infrastructure.
Other infrastructure	» Offices; » Operational and maintenance control centre; » Warehouse/workshop; » Panel maintenance and cleaning area; » Ablution facilities; » A conservancy tank for storage of sewage underground with a capacity of up to 35m³; and » Guard Houses.
Services required	» Refuse material disposal - all refuse material generated from the proposed development will be collected by a contractor and will be disposed of at a licensed waste disposal site off site. This service will be arranged with the municipality and suitable contractors when required. » Sanitation – all sewage waste will be collected by a contractor and will be disposed of at a licensed waste disposal site during the construction phase. This service will be arranged with the municipality when required during the operational phase.

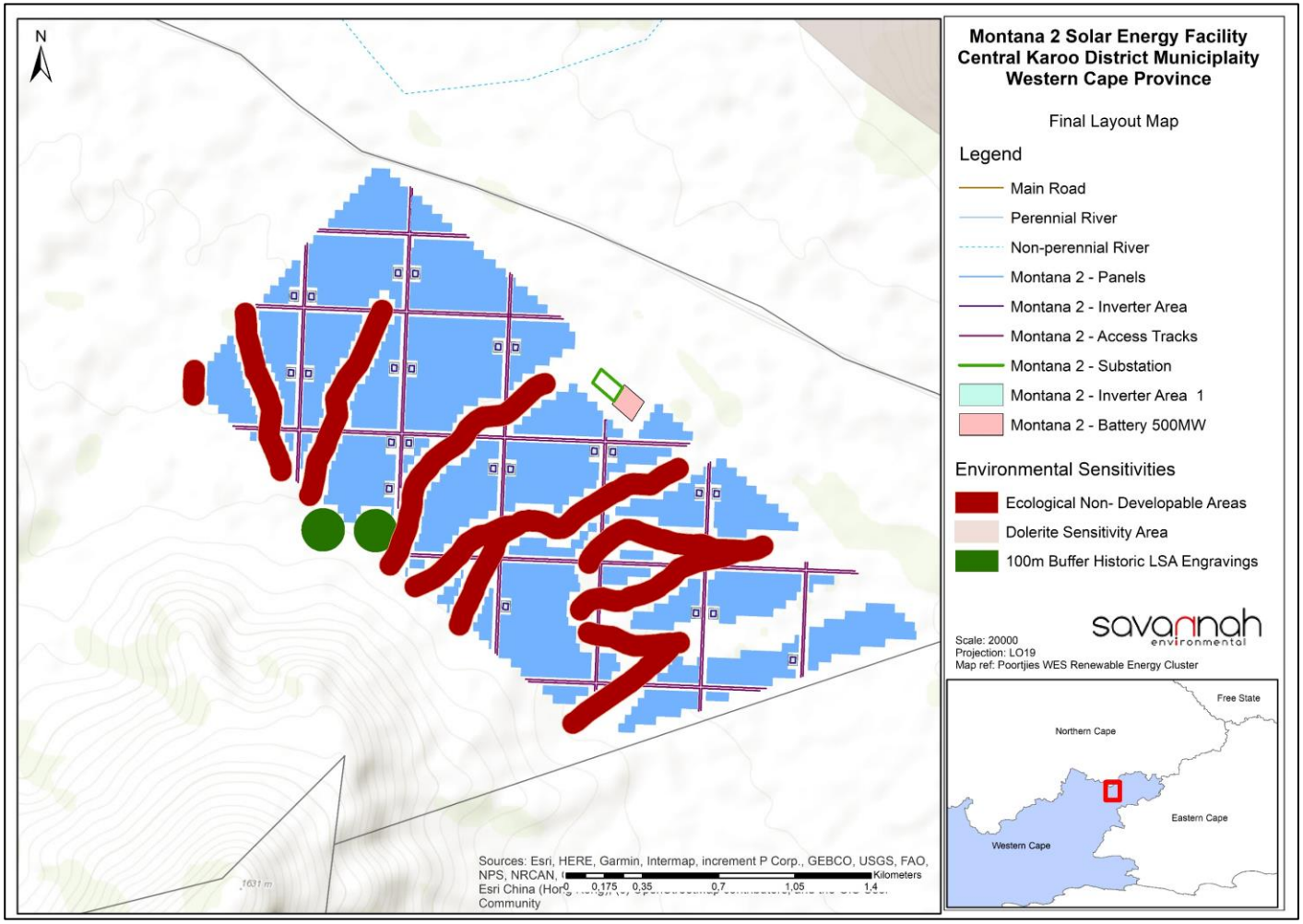

Figure 2.1: Final Layout of the Montana 2 Solar Energy facility and associated infrastructure

2.3. Life-cycle Phases Montana 2 Solar Energy facility

Pre-construction	
Requirements	» Planning and Design of facility
Activities to be undertaken	
Site preparation	» Confirming the integrity of site access to accommodate the required equipment. » Preparation of the site (e.g., laydown areas). » Mobilisation of construction equipment.
Conduct surveys prior to construction	» Including, but not limited to a detailed site survey and confirmation of the infrastructure micro-siting footprint, survey of the on-site substation site and O&M building area to determine and confirm the locations of all associated infrastructure.
Construction Phase	
Requirements	» Project requires Environmental Authorisation from DFFE, selection as a Preferred Bidder and a generation license issued by NERSA. » Duration of construction expected to be up to 18 to 24 months for the Montana 2 Solar Energy facility. » Create direct construction employment opportunities: Up to 150 jobs (at peak of construction) created and maintained for approximately two and a half years. » Security staff will also be present during the night-time of the construction phase. » Waste removal and sanitation will be undertaken by a sub-contractor or the municipality, where possible. Waste containers, including containers for hazardous waste, will be located at easily accessible locations on site when construction activities are undertaken. » Water will be required for the construction phase, which will be approximately 5 000m3 per year. Water will be sourced from either boreholes (drilled onsite) or from the Municipality (if sourced from the Municipality).
Activities to be undertaken	
Establishment of access roads to the Site	» Access/haul roads and internal access roads within the site will be established at the commencement of construction. » Existing access roads will be utilised where possible to minimise impact and upgraded where required. » Access roads to the site will have a width of up to 6m. » Access roads to be established between the project components for construction and/or maintenance activities within the development footprint. » Internal service road alignment will be approximately 4m wide.
Undertake site preparation	» Including the clearance of vegetation at the footprint of each support structure, establishment of the laydown areas, the establishment of internal access roads and excavations for foundations. » Stripping of topsoil to be stockpiled, backfilled, removed from site and/or spread on site. » To be undertaken in a systematic manner to reduce the risk of exposed ground being subjected to erosion.

	» Include search and rescue of floral Species of Conservation Concern (where required) and the identification and excavation of any sites of cultural/heritage value (where required).
Establishment of laydown areas and batching plant on site	» A laydown area for the storage of project components, including the PV panels and civil engineering construction equipment. » The laydown area will also accommodate building materials and equipment associated with the construction of buildings. » Infilling or depositing materials will be sourced from licenced borrow pits within the surrounding areas, which have been authorised independently to the Montana 2 BA process.
Transport of components and equipment to and within the site	» Transportation will take place via appropriate National and Provincial roads, and the dedicated access/haul road to the site. » Some of the components (i.e. substation transformer) may be defined as abnormal loads in terms of the Road Traffic Act (Act No. 29 of 1989) by virtue of the dimensional limitations. » Typical civil engineering construction equipment will need to be brought to the site (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.) as well as components required for the mounting of the PV support structures, construction of the substation and site preparation.
Erect PV Panels and Construct Substation, Inverters	» Installation of the solar PV panels and the structural and electrical infrastructure to make the plant operational. » For array installation, typically vertical support posts/piles are driven into the ground. Depending on the results of the geotechnical investigation a different foundation method may be required. Different options include a screw pile, helical pile, micro-pile or drilled post/pile which may or may not need to be cast in concrete underground at an appropriate depth as determined by the Geotechnical investigation. The posts will hold the support structures (tables) on which PV arrays would be mounted. Brackets attach the PV modules to the tables.   » Trenches are dug for the underground AC and DC cabling and the foundations of the inverter enclosures and transformers are prepared. » Wire harnesses connect the PV modules to the electrical collection systems.
Construction of the substation and BESS	» One on-site substation to be constructed within the development footprint. » Substation will be constructed with a high-voltage yard footprint.

	» The BESS will be constructed as part onsite substation and will require a survey of the footprint, site clearing and levelling. For solid state batteries, the battery cell packs (containing an electrolyte solution) will be brought to site as sealed units which will be installed and connected on site.
Establishment of ancillary infrastructure	» Operation and Maintenance buildings including a gate house, security building, control centre, offices, warehouses, a workshop and visitor's centre. » Temporary staff accommodation is required for the duration of construction. » Establishment will require the clearing of vegetation, levelling and the excavation of foundations prior to construction.
Connection of PV facility to the onsite substation	» Underground cables and overhead circuits connect the string inverters to the on-site AC electrical infrastructure (central inverter) and ultimately the project's on-site substation. » Excavation of trenches are required for the installation of the cables. Trenches will be approximately 1.2m deep. » Underground cables are planned to follow the internal access roads, as far as possible.
Connect substation to the power grid	All six (6) renewable energy ("RE") facilities which form part of the Poortjie Wes cluster will connect to the Eskom grid via the following infrastructure: » A 132kV Belvedere Collector Switching Station (the "Collector Switching Station") via 132kV Overhead Lines ("OHLs"). The Collector Switching Station will be +/-16ha in extent and will be located on Remaining extent of Portion 2 of the Farm Belvedere Nr. 73, in the Beaufort West Municipality, Division of Murraysburg, Western Cape Province. » The proposed Collector Switching Station will connect to the new Poortjie Wes 400/132kV LILO MTS ("Poortjie Wes LILO MTS") via a 132kV OHL (approximately 7km). This OHL will cross the 400kV Droërivier/Hydra OHL. A corridor of 300m is being considered in the BA process, within which the 32m servitude for this power line will be located. » The MTS will connect to either of the existing 400kV Droërivier/Hydra OHL) traversing the property via a Loop-in Loop-out ("LILO") connection. The 2 x 400kV LILO OHLs will be +/- 1km in length. It is unclear at this stage which of the two OHLs will be approved by Eskom. A corridor of 500m is being considered in the BA process, within which the two 55m servitudes for these power lines will be located.
Undertake site rehabilitation	» Commence with rehabilitation efforts once construction is completed in an area, and all construction equipment is removed. » On commissioning, access points to the site that will not be required for the operation phase will be closed and prepared for rehabilitation.
Operation Phase	
Requirements	» Duration will be 20-25 years, or longer depending on need for the project. » Requirements for security and maintenance of the facility. » Employment opportunities relating mainly to operation activities and maintenance. Up to 20 full-time and 10 temporary direct employment opportunities will be available. » Water will be required for the operation phase. Approximately 5000m^3 of water per annum will be required for the cleaning of the PV modules. Water will be sourced from existing boreholes in the area or municipal supply. » Current land-use activities being undertaken within the project site can continue during the operation of the PV facility.
Activities to be undertaken	

Operation and Maintenance	» Full time security, maintenance, and control room staff. » PV facility will be operational except under circumstances of mechanical breakdown, inclement weather conditions, or maintenance activities. » PV facility to be subject to periodic maintenance and inspection. » Disposal of waste products (e.g., oil) in accordance with relevant waste management legislation. » Areas which were disturbed during the construction phase to be utilised should a laydown area be required during operation. » PV panels will be washed during operation utilising clean water or non-hazardous biodegradable cleaning products. Wastewater generated by washing can be allowed to run-off under the panels.
Decommissioning Phase	
Requirements	» Decommissioning of the Montana 2 facility infrastructure at the end of its economic life. » Potential for repowering of the facility, depending on the condition of the facility at the time. » Expected lifespan of approximately 20 - 25 years (with maintenance) before decommissioning is required. » Decommissioning activities to comply with the legislation relevant at the time.
Activities to be undertaken	
Site preparation	» Confirming the integrity of site access to accommodate the required equipment. » Preparation of the site (e.g., laydown areas and construction platform). » Mobilisation of equipment required for decommissioning.
Disconnect, Disassemble, and remove solar facility components	» Disconnect the facility from the grid. » Dismantle all panels, mounting structures and foundations in line with all relevant legislation. » Recycle, repurpose and re-use as much of the decommissioned project components as possible in accordance with regulatory requirements. » Concrete foundations will be removed to a depth as defined by an agricultural specialist. » Backfill the mounting structure holes and rehabilitate the area appropriately. » Visible cables will be removed. » Access roads will either be left for use by landowners/future landowners or covered with topsoil or reduced in width. » A final site walkthrough will be conducted to remove debris and/or waste generated within the site during the decommissioning process. » Rehabilitation may include top soiling, raking, and/or re-seeding (whichever is appropriate).

2.4 Findings of the Basic Assessment

The Ecological Importance of the development area is regarded as Medium, specifically from an avian biodiversity and habitat perspective. However, the location of the development area has achieved an acceptable extent of avoidance within the project site, which will not result in unacceptable residual impacts. No environmental fatal flaws were identified in the detailed specialist studies conducted, and no impacts of unacceptable significance are expected to occur with the implementation of the recommended mitigation measures. These measures include, amongst others, the avoidance of sensitive features and the undertaking of monitoring, as specified by the specialists.

From the specialist studies undertaken it was determined that soils and agricultural aspects did not require any further assessment (refer to **Appendix F**). The most sensitive soil forms that can be expected for the area include the Hutton and Oakleaf soil forms. The land capability sensitivities (DAFF, 2017) indicate land capabilities with "Very Low to Moderate" sensitivities, which correlates with the requirements for a compliance statement only.

The available climate can limit crop production significantly. The harsh climatic conditions are associated with low annual rainfall and high evapotranspiration potential demands of the area. The area is not favourable for most cropping practices. It is worth noting that, additional baseline soil field assessments can provide for a better understanding of the soil or land potentials for the project area. It is the specialist's opinion that the proposed solar renewable energy project based on the DAFF (2017) land capability sensitivity of the area will have limited impact on the agricultural production ability of the land. Additionally, the proposed activities will not result in the segregation of any high production agricultural land. Therefore, the proposed solar renewable energy project development may be favourably considered.

The potential environmental impacts associated with Montana 2 Solar Energy facility identified and assessed through the BA process include:

- Impacts on ecology, flora and fauna
- Impacts on avifauna
- Impacts on heritage resources, including archaeology and palaeontology
- Visual impacts on the landscape as a result of the facility
- Positive and negative social impacts
- Impacts on traffic.

2.2.1 Impacts on Ecology

The aim of this Biodiversity Impact Assessment (refer to **Appendix D**) was to provide information to guide the risk of the proposed Montana 2 Solar Energy Facility to the ecosystems affected by its development and their inherent fauna and flora.

Based on the latest available ecologically relevant spatial data the following information is pertinent to the project area:

- It is recognised as an Ecological Support Area, with marginal overlap with a Critical Biodiversity Area, as per the Western Cape Biodiversity Spatial Plan;
- The Combined Animal Species Theme Sensitivity was rated as 'High' according the Environmental Screening Tool;

- » The Ecosystem Protection Level for the vegetation type associated with the development footprint is regarded as Poorly Protected; and
- » The ephemeral drainage lines traversing the (Project Area of Influence) PAOI drain into a Freshwater Ecosystem Priority Area to the NFEPA database.

Based on the fauna components recorded within the PAOI and proximal landscape, the area provides important ecosystem services, particularly with regards to the maintenance of dynamic soil properties, nutrient cycling and pollination. The SEI of the PAOI was determined to 'High' based on the high likelihood of occurrence for NT species, the extent of the area considered and its connectivity to natural areas within the landscape, and the low resilience of the vegetation type.

Impact Statement

The main expected impacts of the proposed Montana 2 SEF will be the loss of habitat and emigration of fauna. Based on the outcomes of the SEI determination, the project possesses a 'High' SEI. This denotes that avoidance mitigation wherever possible must be implemented. This includes changes to project infrastructure design to limit the amount of habitat impacted. Moreover, the avoidance and minimisation mitigation measures are the most important with respect to the mitigation hierarchy (Figure 9.1).

In order to evaluate the extent of 'avoidance' achieved for the project, the following is noteworthy:

- The footprint areas for the four proposed solar facilities amounts to 1 144.645 ha; and
- The total extent of the entire property area comprising 49 337.900 ha, thus approximately 2% of the property area will be developed.

The project area has been designated as a REDZ (Renewable Energy Development Zone) and taking into consideration the extent of 'avoidance' achieved for the project, it is the opinion of the specialist that the authorisation of the proposed project may be favourably considered. It is recommended that should any future developments be proposed for the remaining extent of any 'Very High' or 'High' SEI areas within the associated properties, that offset strategies be required for these authorisations.

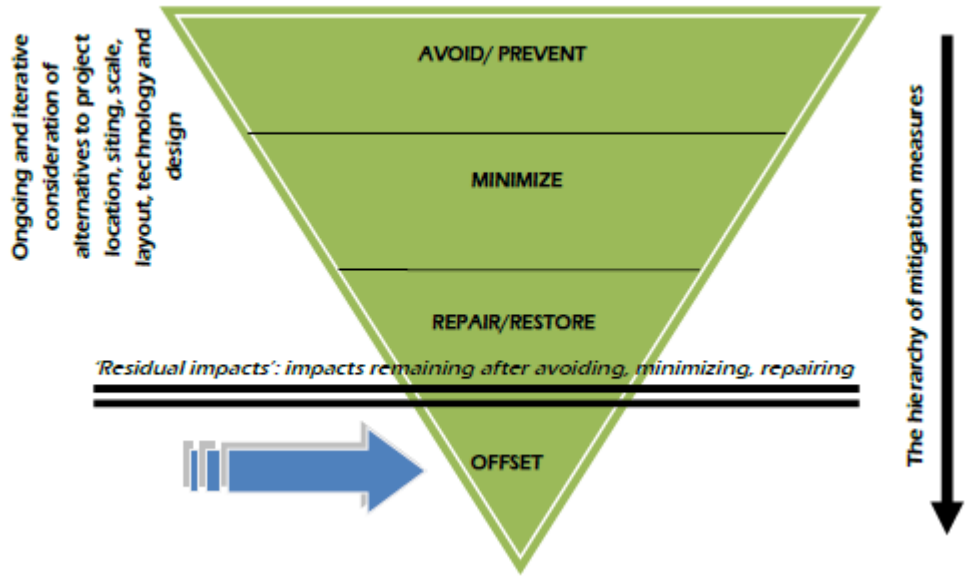

Figure 2.1 Schematic diagram illustrating the mitigation hierarchy indicating where residual impacts are considered. Source: (DFFE, 2021c)

The PAOI is drained by minor ephemeral drainage lines that drain into a FEPA system The channel physiognomy of these drainage systems was distinct from the terrestrial component and were identified by a bedrock substrate and the presence of Vachellia karoo.

A 50 m buffer was applied to these drainage systems (Macfarlane et al, 2009) as they are regarded as Ecological Support Areas and during surface flow would be important in the distribution of propagules and also form a corridor for movement of fauna.

The following Zones of Regulation (ZoR) are applicable to the drainage lines identified within the PAOI:

- A 32 m Zone of Regulation in accordance with the National Environmental Management Act, 1998 (Act No. 107 of 1998) should be assigned to the drainage lines; and
- A 100 m ZoR in accordance with the National Water Act, 1998 (Act No. 36 of 1998) should be assigned to the drainage lines.

The proposed solar facility is expected to pose a low residual risk to the delineated drainage lines, with key mitigation being the avoidance and adherence to the recommended buffer widths. Due to the low residual risk, a General Authorisation is required for the required water use authorisation.

2.2.2 Impacts on Avifauna

According to the specialist report (refer to **Appendix E**) the proposed development site appears to be well suited for the development of renewable energy facilities as proposed. The proposed development site is outside of major avifaunal sensitivities and does not represent unique avifaunal habitat in the context of the broader area. The available habitat across the site is already modified through grazing pressure and is located relatively close to existing overhead transmission lines, this translates into a reduced length of novel overhead powerline required for the grid connection, reducing the potential impact on species susceptible to collisions with transmission lines such as bustards, cranes, and storks in the area.

The proposed development is unlikely to have a significant negative impact on the long-term viability or persistence of avifaunal species in the area and therefore can be approved from an avifaunal perspective.

2.2.3 Impacts on Heritage (including archaeology and palaeontology)

The site forms part of an intact cultural landscape representative of the Central Plateau of the Great Karoo possessing heritage value for historical, aesthetic, architectural, social and scientific reasons. The site possesses a number of landscape elements contributing to a composite cultural landscape. Significant from a landscape perspective is the distinctive poort and its associated dam, linkage route and topographical condition. The area is of medium to high sensitivity in terms of the placement of renewable energy infrastructure. The principle of locating PV infrastructure is this environment is acceptable especially if occurring on the flatlands and lower slopes and avoiding the immediate landscape setting of the poort.

No archaeological resources of significance were identified within the area proposed for development although the broader area has archaeological significance in terms of the sensitive dolerite outcrops in the area. A small area on the southern boundary of option D holds two sites with historic and LSA engravings which can easily be avoided with a 100m buffer zone around these sites.

No observations of palaeontological significance were noted within the area proposed for development. However, the geology underlying the development area remains sensitive for impacts to significant palaeontological heritage.

There are limited impacts anticipated to archaeological and palaeontological heritage from this proposed development and as such, the principle of a renewable energy facility in this location is supported from a heritage perspective provided that the infrastructure is located in areas able to tolerate the impact of the high degree of change from a cultural landscape perspective.

Based on the outcomes of the Heritage study (refer to **Appendix G**), it is not anticipated that the proposed development of the solar PV facility and its associated grid connection infrastructure will negatively impact on significant heritage resources on condition that the following recommendations are adhered to:

- The recommendations of the VIA must be implemented.
- A 100m no-go development buffer is implemented around sites POORTJIE027 & POORTJIE028
- The HWC Chance Fossil Finds Procedure must be implemented for the duration of construction activities
- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and HWC must be alerted immediately to determine an appropriate way forward.

2.2.4 Visual Impacts

The visual assessment of the proposed Montana 2 Solar Energy Facility indicates that the construction and operation of the proposed facility will have a visual effect on both the rural landscape and on sensitive receptors in the study area.

The proposed infrastructure will be visible within an area that is generally characterised by low growing shrubland and wide-open undeveloped spaces. The infrastructure would thus be highly visible and impossible to hide within an area that incorporates potentially various sensitive visual receptors that may consider visual exposure to this type of infrastructure to be intrusive.

The low occurrence of such sensitive visual receptors within this environment, specifically in close proximity to the proposed facility, is of relevance however, and has affected the significance rating of the anticipated visual impacts.

Overall, the post mitigation significance of the visual impacts is predominately **low to negligible**. No visual impacts with a high residual significance are anticipated.

Notwithstanding the above, there are not many options as to the mitigation of the visual impact of the proposed infrastructure. No amount of vegetation screening or landscaping would be able to hide structures of these dimensions, especially within this receiving environment.

In order to ensure that all the spatial analyses and mapping undertaken in this report is as accurate as possible, a transparent and scientifically defensible approach in line with best practice methodology for this type of assessment, has been utilised. The objective of this process is to quantify the potential visual impacts associated with the proposed Montana 2 Solar Energy Facility, using visibility analyses, proximity analyses and the identification of sensitive receptors. However, it must be noted that visual impact is a very subjective concept, personal to each individuals' backgrounds, opinions and perceptions. The subjects in this case are the identified sensitive receptors such as the residents of homesteads/dwellings and users of roads.
According to the Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning ("DEA&DP") Guideline for Involving Visual and Aesthetic Specialists in the EIA Process (Oberholzer, 2005), the criteria that determine whether or not a visual impact constitutes a potential fatal flaw are categorised as follows:

1. Non-compliance with Acts, Ordinances, By-laws and adopted policies relating to visual pollution, scenic routes, special areas or proclaimed heritage sites.
2. Non-compliance with conditions of existing Records of Decision.
3. Impacts that may be evaluated to be of high significance and that are considered by the majority of the stakeholders and decision-makers to be unacceptable.

In terms of the above and to the knowledge of the author, the proposed development is compliant with all Acts, Ordinances, By-laws and adopted policies relating to visual pollution, scenic routes, special areas or proclaimed heritage sites, as well as, conditions of existing Records of Decisions and no impacts of high significance have been evaluated post mitigation.

This assessment has adopted a risk averse approach by assuming that the perception of most (if not all) of the sensitive visual receptors (bar the landowners of the properties earmarked for the development), would be predominantly negative towards the Montana 2 Solar Energy Facility in the region. While still keeping in mind that there are also likely to be supporters of the facility (as a possible employer and income generator

in the region) amongst the population of the larger region, but they are largely expected to be indifferent to the construction of the facility and not as vocal in their support for the facility as the detractors thereof.

Therefore, with the information available to the specialist at the time of writing this report, it cannot be empirically determined that the statistical majority of objecting stakeholders were exceeded. If evidence to the contrary surfaces during the progression of the development application, the specialist reserves the right to revise the statement below.

Therefore, the likelihood that the proposed development will be met with concern and objections from some of the affected sensitive receptors in the region, this report cannot categorically state that any of the above conditions were transgressed. As such these visual impacts are not considered to be fatal flaws for a development of this nature particularly due to the remote location of the study area and very low density of visual receptors. It is, therefore, suggested that the proposed Montana 2 Solar Energy Facility, as per the assessed layout be supported from a visual perspective, subject to the implementation of the suggested best practice mitigation measures provided in the specialist Visual Impact Report (refer to **Appendix H**). **Appendix M** includes the best practice guidelines as stipulated in the visual impact assessment report.

2.2.5 Social Impacts

The findings of the SIA (**Appendix I**) indicate that the development of the proposed 160 MW Montana 2 PV SEF and associated infrastructure will create employment and business opportunities for locals in the Beaufort West Municipality during both the construction and operational phase of the project.

The establishment of a Community Trust will also benefit the local community. The enhancement measures listed in the report should be implemented in order to maximise the potential benefits. The significance of this impact is rated as **High Positive**. The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the negative environmental and socio-economic impacts associated a coal-based energy economy and the challenges created by climate change, represents a significant positive social benefit for society as a whole. The findings of the SIA also indicate that the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) has resulted in significant socio-economic benefits, both at a national level and at a local, community level. These benefits are linked to foreign Direct Investment, local employment and procurement and investment in local community initiatives. The proposed site is also located within the Beaufort West REDZ. The area has therefore been identified as suitable for the establishment of large-scale solar energy facilities and associated infrastructure. The establishment of the proposed 160 MW Montana II PV SEF and associated infrastructure including a BESS is therefore supported by the findings of the SIA.

The enhancement and mitigation measures outlined in the SIA and other key specialist reports should be implemented.

2.2.6. Impacts on Traffic

The potential traffic and transport related impacts for the construction and operation phases of the proposed Montana 2 Solar Energy Facility were assessed (refer to **Appendix J**). The following was concluded:

- The traffic generated during the construction phase, although significant, will be temporary and impacts are considered to be negative and of **medium significance** before and of **low significance** after mitigation.
- During operation, it is expected that maintenance and security staff will periodically visit the Facility. It is assumed that approximately 60 full-time employees will be stationed on site (subject to change). The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.
- The traffic generated during the decommissioning phase will be less than the construction phase traffic and the impact on the surrounding road network will also be considered negative and of **medium significance** before and of **low significance** after mitigation.

The potential mitigation measures mentioned in the construction phase are:

- Dust suppression
- Component delivery to/ removal from the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- The use of mobile batching plants and quarries near the site would decrease the impact on the surrounding road network by reducing the construction trips and the distance travelled to transport the materials to the site.
- Staff and general trips should occur outside of peak traffic periods.
- A "dry run" of the preferred route.
- Design and maintenance of internal roads.
- If required, any low hanging overhead lines (lower than 5.1 m) e.g., Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles.

The construction and decommissioning phases of a development is the only significant traffic generator and therefore noise and dust pollution will be higher during this phase. The duration of this phase is short term i.e., the impact of the traffic on the surrounding road network is temporary and a solar Facility, when operational, does not add any significant traffic to the road network.

Both the proposed access point and the access road to the Facility are deemed feasible from a traffic engineering perspective.

The development is supported from a transport perspective provided that the recommendations and mitigations contained in the specialist report (**Appendix J**) are adhered to.

The potential impacts associated with the proposed Montana 2 Solar Energy Facility and associated infrastructure are acceptable from a transport perspective and it is therefore recommended that the proposed Facility be authorised.

2.2.7 Assessment of Cumulative Impacts

Cumulative impacts and benefits on various environmental and social receptors will occur to varying degrees with the development of several renewable energy facilities in South Africa. The most significant of these will be the contribution towards a reduction in greenhouse gas emissions and consequent assistance with climate change mitigation.

The alignment of renewable energy developments with the IRP and the global drive to move away from the use of non-renewable energy resources and to reduce greenhouse gas emissions is undoubtedly positive. The social and economic benefits of renewable energy developments at a local, regional and national level have the potential to be significant. However, there is a lack of understanding of the cumulative impacts on other environmental and social receptors such as birds, visual amenity and landscape character of the affected areas largely due to limited information of impacts from existing facilities within the country. This assessment is therefore qualitative.

The significance of the cumulative impacts associated with the development of Montana 2 Solar Energy facility are predominately low to medium, depending on the impacts being considered, except for biodiversity and avifauna impacts which are high cumulative impacts, although were found to be acceptable due to appropriate placement of infrastructure outside remaining high and very sensitive areas within the project site. A summary of the cumulative impacts is included in **Table 2.1**.

Table 2.1: Summary of the cumulative impact significance for Montana 2 Solar Energy facilitywithin the development area

Specialist assessment	Overall significance of impact of the proposed project considered in isolation	Cumulative significance of impact of the project and other projects in the area
Ecology	Medium	Medium
Avifauna	Medium	Medium
Heritage (archaeology and palaeontology)	Low	low
Visual	Medium	Medium
Positive Social Impacts (Impacts on the local economy)	Low	High
Negative Social Impacts (Impacts on sense of place and local services)	Low	Medium
Traffic	Medium	Low

Considering the findings of the cumulative specialist assessments undertaken for the project the following can be concluded considering the Montana 2 Solar Energy Facility:

- There will be no unacceptable loss of biodiversity (vegetation, species types, and ecological processes) due to the degree of avoidance of the development area in relation to remaining high and very high areas of ecological importance within the broader project site and the region.
- It is unlikely that the proposed development will result in a significant negative effect on the long-term viability or persistence of avifaunal populations in the area given the availability of suitable habitat for SCCs in the area.
- The construction of the project will not result in the complete or whole-scale change in sense of place and character of the area nor will the project result in unacceptable visual intrusion.
- The construction of the project will not result in unacceptable loss of or impact to heritage resources. Impacts on cultural landscape have been minimised through the appropriate placement of the facility on the site outside of sensitive landscape features.

- The project will not significantly increase the negative impact on the social environment. However, an increase in positive impacts, specifically as a result of job creation and socio-economic benefits, can be expected.
- The project will contribute towards a reduction in greenhouse gas emissions from energy generation and will aid the country in meeting the commitments made under the COP 21 Agreement, to which the Government has committed to become a signatory.

Based on a detailed evaluation, the cumulative impacts associated with the construction and operation of the proposed Montana 2 Solar Energy facility and other proposed renewable energy facilities in the region are considered to be acceptable. The location of this project within the Beaufort West REDZ is considered to be a desirable location for further consideration provided that environmental impacts are mitigated to suitable standards as recommended within this BA Report.

2.5. Environmental Sensitivity

As part of the specialist investigations undertaken within the development area of Montana 2 Solar Energy Facility, specific environmental features were identified which will be impacted by the placement of the development footprint (i.e. project infrastructure) associated with the facility. The current condition of the features identified (i.e. intact or disturbed) informed the sensitivity of the environmental features and the capacity for disturbance and change associated with the proposed development.

The environmental features identified within and directly adjacent to the development area and development footprint are illustrated in **Figure 2.2**. **Figure 2.3** is the final layout map for Montana 2 Solar Energy Facility considering environmental sensitivities. The features identified specifically relate to ecological and avifauna habitats. The following points provide a description of the features present within the development area, as well as the surrounding area:

- It is recognised as an Ecological Support Area, with marginal overlap with a Critical Biodiversity Area, as per the Western Cape Biodiversity Spatial Plan;
- The Combined Animal Species Theme Sensitivity was rated as 'High' according to the Environmental Screening Tool;
- The Ecosystem Protection Level for the vegetation type associated with the development footprint is regarded as Poorly Protected; and
- The ephemeral drainage lines traversing the PAOI drain into a Freshwater Ecosystem Priority Area to the NFEPA database.

- Although largely outside of the development area the following avifauna features have been identified:
  - The diversity and abundance of birds observed during the walk transects was low, with a total of 52 positively identified species in the area recorded over both seasons (39 during Season 1 and 37 species during Season 2). The abundance of birds recorded during Season 1 (197 individuals) was lower than during Season 2 (852 individuals) as expected. This was largely due to large flocks of Red-billed Quelea. The avifaunal SCCs recorded during either season included Ludwig's Bustard, Blue Crane, Lanner Falcon and Karoo Korhaan.
  - Avifaunal SCCs observed in the broader area included Martial Eagle, Lanner Falcon, Secretarybird, Blue Crane, Karoo Korhaan, Southern Black Korhaan and Verreaux's Eagle. A Pale Chanting Goshawk nest was located in the kloof approximately 1.7 km from the project boundary and a

Verreaux's Eagle nest was located approximately 3.7 km to the south of the project boundary high in the cliffs of Blinkfontein se Berg. The facility is unlikely to have an impact on either nest location.

Considering the features identified within the project site and development area, the specialists have provided an indication of the acceptability of the proposed development. Given the degree of avoidance of the development area of High and Very High areas of ecological importance within the project site as well as avoidance of the avifauna buffers referred to above, the development may be considered acceptable as the residual impacts are expected to be of medium significance.

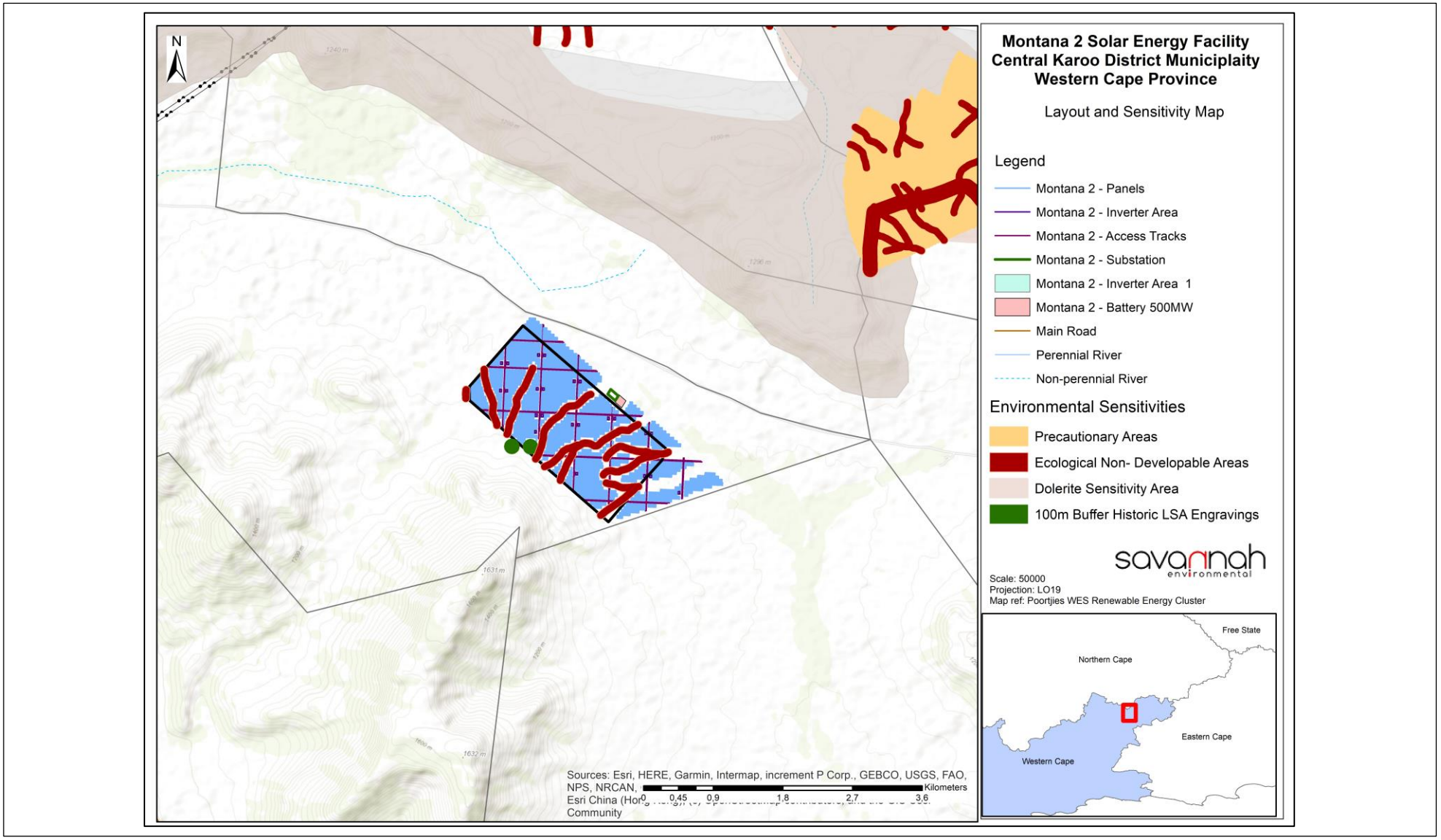

Figure 2.2: Environmental Importance and layout map of Montana 2 Solar Energy facility development footprint (**Refer also to Appendix M**).

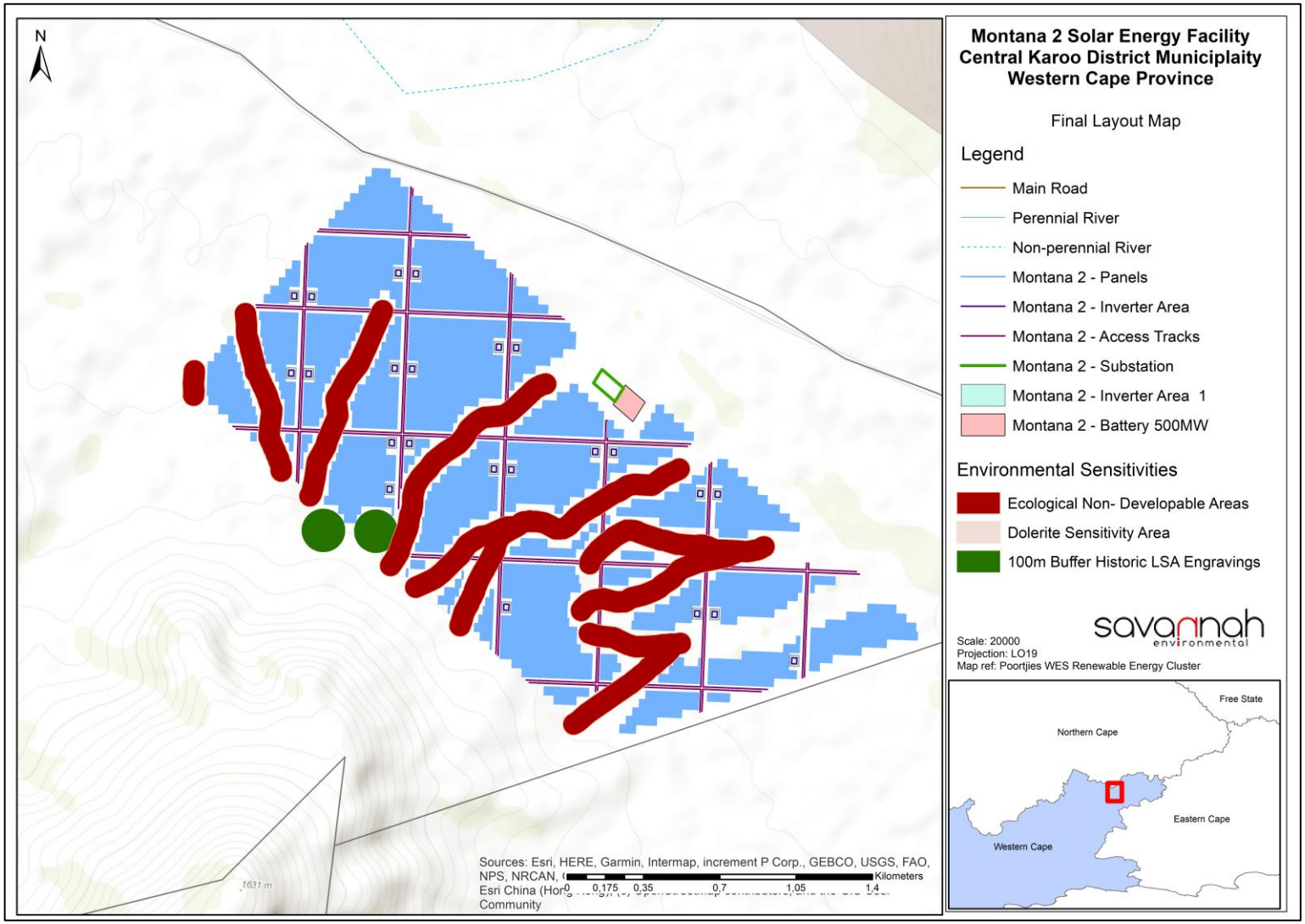

Figure 2.3: Final layout map of Montana 2 Solar Energy Facility development footprint (**Refer also to Appendix M**).

CHAPTER 3 : PURPOSE AND OBJECTIVES OF THE EMPR

An Environmental Management Programme (EMPr) is defined as "an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented or mitigated, and that the positive benefits of the projects are enhanced". The objective of this EMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMPr is to help ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the facility. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the project.

The EMPr provides specific environmental guidance for the construction and operation phases of a project, and is intended to manage and mitigate construction and operation activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (site clearing and site establishment) through to those incurred during the construction activities themselves (erosion, noise, dust) to those incurred during site rehabilitation (soil stabilisation, re-vegetation) and operation. The EMPr also defines monitoring requirements in order to ensure that the specified objectives are met.

This EMPr is applicable to all employees and contractors working on the pre-construction, construction, and operation and maintenance phases of Montana 2 Solar Energy Facility. The document must be adhered to and updated as relevant throughout the project life cycle.

This EMPr has been compiled in accordance with Appendix 4 of the EIA Regulations, 2014 (as amended) (refer to **Table 4.1**). This is a dynamic document and will be further developed in terms of specific requirements listed in any authorisations issued for Montana 2 Solar Energy Facility and/or as the project develops. This will ensure that the construction and operation activities are planned and implemented taking sensitive environmental features into account. The EMPr has been developed as a set of environmental specifications (i.e. principles of environmental management), which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of various monitoring and implementation tools).

The EMPr has the following objectives:

- Outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction, rehabilitation and operation phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the Montana 2 Solar Energy Facility development.
- Ensure that the construction and operation phases do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- Identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities.
- Propose mechanisms and frequency for monitoring compliance, and prevent long-term or permanent environmental degradation.
- Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that were not considered in the BA process.

The mitigation measures identified within the BA process are systematically addressed in the EMPr, ensuring the minimisation of adverse environmental impacts to an acceptable level.

The developer must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr, and through its integration into the relevant contract documentation provided to parties responsible for construction and/or operation activities on the site. Since this EMPr is part of the BA process for Montana 2 Solar Energy Facility, it is important that this document be read in conjunction with the BA Report compiled for this project. This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMPr and the Environmental Authorisation (EA), the stipulations in the EA shall prevail over that of the EMPr, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr.

This EMPr shall be binding on all the parties involved in the planning, construction and operation phases of the project, and shall be enforceable at all levels of contract and operational management within the project. The document must be adhered to and updated as relevant throughout the project life cycle. Any updates must be undertaken in accordance with the requirements of the relevant legislation.

CHAPTER 4: STRUCTURE OF THIS EMPR

The preceding chapters provide background to the EMPr and the proposed project, while the chapters that follow consider the following:

- Planning and design activities;
- Construction activities;
- Operation activities; and
- Decommissioning activities.

These chapters set out the procedures necessary for the project owner to minimise environmental impacts and achieve environmental compliance. For each of the phases of implementation for the project, an overarching environmental **goal** is stated. In order to meet this goal, a number of **objectives** are listed. The management programme has been structured in table format in order to show the links between the goals for each phase and their associated objectives, activities/risk sources, mitigation actions, monitoring requirements and performance indicators. A specific EMPr table has been established for each environmental objective. The information provided within the EMPr table for each objective is illustrated below:

OBJECTIVE: Description of the objective that is necessary to meet the overall goal, which takes into account the findings of the BA specialist studies

Project Component/s	List of project components affecting the objective, i.e.: » PV Panels » Access roads; and » Associated infrastructure.
Potential Impact	Brief description of potential environmental impact if objective is not met.
Activity/Risk Source	Description of activities which could affect achieving the objective.
Mitigation: Target/Objective	Description of the target and/or desired outcomes of mitigation.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
List specific action(s) required to meet the mitigation target/objective described above.	Who is responsible for the measures	Time periods for implementation of measures

Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the management programme.
Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods, and reporting.

The objectives and EMPr tables are required to be reviewed and possibly modified whenever changes, such as the following, occur:

- Planned activities change (i.e. in terms of the components and/or layout of the facility);
- Modification to or addition to environmental objectives and targets;
- Additional or unforeseen environmental impacts are identified and additional measures are required to be included in the EMPr to prevent deterioration or further deterioration of the environment.
- Relevant legal or other requirements are changed or introduced; and
- Significant progress has been made on achieving an objective or target such that it should be re-examined to determine if it is still relevant, should be modified, etc.

4.1 Contents of this Environmental Management Programme (EMPr)

This EMPr has been prepared as part of the BA process being conducted in support of the application for EA for Montana 2 Solar Energy Facility. This EMPr has been prepared in accordance with DEA's requirements as contained in Appendix 4 of the EIA Regulations, 2014 (GNR 326). It provides recommended management and mitigation measures with which to minimise impacts and enhance benefits associated with the project.

An overview of the contents of this EMPr, as prescribed by Appendix 4 of the 2014 EIA Regulations (GNR 326), and where the corresponding information can be found within this EMPr is provided in **Table 4.1.**

Table 4.1: Summary of where the requirements of Appendix 4 of the 2014 NEMA EIA Regulations (GNR 326) are provided in this EMPr.

Requirement	Location in this EMPr
(1) An EMPr must comply with section 24N of the Act and include – (a) Details of – (i) The EAP who prepared the EMPr. (ii) The expertise of that EAP to prepare an EMPr, including a curriculum vitae.	Chapter 4 Appendix A
(b) A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	Chapter 2
I A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.	Chapter 2 Appendix M
(d) A description of the impact management outcomes, 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.	Chapter 5
(ii) Pre-construction activities.	Chapter 5
(iii) Construction activities.	Chapter 6
(iv) Rehabilitation of the environment after construction and where applicable post closure.	Chapter 7
(v) Where relevant, operation activities.	Chapter 8
(f) A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to –	Chapters–5 - 8

Requirement	Location in this EMPr
(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. (iv) Comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable.	
(g) The method of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Chapters–5 - 8
(h) The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Chapters–5 - 8
(i) An indication of the persons who will be responsible for the implementation of the impact management actions.	Chapters–5 - 8
(j) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented.	Chapters–5 - 8
(k) The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f).	Chapters–5 - 8
(l) A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations.	Chapter 6
(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. (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment.	Chapter 6
(n) Any specific information that may be required by the competent authority.	Table 4.2
(2) Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	N/A

Project specific management plans have been developed for specific issues. These are included as follows:

- Appendix B: Grievance Mechanism for Public Complaints and Issues
- Appendix C: Alien Plant and Open Space Management Plan
- Appendix D: Plant Rescue and Protection Plan
- Appendix E: Re-vegetation and Rehabilitation Plan
- Appendix F: Erosion Management Plan
- Appendix G: Stormwater Management Plan
- Appendix H: Waste Management Plan
- Appendix I: Traffic Management Plan
- Appendix J: Emergency Preparedness, Response and Fire Management Plan
- Appendix L: Chance Find Protocol

4.2 Project Team

In accordance with Regulation 12 of the EIA Regulations, 2014 (GNR 326), as amended, the developer appointed Savannah Environmental (Pty) Ltd as the independent environmental consultant responsible for managing the application for EA and the supporting BA process. The application for EA and the BA process,

is being managed in accordance with the requirements of NEMA, the 2014 EIA Regulations (GNR 326), as amended, and all other relevant applicable legislation.

4.2.1 Details and Expertise of the Environmental Assessment Practitioner (EAP)

In accordance with Regulation 12 of the 2014 EIA Regulations (GN R326), Montana 2 Solar Energy Facility (Pty) Ltd has appointed Savannah Environmental (Pty) Ltd (Savannah Environmental) as the independent environmental consultant to undertake the Basic Assessment and prepare the BA Report for Montana 2 Solar Energy Facility and its associated infrastructure. Neither Savannah Environmental nor any of its specialists are subsidiaries of/or are affiliated to Montana 2 Solar Energy Facility (Pty) Ltd. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed solar PV facility.

Savannah Environmental is a leading provider of integrated environmental and social consulting, advisory and management services with considerable experience in the fields of environmental assessment and management. The company is wholly woman-owned (51% black woman-owned) and is rated as a Level 2 Broad-Based Black Economic Empowerment (B-BBEE) Contributor. The company was established in 2006 with a clear objective to provide services to the infrastructure development sector. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team that has been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa and neighbouring countries. Strong competencies have been developed in project management of environmental processes, as well as strategic environmental assessment and compliance advice, and the assessment of environmental impacts, the identification of environmental management solutions and mitigation/risk minimising measures.

The Savannah Environmental team has considerable experience in environmental impact assessments and environmental management and has been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa, including those associated with electricity generation and transmission.

The Savannah Environmental team comprises:

Tamryn Lee Goddard is the principle author of this report. She holds a bachelor's degree in Environmental Management, and postgraduate higher diplomas in Environmental Engineering, monitoring, and conservation ecology. She has 2 years of experience in the environmental management field. Her key focus is on undertaking environmental impact assessments, GIS mapping, public participation, environmental management plans and programmes. She is registered as a young professional with the International Association of Impact Assessors (IAIA).

Jo-Anne Thomas is the Environmental Assessment Practitioner for this project. She holds a Master of Science Degree in Botany (M.S.c Botany) from the University of the Witwatersrand and is registered as a Professional Natural Scientist (400024/2000) with the South African Council for Natural Scientific Professions (SACNASP) and a registered Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioners Association of South Africa (EAPASA) (2019/726). She has over 20 years of experience in the field of environmental assessment and management, and the management of large environmental assessment and management projects. During this time, she has managed and coordinated a multitude of large-scale infrastructure EIAs and is also well versed in the management and leadership of teams of specialist consultants,

and dynamic stakeholders. She has been responsible for providing technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, EIA studies, environmental permitting, public participation, EMPs and EMPrs, environmental policy, strategy and guideline formulation, and integrated environmental management (IEM). Her responsibilities for environmental studies include project management, review and integration of specialist studies, identification and assessment of potential negative environmental impacts and benefits, and the identification of mitigation measures, and compilation of reports in accordance with applicable environmental legislation.

Nondumiso Bulunga. is a Social, GIS and Stakeholder Engagement Specialist at Savannah Environmental. Nondumiso has eight (8) years working experience in project management and facilitation in various industries such as environmental services field including but not limited to recycling, industrial, energy, mining, and agriculture. Working for small and large organisations, Nondumiso has gained exposure in research, collection of data, critical analysis, GIS, and environmental solutions. Nondumiso has worked on projects in South Africa and Malawi. Nondumiso is very well versed in the IFC Environmental and Social Performance Standards (including IFC PS 2012) and the associated Equator Principles, which have informed the approach and standard for projects regarding ESIA. Nondumiso is skilled at organising and driving effective project teams at a scale relevant to the project's requirements. She has technical experience and can quickly identify the most pertinent issues of a particular project whilst focussing on driving project success by rigorously implementing project management tools.

Nicolene Venter. She is a Board Member of IAPSA (International Association for Public Participation South Africa). She holds a Higher Secretarial Diploma and has over 21 years of experience in public participation, stakeholder engagement, awareness creation processes and facilitation of various meetings (focus group, public meetings, workshops, etc.). She is responsible for project management of public participation processes for a wide range of environmental projects across South Africa and neighbouring countries.

4.2.2 Details of the Specialist Consultants

A number of independent specialist consultants have been appointed as part of the BA project team in order to adequately identify and assess potential impacts associated with the project (refer to **Table 4.2)**.. The specialist consultants have provided input into the BA Report as well as this EMPr.

Table 4.2: Specialist Consultants which provided input into the EMPr

Issue/Assessment	Specialist Name	Specialist Company	Appendices
Biodiversity Impact Assessment	Mahomed Desai	The Biodiversity Company	Appendix D
Avifauna Impact Assessment	Ashlin Bodasin	Arcus Consultancy Service	Appendix E
Soils Compliance Statement	Matthew Mamera	The Biodiversity Company	Appendix F
Heritage Impact Assessment	Jenna Lavin Nicholas Willtshire	CTS Heritage	Appendix G
Visual Impact Assessment	Bryony Van Niekerk Lourens du Plesses	NuLeaf Planning and Environmental & LOGIS	Appendix H
Traffic Impact Assessment	Iris Wink	JG Africa	Appendix J
Social Impact Assessment	Tony Barbour	Tony Barbour Environmental and Social Assessment Consultant	Appendix I

CHAPTER 5: PLANNING AND DESIGN MANAGEMENT PROGRAMME

Overall Goal: undertake the pre-construction activities (planning and design phase) in a way that:

- Ensures that the preferred design and layout of the PV panels and associated infrastructure responds to the identified environmental constraints and opportunities.
- Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements.
- Ensures that adequate regard has been taken of any landowner and community concerns and that these are appropriately addressed through design and planning (where appropriate).
- Ensures that the best environmental options are selected for the linear components (underground cable network, and the on-site facility substation), including the access roads.
- Enables the construction activities to be undertaken without significant disruption to other land uses and activities in the area.

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

5.1 Objectives

OBJECTIVE 1: Ensure the facility design responds to identified environmental constraints and opportunities

No environmental fatal flaws were identified in the detailed specialist studies conducted, and no impacts of unacceptable significance are expected to occur with the implementation of the recommended mitigation measures. These measures include, amongst others, the avoidance of sensitive features and the undertaking of monitoring, as specified by the specialists. The layout as reflected in Figure 2.1 and 2.2 should be implemented.

Project Component/s	» PV panels » Access roads » Inverter stations » Transformer » Underground cabling » Associated buildings
Potential Impact	» Impact on identified sensitive areas. » Design fails to respond optimally to the environmental considerations.
Activities/Risk Sources	» Positioning of all project components » Pre-construction activities, e.g. geotechnical investigations, site surveys and environmental walk-through surveys. » Positioning of temporary sites.
Mitigation: Target/Objective	» The design of the PV facility responds to the identified environmental constraints and opportunities. » Optimal planning of infrastructure to minimise visual impact.

	» Site sensitivities are taken into consideration and avoided as far as possible, thereby mitigating potential impacts.

Mitigation: Action/Control	Responsibility	Timeframe
Plan and conduct pre-construction activities in an environmentally acceptable manner.	Developer Contractor	Pre-construction
Undertake a detailed geotechnical pre-construction survey.	Developer / Contractor Geotechnical specialist	Pre-construction
Finalise layout of all components, and submit to DFFE for approval prior to commencement of construction.	Developer Contractor	Pre-construction
The EMPr and the EA should form part of the contract with the Contractors appointed to construct the PV facility and associated infrastructure, and must be used to ensure compliance with environmental specifications and management measures.	Developer Contractor	Tender Design and Design Review Stage
Ensure that the face of the PV panels procured have the most effective non-reflective surface possible.	Developer Contractor	Project planning
The placement of conservancy tanks below the 1: 100-year flood line must be avoided, to prevent potential pollution incidents during flood events.	Developer Contractor	Project planning
Solar panels must be mounted on pile driven or screw foundations, such as post support spikes, rather than heavy foundations, such as trench-fill or mass concrete foundations, to reduce the negative effects on natural soil functioning, such as its filtering and buffering characteristics, while maintaining habitats for both below and above-ground biodiversity	Developer/Contractor	Project Planning
Plan the placement of the temporary laydown areas and construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible and to avoid habitat loss and disturbance to adjoining areas and . ensure the laydown areas are properly fenced off.	Developer Contractor	Project planning
Plan development levels to minimise earthworks to ensure that levels are not elevated.	Developer Contractor	Project planning
The fence to be used to fence off the facility must be designed to be animal and bird friendly in order to prevent entrapment and electrocutions of ground-dwelling animal and bird species. No electrified strands should be placed within 30cm of the ground or alternatively, the electrified strands should be placed on the inside of the fence and not on the outside.	Developer Contractor	Project planning
Ensure clear rules and regulations for access to the proposed site are developed.	Developer Contractor	Pre-Construction
Carefully plan the access roads and entrances to the site in order to limit any intrusion on the neighbouring property owners and road users.	Developer Contractor	Planning and design
Plan a designated access point to the site to ensure safe entry and exit.	Developer Contractor	Design
Plan the laydown areas, operation and maintenance buildings such that they are located outside drainage features and their associated buffer zones.	Developer Contractor	Design

Mitigation: Action/Control	Responsibility	Timeframe
Plan the placement of light fixtures for the plant and the ancillary infrastructure in such a manner so as to minimise glare impacts on the surrounding area. All night-lighting should use low-UV type lights (such as most LEDs), which do not attract insects, and should be directed downwards.	Developer Contractor	Project planning
Where discharge of rainwater on roads will be channelled directly into the natural environment, the application of diffuse flow measures must be included in the design.	Developer Contractor	Project planning
New elements should be designed to blend as naturally as possible with their backdrop.	Developer / Contractor Design engineer	Planning and design
Plan to maintain the height of structures as low as possible.	Developer / Contractor Design engineer	Planning and design
Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development.	Developer / Contractor Design engineer	Planning and design
Reduce the construction period as far as possible through careful planning and productive implementation of resources.	Developer Contractor	Pre-construction
No temporary site camps must be planned outside the development footprint of the project.	Developer	Planning and design
Should any water storage reservoirs be required, these should be covered with fine mesh or other exclusion material in order to exclude and prevent birds from accessing potentially contaminated water contained therein.	Developer Contractor	Planning and design
Have appropriate action plans on site, and training for contactors and employees in the event of spills, leaks and other potential impacts to the aquatic systems.	Developer Contractor	Planning and design
The following actions are applicable to visual sensitivity. » Respond to the natural environment during the planning of buildings and infrastructure. » Consolidate development and make use of already disturbed sites rather than pristine areas. » Do not exceed a height of 5m for all structures. » Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint. » Wherever possible, use materials, coatings, or paints that have little or no reflectivity. » Commercial messages, symbols and/logos are not permitted on structures. » Use slight variations in topography to screen PV panels, where possible. Design linear features to follow natural land contours rather than straight lines.	Developer Contractor	Planning and design
A 100m no-go development buffer is implemented around heritage sites POORTJIE027 & POORTJIE028	Developer/Contractor	Planning and design

Performance Indicator	» The design meets the objectives and does not degrade the environment. » Demarcated sensitive areas (i.e. no-go areas) are avoided at all times. » Design and layouts respond to the mitigation measures and recommendations in the BA Report.

Monitoring	» Review of the design by the Project Manager and the Environmental Control Officer (ECO) prior to the commencement of construction. » Monitor ongoing compliance with the method statements.

OBJECTIVE 2: Ensure that relevant permits and plans are in place to manage impacts on the environment

Project Component/s	» PV panels » Access roads » Inverter stations » Transformer » Underground cabling » Associated buildings
Potential Impact	» Impact on identified sensitive areas and protected species. » Design fails to respond optimally to the environmental considerations.
Activities/Risk Sources	» Positioning of all project components. » Pre-construction activities, e.g. geotechnical investigations, site surveys of on-site facility substation footprint and internal access roads and environmental walk-through surveys. » Positioning of temporary sites.
Mitigation: Target/Objective	» To ensure that the design of the solar PV facility responds to the identified environmental constraints and opportunities. » To ensure that pre-construction activities are undertaken in an environmentally friendly manner. » To ensure that the design of the solar PV facility responds to the identified constraints identified through pre-construction surveys.

Mitigation: Action/Control	Responsibility	Timeframe
Obtain any additional environmental permits required from the Department of Forestry, Fisheries, and the Environment (DFFE) and Cape Nature prior to the commencement of construction. Copies of permits/licenses must be submitted to the Director: Environmental Impact Evaluation at the DFFE.	Developer	Pre-construction
Water Use Authorisation must be obtained from the Department of Water and Sanitation or relevant Catchment Management Agency prior to commencing with construction activities.	Developer	Pre-construction
Should abnormal loads have to be transported by road to the site, a permit must be obtained from the relevant Provincial Government. Alert traffic authorities well in advance of any heavy loads that must be transported on local roads and elicit their assistance in controlling traffic associated with the transportation of these loads.	Developer Contractor transporting material to site.	Planning and design
Pre-construction walk through of the facility's layout and the main access road must be undertaken by an ecological specialist.	Developer/ Contractor Specialist	Pre-construction
Undertake search and rescue for identified species of concern before construction in line with the requirements of the relevant permits.	Developer Contractor Specialist	Pre-construction
Affected individuals of selected protected plant species which cannot be avoided must be translocated to a safe area. This does	Developer Specialist	Pre-construction

Mitigation: Action/Control	Responsibility	Timeframe
not include woody plant species listed under the National Forest Act (Act No. 84 of 1989) which will require a permit from DFFE prior to their destruction.		
Vegetation clearing to commence only after the walk through has been conducted and necessary permits obtained.	Developer Contractor	Pre-construction
Pre-construction environmental induction must be provided to all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas etc.	Developer/ Contractor Specialist	Pre-construction
The Chance Fossil Find Protocol (**Appendix L**) must be implemented in the event that archaeological or palaeontological resources are found.	Developer Contractor	Pre-construction
The mitigation measures of the Stormwater Management Plan (SWMP) (**Appendix G**) must be implemented and should provide for a drainage system sufficiently designed to prevent water run-off from the solar panels to cause soil erosion.	Developer/ Contractor Design engineer	Pre-construction
Develop and implement an alien, invasives and weeds eradication/control plan (**Appendix C**).	Developer/ Contractor Specialist	Pre-construction
Compile and implement a construction period 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.	Contractor	Pre-construction

Performance Indicator	» Permits are obtained and relevant conditions complied with. » Impact on protected plant species reduced to some degree through Search and Rescue. » Relevant management plans and Method Statements prepared and implemented.
Monitoring	» Review of the design by the Project Manager and the ECO prior to the commencement of construction. » Monitor ongoing compliance with the EMPr and method statements.

OBJECTIVE 3: Ensure appropriate planning is undertaken by each contractor

Project Component/s	» PV panels » Access roads » Inverter stations » Transformer » Underground cabling » Associated buildings
Potential Impact	» Impact on identified sensitive areas. » Design and planning fail to respond optimally to the environmental considerations.
Activities/Risk Sources	» Positioning of all project components. » Pre-construction activities. » Positioning of temporary sites.

	» Employment and procurement procedures.
Mitigation: Target/Objective	» To ensure that the design of the solar PV facility responds to the identified environmental constraints and opportunities. » To ensure that pre-construction activities are undertaken in an environmentally friendly manner.

Mitigation: Action/Control	Responsibility	Timeframe
Where feasible, local suppliers and contractors, that are compliant with the Broad-Based Black Economic Empowerment (B-BBEE) criteria, should be used as far as possible to ensure that the benefits resulting from the project accrue to the local communities which are also likely to be the most significantly impacted/affected by the project.	Developer Contractor	Pre-construction
Develop a database of local companies, specifically Historically Disadvantaged (HD), that qualify as potential service providers (e.g. construction companies, security companies, catering companies, waste collection companies, transportation companies etc.) prior to the tender process and invite them to bid for project-related work where applicable.	Developer Contractor	Pre-construction
Adopt a local employment policy to maximise the opportunities made available to the local labour force.	Developer Contractor	Pre-construction
The tender documentation must stipulate the use of local labour as far as possible.	Developer Contractor	Pre-construction
Perform a skills audit to determine the potential skills that could be sourced in the local area.	Developer Contractor	Pre-construction
Develop and implement a recruitment protocol in consultation with the Beaufort West LM and local community leaders. Ensure that the procedures for applications for employment are clearly communicated.	Developer Contractor	Pre-construction
In the recruitment selection process, a minimum percentage of women must be employed.	Developer Contractor	Pre-construction
Set realistic local recruitment targets for the construction phase.	Contractor	Pre-construction
Training and skills development programmes must be initiated prior to the commencement of the construction phase.	Developer Contractor	Pre-construction
Recruitment of temporary works onsite is not permitted. A recruitment office with a Community Liaison Officer must be established to deal with job seekers. The labour desk should be in a secure and suitable area in order to discourage the gathering of people at the construction site.	EO	Pre-construction
Local community organisations and policing forums must be informed of construction times and the duration of the construction phase. Procedures for the control and removal of loiterers at the construction site should be established.	Developer Contractor	Pre-Construction
A security company must be appointed and appropriate security procedures implemented.	Developer Contractor	Pre-Construction

Performance Indicator	» Local employment and procurement is encouraged.
Monitoring	» Monitor ongoing compliance with the EMPr and method statements.

OBJECTIVE 4 : Ensure effective communication mechanisms

On-going communication with affected and surrounding landowners, and surrounding communities is important to maintain during the construction and operation phases of the development. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

Project component/s	» PV facility » Access roads » Associated infrastructure
Potential Impact	» Impacts on affected and surrounding landowners, communities and land uses
Activity/risk source	» Activities associated with construction » Activities associated with operation
Mitigation: Target/Objective	» Effective communication with affected and surrounding landowners, and communities. » Addressing of any issues and concerns raised as far as possible in as short a timeframe as possible.

Mitigation: Action/control	**Responsibility**	**Timeframe**
Compile and implement a grievance mechanism (**Appendix B**) procedure for the public to be implemented during both the construction and operation phases of the facility. This procedure should include details of the contact person who will be receiving issues raised by interested and affected parties, and the process that will be followed to address issues.	Developer Contractor O&M Contractor	Pre-construction (construction procedure) Pre-operation (operation procedure)
Develop and implement a grievance mechanism for the construction, operation and closure phases of the project for all employees, contractors, subcontractors and site personnel. This procedure should be in line with the South African Labour Law.	Developer Contractor O&M Contractor	Pre-construction (construction procedure) Pre-operation (operation procedure)
Organise local community meetings to advise the local labour of the project that is planned to be established and the jobs that can potentially be applied for.	EO	Pre-construction
Before construction commences, representatives from the local municipality, community leaders, community-based organisations and the surrounding property owners (of the larger area), must be informed of the details of the contractors, size of the workforce and construction schedules.	Developer Contractor	Pre-construction and construction

Performance Indicator	» Effective communication procedures in place.
Monitoring	» A grievance mechanism (**Appendix B**) and register must be maintained by the Contractor to record all complaints and queries relating to the project and the action taken to resolve the issue. » All correspondence should be in writing. » Developer and contractor must keep a record of local recruitments and information on local labour; to be shared with the ECO for reporting purposes during construction.

CHAPTER 6: MANAGEMENT PROGRAMME: CONSTRUCTION

Overall Goal: Undertake the construction phase in a way that:

- Ensures that construction activities are appropriately managed in respect of environmental aspects and impacts.
- Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area, in particular concerning noise impacts, farming practices, traffic and road use, and effects on local residents.
- Minimises the impact on the indigenous natural vegetation, and habitats of ecological value, including drainage lines.
- Minimises impacts on fauna (including avifauna) in the study area.
- Minimises the impact on heritage sites should they be uncovered.
- Establish an environmental baseline during construction activities on the site, where possible.

6.1 Institutional Arrangements: Roles and Responsibilities for the Construction Phase

As the developer, Montana 2 Solar Energy Facility (Pty) Ltd must ensure that the project complies with the requirements of all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation. This obligation is partly met through the development of the EMPr, and the implementation of the EMPr through its integration into the contract documentation. The Developer will retain various key roles and responsibilities during the construction phase.

OBJECTIVE 1: Establish clear reporting, communication, and responsibilities in relation to the overall implementation of the EMPr

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Technical Director/Manager, Site Manager, Internal Environmental Officer (EO), Safety and Health Representative, Independent Environmental Control Officer (ECO) and Contractor for the construction phase of this project are as detailed below. Formal responsibilities are necessary to ensure that key procedures are executed. **Figure 6.1** provides an organogram indicating the organisational structure for the implementation of the EMPr.

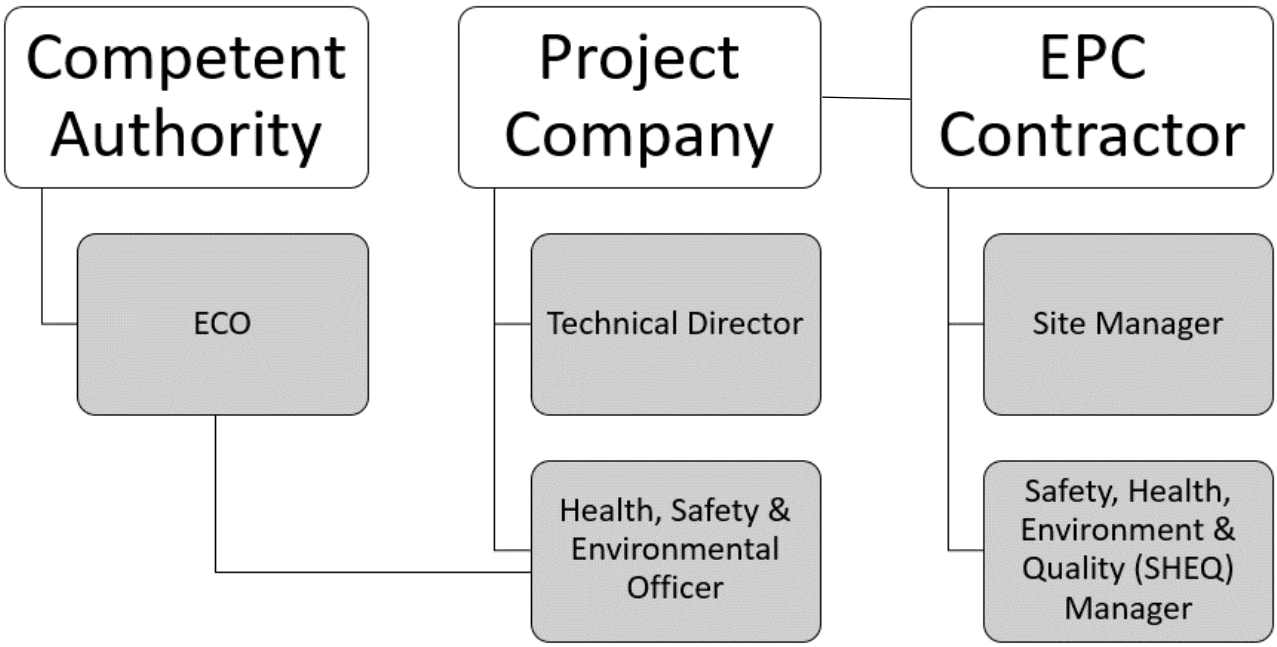

Figure 6.1: Organisational structure for the implementation of the EMPr

Construction Manager will:

- Ensure all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these.
- Ensure that the Developer and its Contractor(s) are made aware of all stipulations within the EMPr.
- Ensure that the EMPr is correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes through input from the independent ECO.
- Be fully conversant with the BA Report for the project, the EMPr, the conditions of the Environmental Authorisation, and all relevant environmental legislation.
- Be fully knowledgeable with the contents of all relevant licences and permits.

Site Manager (The Contractor's on-site Representative) will:

- Be fully knowledgeable with the contents of the BA Report.
- Be fully knowledgeable with the contents and conditions of the Environmental Authorisation.
- Be fully knowledgeable with the contents of the EMPr.
- Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with these.
- Have overall responsibility of the EMPr and its implementation.
- Conduct audits to ensure compliance to the EMPr.
- Ensure there is communication with the Technical Director, the ECO, the Internal EO and relevant discipline engineers on matters concerning the environment.
- Be fully knowledgeable with the contents of all relevant licences and permits.

- Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site.
- Confine activities to the demarcated construction site.

An independent **ECO** must be appointed by the project developer prior to the commencement of any authorised activities and will be responsible for monitoring, reviewing and verifying compliance by the Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation. Accordingly, the ECO will:

- Be fully knowledgeable of the contents of the BA Report.
- Be fully knowledgeable of the contents of the conditions of the EA (once issued).
- Be fully knowledgeable of the contents of the EMPr.
- Be fully knowledgeable of the contents of all relevant environmental legislation, and ensure compliance therewith.
- Be fully knowledgeable with the contents of all relevant licences and permits issued for the project.
- Ensure that the contents of the EMPr are communicated to the Contractors' site staff and that the Site Manager and Contractors are constantly made aware of the contents through ongoing discussion.
- Ensure that compliance with the EMPr is monitored through regular and comprehensive inspection of the site and surrounding areas.
- Ensure that the Site Manager has input into the review and acceptance of construction methods and method statements.
- Ensure that activities on site comply with all relevant environmental legislation.
- Ensure that a removal is ordered of any person(s) and/or equipment responsible for any contravention of the specifications of the EMPr.
- Ensure that any non-compliance or remedial measures that need to be applied are reported.
- Keep records of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- Independently report to the Department of Environmental Affairs (DEA) in terms of compliance with the specifications of the EMPr and conditions of the EA (once issued).
- Keep records of all reports submitted to DEA.

As a general mitigation strategy, the ECO should be present on site full-time for the site preparation and initial clearing activities to ensure the correct demarcation of no-go areas, to facilitate environmental induction with construction staff and to supervise any flora relocation and faunal rescue activities that may need to take place during the site clearing (i.e. during site establishment, and excavation of foundations). Thereafter, weekly site compliance inspections would probably be sufficient, which must be increased if required. The ECO will be supplemented with the EPC Contractor's/Project Company's Environmental Officer (EO) who will be located on site on a daily basis and will guide the EPC Contractors/Project Company to ensure compliance with the environmental considerations. Therefore, in the absence of the ECO there will be a designated owner's EO present to deal with any environmental issues that may arise such as fuel or oil spills. The ECO shall remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site handed over for operation.

Contractor's Safety, Health and Environment Representative and/or Environmental Officer: The Contractor's Safety, Health and Environment (SHE) Representative, employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports. In addition, the SHE must act as liaison and advisor on all environmental and

related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor. In some instances, a separate EO may be appointed to support this function.

The Contractor's Safety, Health and Environment Representative and/or EO should:

- Be well versed in environmental matters.
- Understand the relevant environmental legislation and processes and the implementation thereof.
- Understand the hierarchy of Environmental Compliance Reporting, and the implications of Non-Compliance.
- Know the background of the project and understand the implementation programme.
- Be able to resolve conflicts and make recommendations on site in terms of the requirements of this specification.
- Keep accurate and detailed records of all EMPr-related activities on site. The EO shall keep a daily diary for monitoring the site specific activities as per the project schedule.
- Supervise any flora relocation and faunal rescue activities that may need to take place during the site clearing (i.e. during site establishment, and excavation of foundations) and therefore needs the relevant training/ experience. The EO will have the overall responsibility for day-to day environmental management and implementation of mitigations.
- The EO is responsible for reporting to the ECO on the day-to-day on-site implementation of this EMPr and other Project Permits/Authorisations.
- Ensure or otherwise train and induct all contractor's employees prior to commencement of any works.
- Ensure that there is daily communication with the Site Manager regarding the monitoring of the site.
- Compilation of Weekly and Monthly Monitoring Reports to be submitted to the ECO and Site Manager.
- In addition, the EO/ Environmental Representative must act as project liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager, ECO and Contractor(s).

Contractors and Service Providers: It is important that Contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The Contractors must appoint an Internal EO who will be responsible for informing contractor employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The Internal EO and Contractor's obligations in this regard include the following:

- Must be fully knowledgeable on all environmental features of the construction site and the surrounding environment.
- Be fully knowledgeable with the contents and the conditions of the Environmental Authorisation.
- Be fully knowledgeable with the contents with the EMPr.
- Be fully knowledgeable of all the licences and permits issued for the site.
- Ensure a copy of the Environmental Authorisation and EMPr is easily accessible to all on-site staff members.
- Ensure contractor employees are familiar with the requirements of this EMPr and the environmental specifications as they apply to the construction of the solar PV facility.
- Ensure that prior to commencing any site works, all contractor employees and sub-contractors must have attended environmental awareness training included in the induction training which must provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented.

- Ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor.
- Manage the day-to-day on-site implementation of this EMPr, and the compilation of regular (usually weekly) Monitoring Reports.
- Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken, including those of the Independent ECO.
- Inform staff of the environmental issues as deemed necessary by the Independent ECO.

All Contractors (including sub-contractors and staff) and service providers are ultimately responsible for:

- Ensuring adherence to the environmental management specifications.
- Ensuring that Method Statements are submitted to the Site Manager (and ECO) for approval before any work is undertaken.
- Ensuring that any instructions issued by the Site Manager on the advice of the ECO are adhered to.
- Ensuring that a report is tabled at each site meeting, which will document all incidents that have occurred during the period before the site meeting.
- Ensuring that a register is kept in the site office, which lists all transgressions issued by the ECO.
- Ensuring that a register of all public complaints is maintained.
- Ensuring that all employees, including those of sub-contractors, receive training before the commencement of construction in order for the sub-contractors to constructively contribute towards the successful implementation of the EMPr (i.e. ensure their staff are appropriately trained on the environmental obligations).

Community Liaison Officer (CLO) will be responsible for community relations between the Developer, Owner, Contractor and the Engineer. The CLO will inform the community regarding the project details, safety precautions and programme. Duties and responsibilities of the community liaison officer include:

- Be available at the site offices generally between the hours of 07:00 and 09:00 and again from 15:00 until the end of working day. Normal working hours will be from 07:00 till 17:00.
- Maintain an up-to-date record of potential employees within the community and provide the contractor with copies of this information.
- To assist the contractors human resources team to, screen and nominate labour from the community in accordance with the Contractor's requirements and determine, in consultation with the Contractor, the needs of local labour for employment and relevant technical training, where applicable.
- Communicate on a daily basis with the Contractor on labour related issues concerning the community. .
- In relation to the community, identify possible labour disputes, unrest, strikes, etc., in advance and assist in their resolution.
- Attend all meetings at which the community and/or labour is represented or discussed.
- Attend contract site meetings and report on community and labour issues at these meetings.
- Co-ordinate and assist with the obtaining of information regarding the community's needs (questionnaires, etc.).
- Inform local labour of their conditions of temporary employment, to ensure their timeous availability and to inform them timeously of when they will be relieved.
- Keep a daily written record of meetings and community liaison.
- Arrange venues for meetings, if required.
- Coordinate stakeholder contact through the implementation of a stakeholder management platform.

» Assist with the training and education of the community regarding the correct usage of the services, where applicable.
» Any other duties that may become necessary as the works progress.

6.2 Objectives

In order to meet the overall goal for construction, the following objectives, actions, and monitoring requirements have been identified.

OBJECTIVE 2: Minimise impacts related to inappropriate site establishment

Project Component/s	» Area infrastructure (i.e. PV panels, inverters, transformers, switchgear and ancillary buildings). » Linear infrastructure (i.e. underground cabling, main access road and internal access roads and fencing).
Potential Impact	» Hazards to landowners and the public. » Damage to indigenous natural vegetation. » Loss of threatened plant species. » Visual impact of general construction activities, and the potential scarring of the landscape due to vegetation clearing and resulting erosion.
Activities/Risk Sources	» Any unintended or intended open excavations (foundations and cable trenches). » Movement of construction vehicles in the area and on site. » Transport to and from the temporary construction area/s.
Mitigation: Target/Objective	» To secure the site against unauthorised entry. » Low faunal impacts during construction. » To protect members of the public/landowners/residents. » No loss of or damage to sensitive vegetation in areas outside the immediate development footprint. » Minimal visual intrusion by construction activities and intact vegetation cover outside of the immediate construction work areas.

Mitigation: Action/Control	Responsibility	Timeframe
All personnel should undergo environmental induction with regards to fauna and, in particular, awareness about not harming or collecting species such as snakes, tortoises and owls, which are often persecuted out of superstition.	Developer Contractor	Site establishment and duration of construction
Any fauna threatened by the construction activities should be removed to safety by an appropriately qualified environmental officer.	Contractor/Suitably qualified personnel	Site establishment and duration of construction
If there are any active bird nests near construction areas, these should be reported to the ECO and where possible, these should be monitored until the birds have finished nesting and the fledglings have left the nest. The EO should monitor and enforce a ban on the hunting and collecting avifauna or their products (i.e. eggs).	Contractor	Site establishment and duration of construction
The EO must monitor and enforce a ban on hunting and the collection of all plants and animals and their products; and	EO	Site establishment and duration of construction

Mitigation: Action/Control	Responsibility	Timeframe
construction activities are restricted near active raptor/Secretary bird nests should these be discovered prior to or during construction (none were identified during the BA process).		
Any avifauna threatened or injured by construction activities should be removed to safety by the EO or any appropriately qualified professional.	EO/Suitably qualified personnel	Duration of construction
All construction vehicles should adhere to the demarcated access roads and must adhere to a low speed limit (40km/h max for heavy duty vehicles and 30km/h max for light duty vehicles) to avoid collisions with susceptible species such as snakes and tortoises.	Developer Contractor	Duration of construction
Minimise vegetation clearance and maintain the existing vegetation as far as possible with the development footprint and on the surrounding areas. Unnecessary vegetation clearance must be avoided.	Contractor	Duration of construction
Vegetation clearance must only be undertaken prior to construction.	Contractor	Duration of construction
Soil stockpiles must be dampened with a dust suppressant or an equivalent to prevent erosion by wind.	Contractor	Duration of construction
All graded or disturbed areas which will not be covered by permanent infrastructure such as paving, buildings or roads must be stabilised with erosion control mats (geo-textiles) and revegetated.	Contractor	Duration of construction
Signs of erosion within the development footprint must be documented through photographic evidence encompassed with the inclusion of the GPS coordinates of the identified problem areas.	EO	Duration of project
All soil stockpiles on site that are within 100m of the large drainage line must be bunded using an appropriate structure (i.e. silt nets, sand bags, pegged wooden planks, etc.)	Contractor	Site establishment and duration of construction.
All vehicles and machinery must be checked for leaks before being allowed to operate on site. Should leaks be detected, the relevant vehicles and machinery must be repaired before being allowed to operate on the development area.	Contractor	Site establishment and duration of construction
Vehicle movement through the drainage lines is to be limited as far as possible.	Contractor	Site establishment and duration of construction.
If holes or trenches are to be dug, these should not be left open for extended periods of time as terrestrial avifauna may become entrapped therein.	Contractor	Site establishment and duration of construction
Where erosion takes place, the EO must inspect the degree of erosion and propose suitable mitigation measures to prevent further erosion.	Contractor EO	Construction
The Stormwater Management Plan (**Appendix G**) must be implemented for the construction phase to ensure that drainage and run-off issues on the site are adequately addressed.	Contractor Civil Engineer	Site establishment and duration of construction.
Secure site, working areas and excavations in an appropriate manner.	Contractor	Site establishment, and duration of construction
Ensure that no activities infringe on identified no-go and very high and high sensitivity areas.	Contractor	Duration of construction

Mitigation: Action/Control	Responsibility	Timeframe
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Contractor	Construction
Access to adjacent areas to be strictly controlled.	Developer Contractor	Pre-construction Construction
Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).	Contractor	Construction
Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.	Contractor	Construction
The construction site must be appropriately fenced and security provided.	Contractor	Construction
Adequate protective measures must be implemented to prevent unauthorised access to the working area and the internal access routes.	Contractor	Construction
All unattended open excavations must be adequately demarcated and/or fenced.	Contractor	Construction
Establish appropriately bunded areas for storage of hazardous materials (e.g. fuel to be required during construction).	Contractor	Site establishment, and duration of construction
Visual impacts must be reduced during construction through minimising areas of surface disturbance, controlling erosion, using dust suppression techniques, and restoring exposed soil as closely as possible to their original contour and vegetation.	Contractor	Site establishment, and duration of construction
Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing but must be temporarily stored in a demarcated area.	Contractor	Site establishment, and duration of construction
Establish the necessary ablution facilities with chemical toilets and provide adequate sanitation facilities and ablutions for construction workers so that the surrounding environment is not polluted (at least one sanitary facility for each sex and for every 30 workers as per the 2014 Construction Regulations; Section 30(1)(b)) at appropriate locations on site). The facilities must be placed within the construction area.	Contractor	Site establishment, and duration of construction
Ablution or sanitation facilities must not be located within 100m from any drainage line or within the 1:100 year flood.	Contractor	Site establishment, and duration of construction
Supply adequate weather and vermin proof waste collection bins and skips (covered at minimum with secured netting or shade cloth) at the site where construction is being undertaken. Separate bins should be provided for general and hazardous waste. Provision should be made for separation of waste for recycling.	Contractor	Site establishment, and duration of construction
Foundations and trenches must be backfilled to originally excavated materials as much as possible. Excess excavation materials must be disposed of only in approved areas, or, if suitable, stockpiled for use in reclamation activities.	Contractor	Site establishment, and duration of construction and rehabilitation

Performance Indicator	» Site is secure and there is no unauthorised entry. » No members of the public/ landowners injured.

	» Appropriate and adequate waste management and sanitation facilities are provided at construction site. » Vegetation cover on and in the vicinity of the site is intact (i.e. full cover as per natural vegetation within the environment) with no evidence of degradation or erosion. » Avifaunal microhabitat loss restricted to development footprint. » Low disturbance and impact on red-listed avifaunal species. » Avifauna do not have access to water contained in reservoirs. » Low mortality of avifauna due to construction machinery and activities. » No disturbance of breeding raptors (i.e. no nest abandonment due to disturbance), if present in the development area. » No poaching or collecting of avifauna or their products (e.g. eggs and nestlings) by construction personnel. » Removal to safety of entrapped/injured avifauna encountered during construction. » Prevent, minimise and manage any visible erosion within the development footprint of the project.
Monitoring	» An incident reporting system is used to record non-conformances to the EMPr. » EO and ECO to monitor all construction areas on a continuous basis until all construction is completed. Non-conformances must be immediately reported to the Site Manager. » Monitoring of vegetation clearing during construction (by contractor as part of construction contract). » On-going visual assessments of disturbed areas to ensure erosion prevention by the EO. » Monitor visual signs of erosion such as the formation of gullies after rainfall events and the presence of the dust emissions during wind storms. » Monitoring of rehabilitated areas quarterly for at least a year following the end of construction (by contractor as part of construction contract). » Vegetation is cleared only within footprint areas during construction. » Perimeter fencing is constructed in a manner that is considered bird friendly, especially with respect to ground-dwelling birds. » Open reservoirs on site are covered with mesh to exclude birds. » No birds or eggs are disturbed or removed by construction personnel.

OBJECTIVE 3: Appropriate management of the construction site and construction workers

Project Component/s	» Area infrastructure (i.e. PV panels, inverters, transformers, switchgear and ancillary buildings). » Linear infrastructure (i.e. underground cabling, main access road and internal access roads and fencing).
Potential Impact	» Damage to indigenous natural vegetation and sensitive areas. » Damage to and/or loss of topsoil (i.e. pollution, compaction etc.). » Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities. » Pollution/contamination of the environment.
Activities/Risk Sources	» Vegetation clearing and levelling of equipment storage area/s. » Access to and from the equipment storage area/s. » Ablution facilities. » Contractors not aware of the requirements of the EMPr, leading to unnecessary impacts on the surrounding environment.

Mitigation: Target/Objective	» Limit equipment storage within demarcated designated areas. » Ensure adequate sanitation facilities and waste management practices are implemented. » Ensure appropriate management of actions by on-site personnel in order to minimise impacts to the surrounding environment.

Mitigation: Action/Control	Responsibility	Timeframe
Restrict public access to works area including construction areas, laydown and storage sites via appropriate security. Only allow site access after appropriate induction and use of appropriate personal protective equipment (PPE).	Contractor	Construction
In order to minimise impacts on the surrounding environment, contractors must be required to adopt a certain Code of Conduct and commit to restricting construction activities to areas within the development footprint. Contractors and their sub-contractors must be familiar with the conditions of the EA, the BA Report, and this EMPr, as well as the requirements of all relevant environmental legislation.	Contractor	Construction
Introduce an incident reporting system to be tabled at weekly/monthly project meetings.	Contractor and sub-contractor/s	Pre-construction
Infrastructure such as the perimeter fences (including gates) and the main access and internal roads must be maintained or repaired if disturbed or damaged due to construction activities.	Contractor	Construction
Adequate traffic warning signs and control measures (including speed limits) must be implemented along access roads to warn road users of the construction activities taking place for the duration of the construction phase. Ensure that all signage is visible at all times (especially at night) and must be maintained throughout the construction phase.	Contractor	Construction
All vehicles must be road worthy and drivers must be licensed, obey traffic rules, follow speed limits and be made aware of potential road safety issues.	Contractor and sub-contractor/s	Construction
Implement penalties for drivers of heavy and light vehicles for reckless driving or speeding as a way to enforce compliance to traffic rules.	Contractor	Construction
Heavy and light vehicles must be inspected regularly to ensure their road safety worthiness. Records pertaining to this must be maintained and made available for inspection as necessary.	Contractor	Construction
Ensure all construction equipment and vehicles are properly maintained at all times.	Contractor	Construction
Noise generated on-site from all the proposed activities must comply with the Western Cape Noise Control Regulations gazetted in Provincial Notice 200/2013.	Contractor	Construction
Restrict the operation of power tools and plant that generate noise to daylight hours as per the Environment Conservation Act (Act No. 73 of 1989) during the construction phase, and/or as any deviation that is approved by the relevant authorities.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
Ensure that construction workers are clearly identifiable. All workers should carry identification cards and wear identifiable clothing.	Contractor	Construction
As far as possible, minimise vegetation clearing and levelling for equipment storage areas.	Contractor	Site establishment, and during construction
Ensure that operators and drivers are properly trained and make them aware, through regular toolbox talks, of any risk they may pose to the community and/or environment.	Contractor	Construction
Contact details of emergency services should be prominently displayed on site.	Contractor	Construction
Open fires on the site for heating, smoking or cooking are not allowed, except in designated areas.	Contractor	Construction
Contractor must provide adequate firefighting equipment on site and provide firefighting training to selected construction staff.	Contractor	Construction
Personnel trained in first aid should be on site to deal with smaller incidents that require medical attention.	Contractor	Construction
Road borders must be regularly maintained to ensure that vegetation remains short to serve as an effective firebreak. An emergency fire plan must be developed with emergency procedures in the event of a fire.	Contractor	Site establishment, and during construction
Encourage contractors and local people to report any suspicious activity associated with crime to the appropriate authorities.	Contractor	Construction
Ensure that the local municipalities, police, security companies, and policing forums are alerted to the increased construction activities in the region and the risk it poses in respect of crime.	Contractor	Duration of Contract
Ensure waste storage facilities are maintained and emptied on a regular basis.	Contractor	Site establishment, and duration of construction
No liquid waste, including grey water, may be discharged into any water body or drainage line. All sewage disposal to take place at a registered and operational wastewater treatment works. Proof of disposal to be retained as proof of responsible disposal.	Contractor	Duration of construction
Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm. This can be achieved through the provision of appropriate environmental awareness training to all personnel. Records of all training undertaken must be kept.	Contractor	Duration of construction
Ensure compliance with all national, regional and local legislation with regard to the storage, handling and disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials.	Contractor	Construction
Ensure ablution facilities are appropriately maintained. Ablutions must be cleaned regularly and associated waste disposed of at a registered/permitted waste disposal site. Ablutions must be removed from site when construction is completed.	Contractor and sub-contractor/s	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
Cooking and eating of meals must take place in a designated area. No fires are allowed on site. No firewood or kindling may be gathered from the site or surrounds.	Contractor and sub-contractor/s	Duration of contract
All litter must be deposited in a clearly marked, closed, animal-proof disposal bin in the construction area. Particular attention needs to be paid to food waste.	Contractor and sub-contractor/s	Duration of contract
Keep a record of all hazardous substances stored on site. Clearly label all the containers storing hazardous waste.	Contractor	Duration of contract
A Method Statement should be compiled for the management of pests and vermin within the site, specifically relating to the canteen area if applicable.	Contractor	Construction
No disturbance of flora or fauna must be undertaken outside of the demarcated construction area/s.	Contractor and sub-contractor/s	Duration of contract
Workers must be aware of the importance of drainage lines and drainage systems (especially those located within and surrounding the development footprint) and the significance of not undertaking activities that could result in pollution of the features.	Contractor and EO	Pre-construction Construction
On completion of the construction phase, all construction workers must leave the site within one week of their contract ending.	Contractor and sub-contractor/s	Construction
When possible, no activity should be undertaken at the site between sunset and sunrise, except for security personnel guarding the development.	Contractor and sub-contractor/s	Construction
Ensure all requirements of the OHS Act and any other relevant health and safety protocols are appropriately implemented.	Contractor	Construction
Keep record of all accidents or transgressions of safety in accordance with OHS Act and implement corrective action.	Contractor	Construction
Implement an HIV/AIDS Awareness and Training Programme for the Contractor's workforce and if feasible the local community within two weeks of commencement of construction. Ensure that the HIV/AIDS Awareness and Training Programme is consistent with national guidelines and/or IFC's Good Practice.	Contractor	Construction
A CLO should be appointed and a grievance mechanism (**Appendix B**) implemented. A communication protocol should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.	Contractor	Construction

Performance Indicator	» The construction camps and laydown areas have avoided sensitive areas. » Ablution and waste removal facilities are in a good working order and do not pollute the environment due to mismanagement. » All areas are rehabilitated promptly after construction in an area is complete. » Excess vegetation clearing and levelling is not undertaken. » No complaints regarding contractor behaviour or habits are received. » Appropriate training of all staff is undertaken prior to them commencing work on the construction site. » Code of Conduct drafted before commencement of the construction phase. » Compliance with OHS Act.

	» Vehicles are roadworthy, inspected regularly and speed limits are adhered to. » Roadworthy certificates are in place for all vehicles. » Traffic warning signs are placed along the main access road and these are well illuminated at night. » Roads and the perimeter fence are maintained or improved if disturbed. » A CLO is appointed for the project. » The CLO is available for community grievances and provides a communication channel.
Monitoring	» Regular audits of the construction camps and areas of construction on site by the EO. » Proof of disposal of sewage at an appropriate licensed wastewater treatment works. » Proof of disposal of waste at an appropriate licensed waste disposal facility. » An incident reporting system should be used to record non-conformances to the EMPr. » Observation and supervision of Contractor practices throughout the construction phase by the EO. » Complaints are investigated and, if appropriate, acted upon. » Comprehensive record of accidents and incidence and related investigations, findings and corrective action in accordance with the OHS Act.

OBJECTIVE 4: Maximise local employment, skills development and business opportunities associated with goods and services from the local area. Engage with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods and products from local suppliers, where feasible.

Employment opportunities will be created during the construction phase, specifically for semi-skilled and unskilled workers. Employment of locals and the involvement of local SMMEs would enhance the social benefits associated with the project, even if the opportunities are only temporary. The procurement of local goods could furthermore result in positive economic spin-offs.

Project Component/s	» Construction activities associated with the establishment of the solar PV facility. » Availability of required skills in the local communities for the undertaking of the construction activities.
Potential Impact	» The opportunities and benefits associated with the creation of local employment and business should be maximised.
Activities/Risk Sources	» Contractors who make use of their own labour for unskilled tasks, thereby reducing the employment and business opportunities for locals. » Sourcing of individuals with skills similar to the local labour pool outside the municipal area. » Unavailability of locals with the required skills resulting in locals not being employed and labour being sourced from outside the municipal area. » Higher skilled positions might be sourced internationally, where required.
Enhancement: Target/Objective	» The contractor should aim to employ as many low-skilled and semi-skilled workers from the local area as possible. This should also be made a requirement for all contractors. » Employment of a maximum number of the low-skilled and/or semi-skilled workers from the local area where possible. » Appropriate skills training and capacity building.

Mitigation: Action/Control	Responsibility	Timeframe
A local procurement policy must be adopted to maximise the benefit to the local economy.	Developer Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
Where feasible, source as much goods and services as possible from the local area. Engage with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods and products from local suppliers.	Developer	Duration of project
Where feasible, effort must be made to employ locally in order to create maximum benefit for the communities. Ensure that the majority of the low-skilled workforce is recruited locally.	Contractor	Construction
Identify employment opportunities for women and ensure that women are employed on the construction site and are trained.	Contractor	Construction
Facilitate the transfer of knowledge between experienced employees and the staff.	Contractor	Construction
Proof of skills development must be provided to the upskilled individuals.	Developer Contractor	Construction
Identify opportunities for local businesses and ensure that the services from local businesses are prioritised.	Contractor	Construction

Performance Indicator	» Composition of labour force and value of procurement from local businesses. » Level of skills imparted to local workforce. » Local goods and services are purchased from local suppliers.
Monitoring	» Human Resources and Finance function to monitor and report on through audits.

OBJECTIVE 5: Protection of sensitive areas, flora, fauna and soils

Project Component/s	» PV panels. » Underground cabling. » Ancillary buildings. Construction of the internal access roads.
Potential Impact	» Impacts on natural vegetation, habitats and fauna. » Loss of indigenous natural vegetation due to construction activities and vegetation clearing. » Impacts on soil. » Loss of topsoil. » Erosion.
Activity/Risk Source	» Site preparation and earthworks. » Excavation of foundations. » Construction of infrastructure. » Site preparation (e.g. compaction). » Excavation of foundations. » Stockpiling of topsoil, subsoil and spoil material.
Mitigation: Target/Objective	» To minimise the development footprint as far as possible. » To minimise impacts on surrounding sensitive areas. » To minimise impacts on soils. » Minimise spoil material. » Minimise erosion potential.

Mitigation: Action/Control	Responsibility	Timeframe
Contractor's EO to provide supervision and oversight of vegetation clearing activities within sensitive areas such as drainage lines.	Developer Contractor EO	Construction
In order to minimise impacts on flora, fauna, and ecological processes, the development footprint should be limited to the minimum necessary to accommodate the required infrastructure.	Contractor	Duration of contract
Land clearance must only be undertaken immediately prior to construction activities and only within the development area.	Contractor	Construction
Retain natural vegetation on all sides of the proposed project.	Contractor	Construction
During vegetation clearance, methods should be employed to minimise potential harm to fauna species.	Contractor	Construction
Prior and during vegetation clearance any larger fauna species noted should be given the opportunity to move away from the construction machinery.	Contractor	Construction
Areas to be cleared must be clearly marked on-site to eliminate the potential for unnecessary clearing. No vegetation removal must be allowed outside the designated project development footprint. Restrict construction activity to demarcated areas.	Contractor	Duration of Construction
Practical phased development and vegetation clearing must be practiced so that cleared areas are not left un-vegetated and vulnerable to erosion for extended periods of time. Where possible work should be restricted to one area at a time.	Contractor	Construction
No harvesting of plants for firewood, medicinal or any other purposes are to be permitted	Contractor	Construction
No killing and poaching of any wild animal to be allowed. This should be clearly communicated to all employees, including subcontractors.	Contractor	Construction
Areas beyond the development footprint should be expressly off limits to construction personnel and construction vehicles and this should be communicated to them.	Contractor	Construction
If trenches need to be dug for electrical cabling or other purpose, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are standing open should have places where there are soil ramps allowing fauna to escape the trench.	Contractor	Construction
Education of employees on the conservation importance of natural areas and fauna must be provided.	Contractor	Construction
Access to high sensitivity and no-go areas to be restricted and controlled. This should be clearly communicated to all employees.	Contractor	Construction
All construction vehicles should adhere to clearly defined and demarcated roads	Contractor	Construction
Topsoil must be removed and stored at a maximum height of 2m and stored separately from subsoil and must be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas. (maximum length of time before re-use 18 months).	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
Soil stockpiles must be located away from any drainage lines or preferential water flow path in the landscape, to minimise soil erosion from these	Contractor	Construction
All graded or disturbed areas which will not be covered by permanent infrastructure such as paving, buildings or roads must be stabilised using appropriate erosion control measures.	Contractor	Construction
A method statement must be developed and submitted to the engineer to deal with erosion issues prior to bulk earthworks operations commencing.	Contractor	Before and during construction
Stockpiles are not to be used as stormwater control features.	Contractor	Construction
Any stockpiling of materials may not exceed two metres in height to reduce materials being blown away during high wind velocity events.	Contractor	Construction
Any erosion problems observed within the development area as a result of the construction activities must be rectified immediately and monitored thereafter to ensure that they do not re-occur.	Contractor	Construction
Any signs of soil erosion on site should be documented (including photographic evidence and coordinates of the problem areas) and submitted to the management team for further action.	Contractor	Construction
During construction the contractor shall protect areas susceptible to erosion by installing appropriate temporary and permanent drainage works as soon as possible and by taking other measures necessary to prevent the surface water from being concentrated in streams and from scouring the slopes, banks or other areas.	Contractor	construction
Create energy dissipation at discharge areas to prevent scouring	Contractor	construction
Activity at the site must be reduced after large rainfall events when the soils are wet. No driving off of hardened roads should occur at any time and particularly immediately following large rainfall events.	Contractor	Construction
Silt traps or cut-off berms downslope of working areas should be used where there is a danger of topsoil or material stockpiles eroding and entering drainage lines and other sensitive areas.	Contractor	Construction
Erosion control measures to be regularly maintained.	Contractor	Construction
If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion.	Contractor	Construction
Only the designated access routes are to be used to reduce any unnecessary compaction.	Contractor	Construction
Compacted areas are to be ripped to loosen the soil structure.	Contractor	Construction
Topsoil to be stripped when the soil is dry in order to reduce compaction. The topsoil should be stripped by means of an excavator bucket, and loaded onto dump trucks.	Contractor	Construction
The handling of the stripped topsoil must be minimized to ensure the soil's structure does not deteriorate significantly	Contractor	Construction
Compaction of the removed topsoil must be avoided by prohibiting traffic on stockpiles.	Contractor	Construction
The stockpiles must be vegetated in order to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
Cleared vegetation must be removed from site and must not be stored onsite.	Contractor	Construction
Outside lighting should be designed to minimise impacts on fauna.	Contractor	Before construction
All night-lighting should use low-UV type lights (such as most LEDs), which do not attract insects. The lights should also be of types which are directed downward and do not result in large amounts of light pollution.	Contractor	Construction
Fluorescent and mercury vapour lighting should be avoided and sodium vapour (yellow) lights should be used wherever possible.	Contractor	Construction
Noise from vehicles and powered machinery and equipment on-site should not exceed the manufacturer's specifications, based on the installation of a silencer. Equipment should be regularly serviced. Attention should also be given to muffler maintenance and enclosure of noisy equipment.	Contractor	Construction

Performance Indicator	» No disturbance outside of the designated work areas. » Minimised clearing of existing vegetation. » Vegetation and habitat loss is restricted to the development footprint. » No poaching etc. of fauna by construction personnel during construction. » Removal to safety of fauna encountered during construction. » Low mortality of fauna due to construction machinery and activities. » Topsoil appropriately stored, managed and rehabilitated. » Limited soil erosion around the development area. » No activity is undertaken in restricted areas. » Minimal level of soil degradation.
Monitoring	» Contractor's EO to provide supervision and oversight of vegetation clearing activities within sensitive areas such as near drainage lines. » Supervision of all clearing and earthworks. » Ongoing monitoring of erosion management measures within the development area. » Monthly inspections of sediment control devices by the EO. » An incident reporting system will be used to record non-conformances to the EMPr.

The following biodiversity impact management actions indicated in Table 5-3 of the Biodiversity Impact Assessment must be adhered to in conjunction with the mitigation measures outlined in Objective 5 of this EMPr.

Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	**Responsible Party**	**Aspect**	**Frequency**
Management Outcome: Vegetation and Habitats				
The areas to be developed must be specifically demarcated to prevent movement into surrounding environments.	Life of operation	Project Manager Environmental Officer	Development footprint	Ongoing
Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no	Life of operation	Project Manager Environmental Officer	Areas of indigenous vegetation	Ongoing

circumstances be fragmented or disturbed further.				
Solar panels must be mounted on pile driven or screw foundations, such as post support spikes, rather than heavy foundations, such as trench-fill or mass concrete foundations, to reduce the negative effects on natural soil functioning, such as its filtering and buffering characteristics, while maintaining habitats for both below and above-ground biodiversity	Life of operation	Project Manager Environmental Officer	Development footprint	Ongoing
Indigenous vegetation to be maintained under the solar panels to ensure biodiversity is maintained and to prevent soil erosion (Beatty et al, 2017; Sinha et al, 2018).	Life of operation	Project Manager Environmental Officer	Areas of indigenous vegetation	Ongoing
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion. This will also reduce the likelihood of encroachment by alien invasive plant species. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are indigenous to this vegetation type.	Decommissioning /Rehabilitation	Project Manager Environmental Officer	Assess the state of rehabilitation and encroachment of alien vegetation	Quarterly for up to three years after the closure
A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills	Life of operation	Environmental Officer Contractor	Spill events, Vehicles dripping.	Ongoing

of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.				
Leaking equipment and vehicles must be repaired immediately or be removed from project area to facilitate repair.	Life of operation	Environmental Officer Contractor	Leaks and spills	Ongoing
A fire management plan needs to be complied to restrict the impact of fire. This is especially concerning stochastic fire events such as discarding of lit cigarette butts and/or glowing embers from cooking fires.	Life of operation	Environmental Officer Contractor	Fire Management	During Phase
Management Outcome: Fauna				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals	Construction	Environmental Officer	Noise levels	Ongoing
No trapping, killing, or poisoning of any wildlife is to be allowed Signs must be put up to enforce this and must be made a punishable offence	Life of operation	Environmental Officer	Evidence of trapping, dead animals, etc.	Ongoing
The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on fauna	Construction/Operational	Project Manager Environmental Officer	Construction/Closure Phase	Ongoing
Outside lighting should be designed and limited to minimize impacts on fauna. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (yellow) lights should be used wherever possible.	Construction/Operational	Project Manager Environmental Officer	Light pollution and period of light.	Ongoing
Wildlife friendly fences must be incorporated into the design. A tunnel underpass of a height of 500 mm will be acceptable for small mammals. Pre-fabricated concrete elements are appropriate for rectangular tunnels. Metal pipes must be avoided. This will also ensure	Operational	Project Manager Environmental Officer Design Engineer	Fauna movement	Ongoing

fences are not damaged by burrowing activity.				
Management Outcome: Invasive Alien Species				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Compilation of and implementation of an Invasive Alien Plant Management Plan	Life of operation	Project Manager Environmental Officer	Assess presence and encroachment of alien vegetation	Quarterly monitoring
A pest control plan must be put in place and implemented; it is imperative that poisons not be used due to the presence of indigenous fauna.	Life of operation	Environmental Officer Health and Safety Officer	Evidence or presence of pests	Ongoing
Management Outcome: Dust				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Reducing the dust generated by construction activities, especially the earth moving machinery, through wetting the soil surface (with "dirty water") and putting up signs to enforce speed limit as well as speed. If feasible, it is recommended that a wind fence be constructed to prevent excessive dust pollution, especially due the sandy nature of the soil.	Life of operation	Project Manager Environmental Officer	Dust pollution levels	Ongoing
Management Outcome: Waste Management				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Waste management must be a priority and all waste must be collected and stored adequately. Refuse bins must be secured. Temporary storage of domestic waste shall be in covered waste skips.	Life of operation	Environmental Officer Health and Safety Officer	Presence of waste	Life of operation
The ratio of toilets to staff must be provided as per the requirements in the Health and Safety Act. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area.	Life of operation	Environmental Officer Health and Safety Officer	Number of toilets per staff member. Waste levels	Daily

Refuse bins must be secured. Temporary storage of domestic waste shall be in covered waste skips. Maximum domestic waste storage period will be 10 days.	Life of operation	Environmental Officer Contractor Health and Safety Officer	Management of bins and collection of waste	Ongoing, every 10 days
All solid waste collected shall be disposed of at a licensed disposal facility. Under no circumstances may domestic waste be burned on site	Life of operation	Environmental Officer Health and Safety Officer	Availability of bins and the collection of the waste.	Ongoing
Management Outcome: Environmental Awareness Training				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff on the importance, biology, habitat requirements and management requirements of the Environmental Authorisation.	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing
Management Outcome: Erosion				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Appropriate drainage must be constructed along the access roads in order to slow the flow of water run-off from the road surface.	Operational	Project Manager Design Engineer	Water runoff from road surfaces	Ongoing
Areas that are denuded during construction that do not have infrastructure during the operational phase must be re-vegetated with indigenous vegetation to prevent erosion.	Operational	Project Manager Environmental Officer	Re-establishment of indigenous vegetation	Quarterly for the first 2 years. Thereafter, annually for the life of the project
A row of indigenous trees can be planted along the boundary to act as wind break to impede erosion.	Operational	Project Manager Environmental Officer	Re-establishment of indigenous vegetation	Quarterly for the first 2 years. Thereafter, annually for the life of the project
All areas affected by the development must be re-vegetated with indigenous vegetation to prevent	Rehabilitation	Project Manager Environmental Officer	Re-establishment of indigenous vegetation	Quarterly for 3 years after decommissioning

erosion on an extensive temporal scale.				

OBJECTIVE 6: Protection of avifauna

Project component/s	» PV panels. » Access roads. » Cabling between project components. » Substation. » All other associated infrastructure.
Potential Impact	» Disturbance of birds (e.g. destruction of habitat). » Displacement of birds. » Collision with project components. » Traffic to and from site.
Activity/risk source	» Site preparation and earthworks. » Foundations or plant equipment installation. » Mobile construction equipment movement on site. » Access road construction activities. » Substation construction facilities.
Mitigation: Target/Objective	» To minimise footprints of habitat destruction. » To minimise disturbance to resident and visitor avifaunal species.

Mitigation: Action/control	Responsibility	Timeframe
The extent of clearing and disturbance to the vegetation must be kept to a minimum so that impact on avifauna and their habitats is restricted.	Contractor	Construction
Speed limits (40 km/h) should be strictly enforced on site to reduce probability of vehicle collisions.	Contractor	Construction
No dogs or cats other than those of the landowners should be allowed on site.	Contractor	Construction
Construction camps should be lit with as little light as practically possible, with the lights directed downwards where appropriate.	Contractor	Construction
The appointed Environmental Officer must be trained to identify the potential Red Data species as well as the signs that indicate possible breeding by these species. The Environmental Officer must then, during audits/site visits, make a concerted effort to look out for such breeding activities of Red Data species, and such efforts may include the training of construction staff (e.g. in Toolbox talks) to identify Red Data species, followed by regular questioning of staff as to the regular whereabouts on site of these species.	Contractor	Construction
If any of the Red Data species are confirmed to be breeding (e.g. if a nest site is found), construction activities within 500 m of the breeding site must cease, and an avifaunal specialist is to be contacted immediately for further assessment of the situation and instruction on how to proceed.	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
Any holes dug e.g. for foundations of pylons should not be left open for extended periods of time to prevent entrapment by ground dwelling avifauna or their young and only be dug when required and filled in soon thereafter.	Contractor	Construction
Temporary fencing must be suitably constructed, e.g. if double layers of fencing are required for security purposes they should be positioned at least 2 m apart to reduce the probability of entrapment by larger bodied species that may find themselves between the two fences.	Contractor	Construction
Roadkill is to be reported to the ECO and removed as soon as possible to reduce the attraction of the site to crows and other scavengers.	Contractor	Construction

Performance Indicator	» No disturbance outside of designated work areas. » Minimised clearing of existing/natural vegetation and habitats for avifauna. » Limited impacts on avifaunal species (i.e. noted/recorded fatalities), especially those of conservation concern.
Monitoring and Reporting	» Observation of vegetation clearing activities by the EO throughout construction phase. » Supervision of all clearing and earthworks by the EO.

OBJECTIVE 7: Minimise the establishment and spread of alien invasive plants

Major factors contributing to invasion by alien invader plants include high disturbance activities and negative grazing practices. Consequences of this may include:

- Loss of indigenous vegetation;
- Change in vegetation structure leading to change in various habitat characteristics;
- Change in plant species composition;
- Change in soil chemical properties;
- Loss of sensitive habitats;
- Loss or disturbance to individuals of rare, endangered, endemic, and/or protected species;
- Fragmentation of sensitive habitats;
- Change in flammability of vegetation, depending on alien species; and
- Hydrological impacts due to increased transpiration and runoff.

Project Component/s	» PV facility. » Access road. » Associated infrastructure.
Potential Impact	» Invasion of natural vegetation surrounding the development area by declared weeds or invasive alien species. » Impacts on soil. » Impact on faunal habitats. » Degradation and loss of agricultural potential.
Activities/Risk Sources	» Transport of construction materials to the development area. » Movement of construction machinery and personnel. » Site preparation and earthworks causing disturbance to indigenous vegetation. » Construction of site access roads. » Stockpiling of topsoil, subsoil and spoil material. » Routine maintenance work – especially vehicle movement.
Mitigation: Target/Objective	» To significantly reduce the presence of weeds and eradicate alien invasive species. » To avoid the introduction of additional alien invasive plants to the development area. » To avoid distribution and thickening of existing alien plants in the development area. » To complement existing alien plant eradication programs in gradually causing a significant reduction of alien plant species throughout the development area.

Mitigation: Action/Control	Responsibility	Timeframe
Develop and implement an Alien Invasive Plant (AIP) Control and Eradication Programme.	Contractor	Construction
Avoid creating conditions in which alien plants may become established: » Keep disturbance of indigenous vegetation to a minimum. » Rehabilitate disturbed areas as quickly as possible. » Do not import soil from areas with alien plants.	Contractor	Construction
When alien plants are detected, these must be controlled and cleared using the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
Eradicate all weeds and alien invasive plants as far as practically possible and ensure that material from invasive plants are adequately destroyed and not further distributed. Continually monitor the re-emergence of these species and manage according to the invasive species management plan (**Appendix C**).	Contractor	Construction
Any alien and invasive vegetation removed should be taken to a registered landfill site to prevent the proliferation of alien and invasive species.	Contractor	Construction
The use of herbicides and pesticides and other related horticultural chemicals must be carefully controlled and only applied by personnel adequately certified to apply pesticides and herbicides. It must be ensured that World Health Organisation (WHO) Recommended Classification of Pesticides by Hazard Class 1a (extremely hazardous) or 1b (highly hazardous) are not purchased, stored or used on site along with any other nationally or internationally similarly restricted/banned products.	Contractor	Construction

Performance Indicator	» Low abundance of alien plants. For each alien species: number of plants and aerial cover of plants within the development area and immediate surroundings.
Monitoring	» On-going monitoring of area by EO during construction. » Annual audit of development footprint and immediate surroundings by qualified botanist. » If any alien invasive species are detected then the distribution of these should be mapped (GPS co-ordinates of plants or concentrations of plants), number of individuals (whole site or per unit area), age and/or size classes of plants and aerial cover of plants. » The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the development area. » The environmental manager/site agent should be responsible for driving this process. » Reporting frequency depends on legal compliance framework.

OBJECTIVE 8: Minimise impacts on surface water resources

The PAOI is drained by minor ephemeral drainage lines that drain into a FEPA system The channel physiognomy of these drainage systems was distinct from the terrestrial component and were identified by a bedrock substrate and the presence of Vachellia karoo.

A 50 m buffer was applied to these drainage systems (Macfarlane et al, 2009) as they are regarded as Ecological Support Areas and during surface flow would be important in the distribution of propagules and also form a corridor for movement of fauna.

The following Zones of Regulation (ZoR) are applicable to the drainage lines identified within the PAOI:

- A 32 m Zone of Regulation in accordance with the National Environmental Management Act, 1998 (Act No. 107 of 1998) should be assigned to the drainage lines; and
- A 100 m ZoR in accordance with the National Water Act, 1998 (Act No. 36 of 1998) should be assigned to the drainage lines.

The proposed solar facility is expected to pose a low residual risk to the delineated drainage lines, with key mitigation being the avoidance and adherence to the recommended buffer widths. Due to the low residual risk, a General Authorisation is required for the required water use authorisation.

Project component/s	» Construction activities. » Storage of dangerous goods. » Ablution facilities.
Potential Impact	» Compaction of soil. » Pollutants such as lime-containing (high pH) construction materials such as concrete, cement, grouts, etc. could be harmful to aquatic biota, particularly during low flows when dilution is reduced. » Removal of freshwater habitat. » Compaction of soils within and surrounding the drainage lines. » Erosion of soils surrounding drainage lines. » Potential proliferation of alien and invasive species within the drainage lines (i.e. drainage lines). » Vegetation clearance in drainage lines. » Movement of vehicles in drainage lines.
Activity/risk source	» Re-fuelling, usage and maintenance of construction vehicles. » Cement batching and usage. » Ablution facilities usage by employees. » Use of any chemicals or hazardous materials/dangerous goods during construction.
Mitigation: Target/Objective	» Reduce potential loss of habitat and ecological structure. » No incidents related to spills of chemicals and hazardous materials. » No release of contaminated water in drainage lines including the riparian habitat.. » No misbehaviour of construction workers (i.e. ablution activities, washing).

Mitigation: Action/control	Responsibility	Timeframe
Alien Invasive and Control Management Plan (**Appendix C**) is to be formulated and implemented.	Contractor	Construction
Ensure strict management of potential sources of pollution (hydrocarbons from vehicles and machinery, cement during construction, etc.). Bunded containment to be provided below and around any fuel storage containers.	Contractor	Construction
No storage of fuels, oils or any other hazardous substance are allowed directly in the drainage lines or within 100m from any drainage line.	Contractor	Duration of contract
Temporary ablution facilities may not be placed directly or within 100m of any drainage line.	Contractor	Construction
Temporary ablution facilities must be regularly checked for leaks and spillages, and repaired where any leakages are detected before being allowed for use on the site.	Contractor	Construction
Where erosion takes place, the EO must inspect the degree of erosion and propose suitable mitigation measures to prevent further erosion.	Contractor EO	Construction
Construction equipment is to be checked daily (by Contractor) to ensure that no fuel spillage takes place from construction vehicles or machinery.	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
Proper use of ablutions should be strictly enforced and ablutions should be regularly cleaned and serviced.	Contractor	Construction
Sand, stone and cement must be stored in demarcated areas, and must be covered or sealed to prevent wind erosion and resultant deposition of dust on the surrounding indigenous vegetation.	Contractor	Construction
Any excess sand, stone and cement must be removed from site at the completion of the construction period.	Contractor	Construction
Measures must be put in place to control illegal dumping of construction waste as this may result in the pollution of surface water run-off. Furthermore, no pollution of groundwater resources may occur.	Contractor	Construction
Any areas disturbed during the construction phase should be encouraged to rehabilitate as fast and effective as possible.	Contractor	Construction
Where possible, reduce the footprint area of exposed ground and prioritise vegetation clearing for the winter months as far as possible.	Contractor	Construction
Exposed areas must be ripped and vegetated to increase surface roughness.	Contractor	Construction
Compilation and adherence to a procedure for the safe handling of battery cells.	Contractor	Construction
Lithium-ion batteries must have battery management systems (containment, automatic alarms and shut-off systems) to monitor and protect cells from overcharging or damaging conditions.	Contractor	Construction
Compilation of an emergency response plan for implementation in the event of a spill or leakage.	Contractor	Construction
Provision of spill kits on site for clean-up of spills and leaks.	Contractor	Construction
Immediate clean-up of spills and disposal of contaminated absorbents and materials or soil at a licensed hazardous waste disposal facility.	Contractor	Construction
Recording and reporting of all electrolyte spills or leaks so that appropriate clean-up measures can be implemented. A copy of these records must be made available to authorities on request throughout the project lifecycle.	Contractor	Construction
Frequent and appropriate disposal of both general and hazardous waste to a licensed waste disposal facility to prevent pollution of soil and groundwater.	Contractor	Construction
On-site battery maintenance should only be undertaken on impermeable surfaces with secondary containment measures. Any resulting hazardous substances must be disposed of appropriately.	Contractor	Construction
Provision of suitable emergency and safety signage on-site, and demarcation of any areas which may pose a safety risk (including hazardous substances). Emergency numbers for the local police, fire department, Eskom and the Beaufort West Municipality must be placed in a prominent, clearly visible area on-site.	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
A comprehensive rehabilitation plan must be developed and implemented from the project onset to ensure net benefit of the environment within all the drainage lines that were affected during construction.	Contractor	Construction

Performance Indicator	» No major preventable spillages are recorded. » No erosion recorded within the drainage lines within the development area. » No degradation of the water resources within the development area.
Monitoring	» Monitor management measures in place for potentially hazardous materials. » Monitoring occurrence of erosion and degradation within the drainage lines.

OBJECTIVE 9: Appropriate Stormwater Management

The Stormwater Management Plan (SWMP) aims to facilitate the protection of surface water resources within the development area of Montana 2 Solar Energy Facility. Although, the findings of the specialist biodiversity report (**Appendix D**) indicated that the development of the solar PV facility is likely to have a low impact, it remains important that the engineers and contractors responsible for the detailed design of the stormwater management systems consider the requirements of this EMPr, as well as, the recommendations by other specialists on the project.

Project Component/s	» Alteration of natural areas into hard surfaces impacting on the local hydrological regime of the area.
Potential Impact	» Poor stormwater management and alteration of the hydrological regime.
Activities/Risk Sources	» Placement of hard engineered surfaces.
Mitigation: Target/Objective	» Reduce the potential increase in surface flow velocities and the impact on localised drainage systems.

Mitigation: Action/Control	Responsibility	Timeframe
The mitigation measures included in the Stormwater Management Plan (**Appendix G** of the EMPr) must be implemented.	Contractor Developer	Duration of project
Stormwater management around the construction footprint areas must be undertaken to ensure that sediment-laden run-off does not enter the surrounding drainage lines.	Contractor	Construction
Please note that the use of potable water for dust suppression purposes is not supported and should be avoided. Where non-potable or treated water is to be used, this should be of a suitable quality so as not to cause any severe/repeated pollution to soil or water resources.	Contractor	Duration of project
Any stormwater within the site must be handled in a suitable manner. Contaminated water must not be discharged into the surrounding environment.	Contractor and Engineers	Construction
Any stormwater within the development area must be handled in a suitable manner, i.e. separate clean and dirty water streams around the plant, and install stilling basins to capture large	Contractor	During site establishment

Mitigation: Action/Control	Responsibility	Timeframe
volumes of run-off, trap sediments and reduce flow velocities (e.g. water used when washing the PV panels).		
Establish silt fences or berms to prevent sediment transport into the large drainage line.	Construction	During site establishment
All roads and other hardened surfaces must have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk.	Contractor	Construction
The access roads should be permeable to allow for drainage from the road surface. In this regard, suitable stormwater management should be implemented to allow for water to drain from the roads without causing erosion.	Contractor	Construction
Where discharge of rainwater on roads will be channelled directly into the natural environment, the application of diffuse flow measures must be included in the design	Contractor	Construction
New access roads within the site are to be constructed according to design and contract specifications. The access routes must have suitable storm water management plans and erosion control measures.	Contractor	Construction
Drainage measures must promote the dissipation of storm water run-off.	Contractor	Construction
Any loss/alteration of flow dynamics must be quantified, and mitigation options to re-introduce water in a safe and environmentally friendly way must be assessed.	Contractor	Construction
Site surface water and wash water must be contained and treated before reuse or discharge from site.	Contractor	Construction

Performance Indicator	» No impacts due to runoff. » Minimise erosion as far as possible. » Appropriate stormwater management system in place.
Monitoring	» Ongoing monitoring of erosion management measures within the development area. » Monthly inspections of sediment control devices by the EO. » An incident reporting system must be used to record non-conformances to the EMPr.

OBJECTIVE 10: Protection of Heritage Resources

Although heritage resources have been identified within the study area and development area for Montana 2 Solar Energy Facility these are of a low significance and no fatal flaws have been identified to be associated with the development; therefore, the development area is considered as an appropriate place for the development of a solar PV facility.

Project Component/s	» PV facility. » Access roads. » Associated infrastructure.

Potential Impact	» Heritage objects or artefacts found on site and within the development footprint are inappropriately managed or destroyed.
Activity/Risk Source	» Site preparation and earthworks. » Foundations or plant equipment installation. » Mobile construction equipment movement on site.
Mitigation: Target/Objective	» To ensure that any heritage objects found on site are treated appropriately and in accordance with the relevant legislation.

Mitigation: Action/control	Responsibility	Timeframe
Contractors must be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow if they find sites. All staff should also be familiarised with procedures for dealing with heritage objects/sites.	Contractor, and heritage specialist	Duration of contract, particularly during excavations
EO to alert workers to the importance of reporting fossil bones seen on site and to the possibility of encountering human remains.	EO	Construction
A 100m no-go development buffer is implemented around sites POORTJIE027 & POORTJIE028	EO Developer	Construction and duration of contract
A Chance Find Protocol (**Appendix L**) must be developed and implemented in the event that archaeological or palaeontological resources are found. In the case where the proposed development activities bring these materials to the surface, work must cease and SAHRA must be contacted immediately.	Developer Contractor	Construction and duration of contract
If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or paleontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA.	EO Developer	Construction and duration of contract
Chance fossil finds such as vertebrate bones and teeth or shells should be safeguarded preferably in-situ and reported by the EO as soon as possible to the South Africa Heritage Resources Agency, SAHRA. Contact Details: Heritage Western Cape Address: 3rd floor Protea Assurance Building, 142 Longmarket St, Cape Town City Centre, Cape Town, 8000 Phone: 021 483 5959	EO Archaeologist	Construction and duration of contract.
If unmarked human burials are uncovered, the SAHRA Burial Grounds & Graves (BGG) Unit must be alerted immediately.	EO Developer	Construction and duration of contract.

Performance Indicator	» No disturbance outside of designated work areas. » All heritage items discovered are dealt with as per the legislative guidelines.
Monitoring	» Observation of excavation activities by the EO throughout construction phase.

	» Supervision of all clearing and earthworks. » Due care taken during earthworks and disturbance of land by all staff and any heritage objects found reported. » Appropriate permits obtained from SAHRA prior to the disturbance or destruction of heritage sites (if required). » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE 10: Management of dust and air emissions

During the construction phase, limited gaseous or particulate emissions are anticipated from exhaust emissions from construction vehicles and equipment on-site, as well as vehicle entrained dust from the movement of vehicles on the main and internal access roads.

Project component/s	» PV facility. » Access roads. » Associated infrastructure.
Potential Impact	» Dust generation and particulates from vehicle movement to and on-site, foundation excavation, road construction activities, road maintenance activities, temporary stockpiles, and vegetation clearing affecting the surrounding residents and visibility. » Release of minor amounts of air pollutants (for example NO_2, CO and SO_2) from vehicles and construction equipment.
Activity/risk source	» Clearing of vegetation and topsoil. » Excavation, grading, scraping, levelling, digging, drilling and associated construction activities. » Transport of materials, equipment, and components on internal access roads and the associated increased traffic. » Vehicle movement on gravel roads. » Re-entrainment of deposited dust by vehicle movements. » Wind erosion from topsoil and spoil stockpiles and unsealed roads and surfaces. » Fuel burning vehicle and construction engines.
Mitigation: Target/Objective	» To ensure emissions from all vehicles and construction engines are minimised, where possible, for the duration of the construction phase. » To minimise nuisance to the community from dust emissions and to comply with workplace health and safety requirements for the duration of the construction phase. » Suppression of dust, pollution control and minimise dust generation.

Mitigation: Action/control	Responsibility	Timeframe
Implement appropriate dust suppression measures on a regular basis along gravel access roads and on the cleared portions of the development area.	Contractor	Construction
Areas must be cleared in a progressive manner. Road surfaces and other infrastructure to be constructed as soon as possible after vegetation clearing in order to minimise exposed ground surfaces, specifically roads which carry traffic.	Contractor	Construction
Roads must be maintained to ensure that nuisance to the community from dust emissions from road or vehicle sources is not visibly excessive.	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
Haul vehicles moving outside the construction site carrying material that can be wind-blown must be covered with suitable material tarpaulins shade cloth.	Contractor	Duration of contract
Ensure that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.	Contractor	Duration of contract
Construction activities be limited on days where there are extreme high winds.	Contractor	Construction
Dust-generating activities or earthworks may need to be rescheduled or the frequency of application of dust control/suppressant increased during periods of high winds if visible dust is blowing toward nearby residences outside the site.	Contractor	Duration of contract
Should a batching plant be required, this must be enclosed with shade cloth to reduce the amount of cement particulates/ particles released into the environment.	Contractor	Duration of contract

Performance Indicator	» No complaints from affected residents or surrounding communities regarding dust or vehicle emissions. » Limited visual presence of dust and good air quality. » Dust does not cause health (inhaling, eye irritation) and safety risks (low visibility). » Dust suppression measures implemented for all heavy vehicles that require such measures during the construction phase. » Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed. » All heavy vehicles are equipped with speed monitors before they are used in the construction phase in accordance with South African vehicle legislation. » Road worthy certificates in place for all heavy vehicles at the outset of the construction phase and updated on a monthly basis. » A complaints register must be maintained, in which any complaints from neighbouring farmers will be logged, and thereafter complaints will be investigated and, where appropriate, acted upon.
Monitoring	Monitoring must be undertaken to ensure emissions are not exceeding the prescribed levels via the following methods: » Immediate reporting by personnel of any potential or actual issues with regards to nuisance dust or emissions to the Site Manager. » A complaints register must be maintained, in which any complaints from residents/the community will be logged, and thereafter complaints will be investigated and, where appropriate, acted upon. » An incident register and non-conformance must be used to record incidents and non-conformances to the EMPr. » A complaints register must be used to record grievances by the public.

OBJECTIVE 11: Minimise impacts related visual impacts during construction, operation and decommissioning

During construction, heavy vehicles, components, cranes, equipment and construction crews will frequent the area and may cause, at the very least, a visual nuisance to landowners and residents in the area as well as road users.

Project component/s	» Construction site. » Transportation of staff and equipment.
Potential Impact	» Visual impact of general construction activities, and the potential scarring of the landscape due to vegetation clearing and the resulting erosion. » Construction traffic.
Activity/risk source	» The viewing of visual scarring by observers in the vicinity of the solar facility or from the roads in the surrounding area.
Mitigation: Target/Objective	» Minimal disturbance to vegetation cover in close vicinity of the solar facility and its related infrastructure. » Minimised construction traffic, where possible. » Minimal visual intrusion by construction activities and intact vegetation cover outside of the immediate construction work areas.

Mitigation: Action/control	Responsibility	Timeframe
Shield the sources of light by physical barriers (walls, vegetation, or the structure itself).	Contractor	Planning & operation
Limit mounting heights of lighting fixtures, or alternatively use footlights or bollard level lights.	Contractor	Planning & operation
Make use of minimum lumen or wattage in fixtures.	Contractor	Planning & operation
Make use of down-lighters, or shielded fixtures.	Contractor	Planning & operation
Make use of Low-Pressure Sodium lighting or other types of low impact lighting.	Contractor	Planning & operation
Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.	Contractor	Planning & operation
Ensure that vegetation is not unnecessarily removed during the construction period.	Contractor	Construction
Reduce the construction period through careful logistical planning and productive implementation of resources.	Contractor	Construction
Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e., in already disturbed areas) wherever possible.	Contractor	Construction
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Contractor	Construction
Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.	Contractor	Construction
Reduce and control construction dust using approved dust suppression techniques as and when required (i.e., whenever dust becomes apparent).	Contractor	Construction
Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
Rehabilitate all disturbed areas immediately after the completion of construction works.	Contractor	Operation
Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint.	Contractor	Operation
Maintain the general appearance of the Facility as a whole.	Contractor	Operation
Lighting should be kept to a minimum wherever possible.	Contractor	Duration of Contract
Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the activity – this is especially relevant where the edge of the activity is exposed to residential properties.	Contractor	Duration of Contract
Avoid high pole top security lighting along the periphery of the site and use only lights that are activated on movement.	Contractor	Duration of Contract
Wherever possible, lights should be directed downwards to avoid illuminating the sky.	Contractor	Duration of Contract
Rehabilitate all construction areas, when no longer required.	Contractor	Construction
Keep vegetation clearing to a minimum.	Contractor	Construction
Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint.	Contractor	Operation
Maintain the general appearance of the Facility as a whole.	Contractor	Operation
If possible keep the construction period to a minimum.	Contractor	Construction
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Contractor	Construction
Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.	Contractor	Construction
Employ dust suppression techniques as and when required (i.e. whenever dust becomes apparent).	Contractor	Construction
Remove infrastructure not required for the post-decommissioning use of the site.	Contractor	Decommissioning
Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.	Contractor	Decommissioning
Rehabilitate all disturbed areas as per the rehabilitation plan and schedule.	Contractor	Construction and Decommissioning

Performance Indicator	» Construction site maintained in a neat and tidy condition. » Site appropriately rehabilitated after construction is complete.
Monitoring	» Monitoring of vegetation clearing during construction by EO. » Monitor rehabilitated areas post-decommissioning and implement remedial actions. » Rehabilitate all areas as per the rehabilitation plan undertaken. Consult an ecologist regarding rehabilitation specifications. » Monitoring of rehabilitated areas quarterly for at least a year following the end of construction (by contractor as part of construction contract).

OBJECTIVE 12: Minimise impacts related to traffic management and transportation of equipment and materials to site

Project Component/s	» Delivery of any component required for the construction phase of the solar PV facility.
Potential Impact	» Impact of heavy construction vehicles on road surfaces, and possible increased risk in accidents involving people and animals. » Traffic congestion, particularly on narrow roads or on road passes where overtaking is not permitted. » Deterioration of road pavement conditions (both surfaced and gravel road) due to abnormal loads.
Activities/Risk Sources	» Construction vehicle movement. » Speeding on local roads. » Degradation of local road conditions. » Site preparation and earthworks. » Foundations or plant equipment installation. » Transportation of ready-mix concrete to the development area. » Mobile construction equipment movement on site.
Mitigation: Target/Objective	» Minimise impact of traffic associated with the construction of the solar PV facility on local traffic volumes, existing infrastructure, property owners, animals, and road users. » To minimise potential for negative interaction between pedestrians or sensitive users and traffic associated with the facility construction. » To ensure all vehicles are roadworthy and all materials/equipment are transported appropriately and within any imposed permit/licence conditions.

Mitigation: Action/Control	Responsibility	Timeframe
Compile and implement a construction period traffic management plan (**Appendix I**) 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.	Contractor	Pre-construction
Undertake regular maintenance of gravel roads.	Contractor	Construction
Ensure that, at all times, affected people have access to their properties as well as to social facilities.	Developer Contractor	Construction
Limit the need for transportation over long distances by sourcing as much materials and goods as is feasible from local suppliers.	Contractor	Construction
Strict vehicle safety standards must be implemented and monitored.	Contractor	Construction
No deviation from approved transportation routes must be allowed, unless roads are closed for whatever reason outside the control of the contractor.	Contractor	Construction
Appropriate road management strategies must be implemented on external and internal roads with all employees and contractors required to abide by standard road and safety procedures.	Contractor (or appointed transportation contractor)	Construction
Heavy construction vehicles must be restricted to off-peak periods. Schedule the delivery hours to avoid peak hour traffic, weekends and evenings and stagger component delivery to site.	Contractor	Construction
Any traffic delays expected because of construction traffic must be co-ordinated with the appropriate authorities.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
When upgrading, constructing and maintaining the access roads ensure that proper hazard warnings signage and traffic control mechanisms such as flags men and traffic control barriers, chevrons and traffic cones separating the road from the worksite are in place at all times.	Contractor	Construction
Visible signage must be established at appropriate points warning of turning traffic and the construction site (all signage to be in accordance with prescribed standards). Signage must be appropriately maintained throughout the construction period.	Contractor	Construction
All construction vehicles must remain on properly demarcated roads. No off-road driving to be allowed.	Contractor	Construction
Implement penalties for reckless driving for the drivers of heavy vehicles as a way to enforce compliance to traffic rules.	Contractor	Construction
The contractors must ensure that there is a dedicated access road and an access control point to the development area.	Contractor	Construction
Provide clearly defined roadway, parking and pedestrian walkway areas within the site with adequate lighting.	Contractor	Construction
Provide flagmen at the access road when accommodating abnormal load vehicles.	Contractor	Construction
On-site parking and safe turn-around facilities should be provided for private vehicles and for buses and mini-buses transporting workers to and from site.	Contractor	Construction

Performance Indicator	» Vehicles are keeping to the speed limits. » Vehicles are in good working order and safety standards are implemented. » Local residents and road users are aware of vehicle movements and schedules. » No construction traffic related accidents are experienced. » Local road conditions and road surfaces are up to standard. » Complaints of residents are not received (e.g. concerning the speeding of heavy vehicles).
Monitoring	» Developer and or appointed EO must monitor indicators listed above to ensure that they have been implemented.

OBJECTIVE 13: Appropriate handling and management of waste

The construction of Montana 2 Solar Energy Facility will involve the generation of various wastes. In order to manage the wastes effectively, guidelines for the assessment, classification, and management of wastes, along with industry principles for minimising construction wastes must be implemented. The main wastes expected to be generated by the construction activities include:

» general solid waste
» hazardous waste
» inert waste (rock and soil)
» liquid waste (including grey water and sewage)

Public and employee awareness of the impacts of waste is critical to achieving a culture of compliance and civic responsibility around waste, particularly around the issues of littering and illegal dumping. While local government provides infrastructure such as public bins and services such as street sweeping, it is important to recognise that littering and illegal dumping represent a major public cost within a context in which government has many competing demands on tightly constrained resources.

In relation to achieving a culture of compliance, particularly in relation to the workplace and occupational health and safety issues pertaining to waste, trade unions have an important role to play in ensuring employers comply with regulations and norms and standards around waste, as well as in raising worker's awareness both in terms of workplace issues around waste, or more general awareness around waste. The following table outlines site specific waste management principles applicable to the Montana 2 Solar Facility. These mitigations should be read in conjunction with the norms and standards outlined in the National Waste Management Strategy 2020 and the National Norms and Standards for the Storage of Waste included in **Appendix N.**

Project Component/s	» PV facility. » Access roads. » Associated infrastructure.
Potential Impact	» Inefficient use of resources resulting in excessive waste generation. » Litter or contamination of the site or water through poor waste management practices.
Activity/Risk Source	» Packaging. » Other construction wastes. » Hydrocarbon use and storage. » Spoil material from excavation, earthworks and site preparation.
Mitigation: Target/Objective	» To comply with waste management legislation. » To minimise production of waste. » To ensure appropriate waste storage and disposal. » To avoid environmental harm from waste disposal. » A waste manifest must be developed for the ablutions showing proof of disposal of sewage at appropriate water treatment works.

Mitigation: Action/Control	Responsibility	Timeframe
Construction method and materials must be carefully considered in view of waste reduction, re-use, and recycling opportunities.	Contractor	Duration of contract
Construction contractors must provide specific detailed waste management plans (**Appendix H**) to deal with all waste streams.	Contractor	Duration of contract
Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises are placed, dumped or deposited on adjacent/surrounding properties, and that the waste is disposed of at a dumping site as approved by the Council.	Contractor	Duration of contract
Waste disposal at the construction site must be avoided by separating and trucking out of waste.	Contractor	Construction
Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse, construction waste (wood and metal scrap), and contaminated waste as required. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control.	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
Where practically possible, construction and general wastes on site must be reused or recycled. Bins and skips must be available on-site for collection, separation, and storage of waste streams (such as wood, metals, general refuse etc.).	Contractor	Duration of contract
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor	Duration of contract
Uncontaminated waste must be removed at least weekly for disposal, if feasible; other wastes must be removed for recycling/ disposal at an appropriate frequency.	Contractor	Duration of contract
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area and clearly labelled.	Contractor	Duration of contract
Waste must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal.	Contractor	Duration of contract
All sewage disposal to take place at a registered and operational wastewater treatment works. Slips of disposal to be retained as proof of responsible disposal.	Contractor	Maintenance: duration of contract within a particular area
All liquid waste must be contained in appropriately sealed vessels/ponds within the footprint of the development, and be disposed of at a designated waste management facility after use.	Contractor	Duration of contract
Documentation (waste manifest) must be maintained detailing the quantity, nature, and fate of any regulated waste. Waste disposal records must be available for review at any time.	Contractor	Duration of contract
SABS approved spill kits must be available and easily accessible.	Contractor	Duration of contract
Regularly serviced chemical toilet facilities and/or septic tank must be used to ensure appropriate control of sewage.	Contractor	Duration of contract
Daily inspection of all chemical toilets and septic tanks must be performed by environmental representatives on site.	Contractor	Duration of contract
In the event where sewage is discharged into the environment, all contaminated vegetation/ rock and soil must be removed immediately and treated as hazardous waste.	Contractor	Duration of construction
Under no circumstances may waste be burnt on site or on surrounding premises.	Contractor	Duration of construction
Where a registered waste site is not available close to the construction site, provide a method statement with regard to waste management.	Contractor	Duration of construction
Implement an integrated waste management approach (**Appendix H**) that is based on waste minimisation and incorporates reduction, recycling, re-use and disposal where appropriate. Where solid waste is disposed of, such disposal shall only occur at a landfill licensed in terms of section 20(b) of the National Environmental Management Waste Act, 2008 (Act 59 of 2008).	Contractor	Duration of construction
Upon the completion of construction, the area must be cleared of potentially polluting materials. Spoil stockpiles must also be removed and appropriately disposed of or the materials re-used for an appropriate purpose.	Contractor	Completion of construction

Mitigation: Action/Control	Responsibility	Timeframe
Upon the completion of construction, all sanitation facilities (including chemical toilets) must be removed, as well as the associated waste to be disposed of at a registered waste disposal site.	Contractor	Completion of construction
Litter generated by the construction crew must be collected in rubbish bins and disposed of weekly, or at an appropriate frequency, at registered waste disposal sites.	Contractor	Duration of construction
All building rubble, solid and liquid waste etc. generated during the construction activities must be disposed of as necessary at an appropriately licensed refuse facility.	Contractor	Duration of construction
All vehicles and containers used for moving waste must encapsulate the waste, which prevents the waste from causing odours and from escaping or blowing around the site. This will also prevent leachate material from spilling out of the containers, which is hazardous.	Contractor	Duration of construction
Any vegetation that is removed during the construction activities may be chipped for reuse or be taken to a waste management facility that will process the waste prior to further reuse or disposal.	Contractor	Duration of construction
The waste management hierarchy must be implemented as far as possible, and disposal of waste must be considered as a last resort.	Contractor	Duration of construction
Any resulting waste that cannot be reused or recycled, must be disposed of at a duly authorized waste management facility.	Contractor	Duration of construction
The applicant must also be aware of the requirements for the storage of waste as per the National Norms and Standards for the Storage of Waste, published in Government Notice ("GN") No. 926 on 29 November 2013. This may require registration with this Department and/or adherence to the conditions of operation if the thresholds for storage of waste will be exceeded.	Contractor	Duration of contract
Broken PV panels must be stored in a designated closed of area on site prior to removal from the site during construction. All broken panel must be removed from site following construction,	Contractor	Duration of construction

Performance Indicator	» No complaints received regarding waste on site or indiscriminate dumping. » Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately. » Provision of all appropriate waste manifests for all waste streams.
Monitoring	» Observation and supervision of waste management practices throughout the construction phase. » Waste collection will be monitored on a regular basis. » Waste documentation completed. » Proof of disposal of sewage at an appropriate wastewater treatment works. » A grievances register must be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon. » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE 14: Appropriate handling and storage of chemicals, hazardous substances

The construction of Montana 2 Solar Energy Facility will involve the generation of various wastes. In order to manage the wastes effectively, guidelines for the assessment, classification, and management of wastes, along with industry principles for minimising construction wastes must be implemented. The main wastes expected to be generated by the construction activities include:

- general solid waste
- hazardous waste
- inert waste (rock and soil)
- liquid waste (including grey water and sewage)

In the event of a significant spill or leak of hazardous substances (petrol, diesel, etc.) during the proposed construction and operational phase, such an incident(s) must be reported to the relevant authorities, including the Directorate: Pollution and Chemicals Management, in accordance with section 30 of the NEMA, 1998 pertaining to the control of incidents as well as the Department of Forestry, Fisheries and the Environment (DFFE).

Project Component/s	» Laydown areas. » Subcontractors' camps. » Temporary hydrocarbon and chemical storage areas.
Potential Impact	» Release of contaminated water from contact with spilled chemicals. » Generation of contaminated wastes from used chemical containers. » Soil pollution.
Activity/Risk Source	» Vehicles associated with site preparation and earthworks. » Construction activities of area and linear infrastructure. » Hydrocarbon spills by vehicles and machinery during levelling, vegetation clearance and transport of workers, materials and equipment and fuel storage tanks. » Accidental spills of hazardous chemicals. » Polluted water from wash bays and workshops. » Pollution from concrete mixing.
Mitigation: Target/Objective	» To ensure that the storage and handling of chemicals (including hydrocarbons) and machinery on-site does not cause pollution to the environment or harm to persons. » Prevent and contain hydrocarbon leaks. » Undertake proper waste management. » Store hazardous chemicals safely in a bunded area.

Mitigation: Action/Control	Responsibility	Timeframe
Implement an emergency preparedness plan (**Appendix J**) during the construction phase.	Contractor	Duration of Contract
Any liquids stored on site, including fuels and lubricants, must be stored in accordance with applicable legislation.	Contractor	Duration of Contract
The use of non-hazardous biodegradable cleaning products, with wastewater allowed to run off into the surrounding area below the panels. Care should be taken to ensure that only these non-hazardous biodegradable products are used, and that excessive wastewater is not generated that will result in localised erosion	Contractor	Duration of Contract
Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment must be contained using a drip tray with plastic sheeting filled with absorbent material when not parked on hard standing.	Contractor	Construction
Establish an appropriate Hazardous Store which is in accordance with the Hazardous Substance Amendment Act, No. 53 of 1992. This should include but not be limited to: » Designated area; » All applicable safety signage; » Firefighting equipment; » Enclosed by an impermeable bund; » Protected from the elements, » Lockable; » Ventilated; and » Have adequate capacity to contain 110% of the largest container contents.	Contractor	Duration of Contract
Corrective action must be undertaken immediately if a complaint is made, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures. Where required, a NEMA Section 30 report must be submitted to DEA within 14 days of the incident.	Contractor	Duration of contract
In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents.	Contractor	Duration of contract
Spilled concrete must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site. Check vehicles and machinery daily for oil, fuel and hydraulic fluid leaks and undertake regular high standard maintenance on vehicles.	Contractor	Duration of contract
Accidental spillage of potentially contaminating liquids and solids must be cleaned up immediately in line with procedures by trained staff with the appropriate equipment.	Contractor	Duration of contract
Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.	Contractor	Duration of contract
Routine servicing and maintenance of vehicles must not to take place on-site (except for emergencies). If repairs of vehicles must take place, an appropriate drip tray must be used to contain any fuel or oils.	Contractor	Duration of contract
All stored fuels to be maintained within an appropriate bund and on a sealed surface as per the requirements of SABS 089:1999 Part 1 and any relevant by-laws.	Contractor	Duration of contract
Fuel storage areas must be inspected regularly to ensure bund stability, integrity, and function.	Contractor	Duration of contract
Construction machinery must be stored in an appropriately sealed area.	Contractor	Duration of contract
Oily water from bunds at the on-site facility substation must be removed from site by licensed contractors.	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
The storage of flammable and combustible liquids such as oils must be undertaken in designated areas which are appropriately bunded, and stored in compliance with Material Safety Data Sheets (MSDS) files.	Contractor	Duration of contract
Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals must be complied with.	Contractor	Duration of contract
Transport of all hazardous substances must be in accordance with the relevant legislation and regulations.	Contractor	Duration of contract
The sediment control and water quality structures used on site must be monitored and maintained in an operational state at all times.	Contractor	Duration of contract
An effective monitoring system must be put in place to detect any leakage or spillage of all hazardous substances during their transportation, handling, installation and storage.	Contractor	Construction
Precautions must be in place to limit the possibility of oil and other toxic liquids entering the soil or clean stormwater system.	Contractor	Construction
As much material as possible must be pre-fabricated and then transported to site to avoid the risks of contamination associated with mixing, pouring and the storage of chemicals and compounds on site.	Contractor	Construction
All chemicals and toxicants used during construction must be stored in bunded areas.	Contractor	Construction
All machinery and equipment should be inspected, serviced and re-fuelled regularly for faults and possible leaks, these should be serviced off-site (pre-use inspection). These activities should either take place off-site, or in controlled and bunded working areas.	Contractor	Construction
All waste generated on-site during construction must be adequately managed.	Contractor	Construction
Should a chemical spill take place, an aquatic ecologist must be contracted to identify the extent of the impact and assist with additional mitigation measures, where aquatic features have been affected.	Contractor	Construction
Minimise fuels and chemicals stored on site.	Contractor	Construction
Install bunds on storage areas and take other precautions to reduce the risk of spills.	Contractor	Construction
Implement a contingency plan to handle spills, so that environmental damage is avoided.	Contractor	Construction
No refuelling, servicing of plant/equipment or chemical substance storage allowed outside of designated areas.	Contractor	Construction
Drip trays should be used during al fuel/chemical dispensing and be placed beneath standing machinery/plant.	Contractor	Construction
In the case of petrochemical spillages, the spill must be collected immediately and stored in a designated area until it can be disposed of in accordance with the Hazardous Chemical Substances Regulations, 1995 (Regulation 15).	Contractor	Construction

Performance Indicator	» No chemical spills outside of designated storage areas. » No water or soil contamination by spills. » No complaints received regarding waste on site or indiscriminate dumping. » Safe storage of hazardous chemicals. » Proper waste management.
Monitoring	» Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout the construction phase. » A grievances register must be maintained, in which any complaints from the community will be logged. » An incident reporting system will be used to record non-conformances to the EMPr. » On-going visual assessment to detect polluted areas and the application of clean-up and preventative procedures. » Monitor hydrocarbon spills from vehicles and machinery during construction continuously and record the volume and the nature of the spill, location and clean-up actions. » Monitor maintenance of drains and intercept drains weekly. » Analyse soil samples for pollution in areas of known spills or where a breach of containment is evident when it occurs. » Records of accidental spills and clean-up procedures and the results thereof must be audited on an annual basis by the ECO. » Records of all incidents that caused chemical pollution must be kept and a summary of the results must be reported to management annually.

6.3 Detailing Method Statements

OBJECTIVE 14: Ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimise environmental risk

The environmental specifications are required to be underpinned by a series of Method Statements, within which the Contractors and Service Providers are required to outline how any identified environmental risks will practically be mitigated and managed for the duration of the contract, and how specifications within this EMPr will be met. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to the Site Manager and ECO.

A Method Statement is defined as "a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications". The Method Statement must cover applicable details with regard to:

» Responsible person/s;
» Construction procedures;
» Materials and equipment to be used;
» Getting the equipment to and from site;
» How the equipment/material will be moved while on-site;
» How and where material will be stored;
» The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;

- Timing and location of activities;
- Compliance/non-compliance with the Specifications; and
- Any other information deemed necessary by the Site Manager.

Method Statements must be compiled for all activities which affect any aspect of the environment and should be applied consistently to all activities. Specific areas to be addressed in the method statement: pre, during and post construction include:

- Site establishment (which explains all activities from induction training to offloading, construction sequence for site establishment and the different amenities and to be established etc. Including a site camp plan indicating all of these).
- Preparation of the site (i.e. clearing vegetation, compacting soils and removing existing infrastructure and waste).
- Soil management/stockpiling and erosion control.
- Excavations and backfilling procedure.
- Stipulate norms and standards for water supply and usage (i.e.: comply strictly to licence and legislation requirements and restrictions).
- Stormwater method statement.
- Ablution facilities (placement, maintenance, management and servicing).
- Solid Waste Management:
  - Description of the waste storage facilities (on site and accumulative).
  - Placement of waste stored (on site and accumulative).
  - Management and collection of waste process.
  - Recycle, re-use and removal process and procedure.
- Liquid waste management.
- Design, establish, maintain and operate suitable pollution control facilities necessary to prevent discharge of water containing polluting matter or visible suspended materials into the surrounding environment. Should grey water (i.e. water from basins, showers, baths, kitchen sinks etc.) need to be disposed of, link into an existing facility where possible. Where no facilities are available, grey water runoff must be controlled to ensure no seepage into the surrounding environment occurs.
- Dust and noise pollution:
  - Describe the necessary measures to ensure that noise from construction activities is maintained within lawfully acceptable levels.
  - Procedure to control dust at all times on the site, access roads and spoil sites (dust control shall be sufficient so as not to have significant impacts in terms of the biophysical and social environments). These impacts include visual pollution, decreased safety due to reduced visibility, negative effects on human health and the ecology due to dust particle accumulation.
- Hazardous substance storage (ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood treatments, bitumen, cement, pesticides and any other harmful and hazardous substances and materials. South African National Standards apply).
  - Lists of all potentially hazardous substances to be used.
  - Appropriate handling, storage and disposal procedures.
  - Prevention protocol of accidental contamination of soil at storage and handling areas.
  - All storage areas, (i.e. for harmful substances appropriately bunded with a suitable collection point for accidental spills must be implemented and drip trays underneath dispensing mechanisms including leaking engines/machinery).
- Fire prevention and management measures on site.

- Fauna and flora protection process on and off site (i.e. removal to reintroduction or replanting, if necessary).
  - Rehabilitation, re-vegetation process and bush clearing.
- Incident and accident reporting protocol.
- General administration.
- Designate access road and the protocols while roads are in use.
- Requirements on gate control protocols.

The Contractor may not commence with the activity covered by the Method Statement until it has been approved by the Site Manager (with input from the ECO), except in the case of emergency activities and then only with the consent of the Site Manager. Approval of the Method Statement will not absolve the Contractor from their obligations or responsibilities in terms of their contract. Failure to submit a method statement may result in suspension of the activity concerned until such time that an appropriate method statement has been submitted and approved.

6.4 Awareness and Competence: Construction Phase

OBJECTIVE 15: To ensure all construction personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm

To achieve effective environmental management, it is important that all personnel involved in the project are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The ECO is responsible for monitoring compliance pre, during and post construction. The contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts.

The Contractors obligations in this regard include the following:

- All Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment. This includes the discussion/explanation of site environmental matters during toolbox talks.
- The content and requirements of Method Statements are to be clearly explained to all plant operators and general workers. All staff acting in a supervisory capacity are to have copies of the relevant Method Statements and be aware of the contents thereof.
- Ensuring that a copy of the EMPr is readily available on-site, and that all senior site staff are aware of the location and have access to the document. Senior site staff will be familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction of the facility.
- Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training session. The training session must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
  - Records must be kept of those that have completed the relevant training.
  - Training should be done either in a written or verbal format but must be appropriate for the receiving audience.

- Refresher sessions must be held to ensure the contractor staff are aware of their environmental obligations as practically possible.

» All sub-contractors must have a copy of the EMPr and sign a declaration/ acknowledgement that they are aware and familiar with the contents and requirements of the EMPr and that they will conduct work in such a manner as to ensure compliance with the requirements of the EMPr.
» Contractors and main sub-contractors must have basic training in the identification of archaeological sites/objects, and protected flora and fauna that may be encountered on the site.
» Awareness of any other environmental matters, which are deemed to be necessary by the ECO.
» Ensuring that employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) are erected at prominent locations throughout the development area.

Therefore, prior to the commencement of construction activities and before any person commences with work thereafter, adequate environmental awareness and responsibility are to be appropriately presented to all staff present on-site, clearly describing their obligations towards environmental controls and methodologies in terms of this EMPr. This training and awareness will be achieved in the following ways:

6.4.1 Environmental Awareness and Induction Training

The EO, in consultation with the contractor, shall ensure that all construction workers receive an induction presentation, as well as on-going environmental education and awareness, on the importance and implications of the EMPr and the environmental requirements it prescribes. The presentation shall be conducted, as far as is possible, in the employees' language of choice. The contractor must provide a translator from their staff for the purpose of translating should this be necessary.

As a minimum, induction training should include:

» Explanation of the importance of complying with the EMPr;
» Explanation of the importance of complying with the Environmental Authorisation;
» Discussion of the potential environmental impacts of construction activities;
» Awareness regarding sensitivities on the site, including sensitive plant species (including the use of visual aids and on-site identification);
» The benefits of improved personal performance;
» Employees' roles and responsibilities, including emergency preparedness (this should be combined with this induction, but presented by the contractor's Health and Safety Representative);
» Explanation of the mitigation measures that must be implemented when carrying out their activities; and
» Explanation of the specifics of this EMPr and its specification (no-go areas, etc.).

Environmental Awareness Training must take the form of an on-site talk and demonstration by the EO/ECO before the commencement of site establishment and construction on site. The education/awareness programme must be aimed at all levels of management and construction workers within the contractor team. A record of attendance of this training must be maintained by the EO/ECO on site. Proof of awareness training must be kept on record. Environmental induction training must be presented to all persons who are to work on the site – be it for short or long durations; Contractor's or Engineer's staff; administrative or site staff; sub-contractors or visitors to site.

This induction training should be undertaken by the Contractor's EO and should include discussing Montana 2 Solar Energy Facility (Pty) 'td's environmental policy and values, the function of the EMPr and Contract Specifications and the importance and reasons for compliance to these. The induction training must highlight the overall do's and don'ts on site and clarify the repercussions of not complying with these. The non-conformance reporting system must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the EO on site.

6.4.2 Toolbox Talks

Toolbox talks should be held on a scheduled and regular basis (at least twice a month) where foremen, environmental and safety representatives of different components of the works and sub-consultants hold talks relating to environmental practices and safety awareness on site. These talks must also include discussions on possible common incidents occurring on site and ones recommended by the on-site EO and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

6.5 Monitoring Programme: Construction Phase

OBJECTIVE 16: To monitor the performance of the control strategies employed against environmental objectives and standards

A monitoring programme must be in place not only to ensure conformance with the EMPr, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are, or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will be stipulated by the EA (once issued). Where this is not clearly dictated, the Developer will determine and stipulate the period and frequency of monitoring required in consultation with relevant stakeholders and authorities. The Technical Director/ Project Manager will ensure that the monitoring is conducted and reported.

The aim of the monitoring and auditing process would be to monitor the implementation of the specified environmental specifications, in order to:

- Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications
- Ensure adequate and appropriate interventions to address non-compliance
- Ensure adequate and appropriate interventions to address environmental degradation
- Provide a mechanism for the lodging and resolution of public complaints
- Ensure appropriate and adequate record keeping related to environmental compliance
- Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site
- Aid in communication and feedback to authorities and stakeholders

All documentation e.g. audit/monitoring/compliance reports and notifications, required to be submitted to the DFFE in terms of the EA, must be submitted to the Director: Compliance Monitoring of the Department.

Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

6.5.1. Non-Conformance Reports

All supervisory staff including Foremen, Engineers, and the ECO must be provided the means to be able to submit non-conformance reports to the Site Manager. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor.

The non-conformance report will be updated on completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously and that the non-conformance can be closed-out to the satisfaction of the Site Manager and ECO.

6.5.2. Monitoring Reports

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to the Director: Compliance Monitoring at DEA for their records. This Report must include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded, corrective action required, and details of those non-conformances or incidents which have been closed out. The contractor must ensure that all waste manifests are provided to the ECO on a monthly basis in order to inform and update the DEA regarding waste related activities.

6.5.3. Audit Reports

The holder of the EA must, for the period during which the EA and EMPr remain valid, ensure that project compliance with the conditions of the EA and the EMPr are audited, and that the audit reports are submitted to the Director: Compliance Monitoring of the DEA.

An environmental internal audit must be conducted and submitted every 3 months and an external audit must be conducted once a year. An annual audit report must be compiled and submitted to DEA until the completion of construction and rehabilitation. This Report must be compiled in accordance with Appendix 7 of the EIA Regulations, 2014, as amended (or any update thereto), and indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the EA conditions and the requirements of the EMPr.

6.5.4. Final Audit Report

A final environmental audit report must be compiled by an independent auditor and be submitted to DFFE upon completion of the construction and rehabilitation activities. The Report must be submitted within 30 days of completion of rehabilitation activities. This Report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the EA conditions and the requirements of the EMPr.

CHAPTER 7: MANAGEMENT PROGRAMME: REHABILITATION

Overall Goal: Undertake the rehabilitation measures in a way that:

» Ensures rehabilitation of disturbed areas following the execution of construction works, such that residual environmental impacts are remediated or curtailed.

7.1. Objectives

In order to meet this goal, the following objective, actions and monitoring requirements are relevant:

OBJECTIVE 1: Ensure appropriate rehabilitation of disturbed areas such that residual environmental impacts are remediated or curtailed

Areas requiring rehabilitation will include all areas disturbed during the construction phase and that are not required for regular operation and maintenance operations. Rehabilitation must be undertaken in an area as soon as possible after the completion of construction activities within that area.

Project Component/s	» Construction camps. » Laydown areas. » Access roads. » Ancillary buildings. » All other areas affected by construction activities and not required for operation.
Potential Impact	» Environmental integrity of the site undermined resulting in reduced visual aesthetics, erosion and increased runoff, and the requirement for on-going management intervention.
Activity/Risk Source	» Temporary construction and laydown areas. » Temporary access roads/tracks. » Other disturbed areas/footprints.
Mitigation: Target/Objective	» Ensure and encourage site rehabilitation of disturbed areas. » Ensure that the site is appropriately rehabilitated following the execution of the works, such that residual environmental impacts (including erosion) are remediated or curtailed.

Mitigation: Action/Control	Responsibility	Timeframe
Implement an appropriate Revegetation and Rehabilitation Plan (**Appendix E**).	Contractor	Following execution of the works
All temporary facilities, equipment, and waste materials must be removed from site as soon as construction is completed.	Contractor	Following execution of the works
All temporary fencing and danger tape must be removed once the construction phase has been completed.	Contractor	Following completion of construction activities in an area
Laydown areas and construction camps are to be checked for spills of substances such as oil, paint, etc. Any spills recorded	Contractor	Following completion of construction activities in an area

Mitigation: Action/Control	Responsibility	Timeframe
must be cleaned up and the contaminated soil appropriately disposed of.		
All voids must be backfilled. Any gullies or dongas must also be backfilled.	Contractor	Following completion of construction activities in an area
Where disturbed areas are not to be used during the operation of the solar PV facility, these areas must be rehabilitated/re-vegetated with appropriate natural indigenous vegetation and/or local seed mix. A seed mix must be applied to rehabilitated and bare areas. No exotic plants must be used for rehabilitation purposes. No grazing must be permitted to allow for the recovery of the area.	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
The area must be shaped to a natural topography. Trees (or vegetation stands) removed must be replaced.	Contractor	Following completion of construction activities in an area
No planting or importing any listed invasive alien plant species (all Category 1a, 1b and 2 invasive species) to the site for landscaping, rehabilitation or any other purpose must be undertaken.	Contractor	Following completion of construction activities in an area
Compacted areas must be ripped (perpendicularly) to a depth of 300mm, and the area must be top soiled and re-vegetated.	Contractor	Following completion of construction activities in an area
Temporary roads must be closed and access to these blocked. The temporary access roads must be rehabilitated.	Contractor	Following completion of construction activities in an area
Necessary drainage works and anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion.	Contractor	Following completion of construction activities in an area
Topsoil from all excavations and construction activities must be salvaged and reapplied during reclamation. Soils must be replaced in the correct sequence / profile.	Contractor	Following completion of construction activities in an area
Re-vegetated areas may need to be protected from wind erosion and maintained until an acceptable plant cover has been achieved.	Developer in consultation with rehabilitation specialist	Post-rehabilitation
Erosion control measures must be used in sensitive areas such as steep slopes, hills, and drainage systems if necessary.	Developer in consultation with EO and rehabilitation specialist (if required)	Post-rehabilitation
On-going alien plant monitoring and removal must be undertaken on all areas of natural vegetation on an annual basis.	Developer	Post-rehabilitation

Performance Indicator	» All portions of the site, including the construction equipment camp and working areas, are cleared of equipment and temporary facilities. » Topsoil is replaced on all areas and stabilised where practicable or required after construction and temporally utilised areas. » Disturbed areas are rehabilitated and an acceptable plant cover achieved on rehabilitated sites.

	» The completed site is free of erosion and alien invasive plants.
Monitoring	» Rehabilitated areas must be monitored (responsibility of EO) on a weekly basis throughout the construction phase and on a monthly basis thereafter and to the point where the area has been rehabilitated to a satisfactory level. » On-going inspection of rehabilitated areas in order to determine the effectiveness of rehabilitation measures implemented during the operational lifespan of the facility. » On-going alien plant monitoring and removal should be undertaken on an annual basis.

CHAPTER 8: OPERATION MANAGEMENT PROGRAMME

Overall Goal: To ensure that the operation of Montana 2 Solar Energy Facility does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the facility in a way that:

» Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
» Enables the operation activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to farming practices, traffic and road use, and effects on local residents.

8.1. Objectives

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

OBJECTIVE 1: Establish clear reporting, communication, and responsibilities in relation to overall implementation of the EMPr during operation

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Operations Manager, and Technical/SHEQ Manager for the operation phase of this project are detailed below.

The **Operations Manager** will:
» Ensure that adequate resources (human, financial, technology) are made available and appropriately managed for the successful implementation of the operational EMPr.
» Conduct annual basis reviews of the EMPr to evaluate its effectiveness.
» Take appropriate action as a result of the findings and recommendations in management reviews and audits.
» Provide forums to communicate matters regarding environmental management.

The **Technical/SHEQ Manager** will:

» Develop and Implement an Environmental Management System (EMS) for the solar PV facility and associated infrastructure.
» Manage and report on the facility's environmental performance.
» Maintain a register of all known environmental impacts and manage the monitoring thereof.
» Conduct internal environmental audits and co-ordinate external environmental audits.
» Liaise with statutory bodies such as the National and Provincial Department of Environmental Affairs (DEA) on environmental performance and other issues.
» Conduct environmental training and awareness for the employees who operate and maintain the facility.
» Compile environmental policies and procedures.
» Liaise with interested and affected parties on environmental issues of common concern.
» Track and control the lodging of any complaints regarding environmental matters.

OBJECTIVE 2: Limit the ecological footprint of the solar PV Facility

Indirect impacts on vegetation and terrestrial fauna and avifauna during operation could result from maintenance activities and the movement of people and vehicles on site. In order to ensure the long-term environmental integrity of the site following construction, maintenance of the areas rehabilitated post-construction must be undertaken until these areas have successfully re-established.

Project Component/s	» PV panels. » Access roads. » Rehabilitated areas.
Potential Impact	» Disturbance to or loss of vegetation and/or habitat in surrounding areas. » Environmental integrity of the site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention. » Mortality and disturbance of avifauna within and beyond the footprint of the facility due to collisions with solar panels, presence of personnel and vehicle traffic
Activities/Risk Sources	» Avifaunal collisions with PV panels » Birds entrapped along perimeter fencing » Human presence » Movement of vehicles to and from the site. » Presence of the PV infrastructure and site fencing.
Mitigation: Target/Objective	» Maintain minimised footprints of disturbance of vegetation/habitats on-site. » Ensure and encourage plant regrowth in non-operational areas of post-construction rehabilitation.

Mitigation: Action/Control	Responsibility	Timeframe
Rehabilitate disturbed areas should the previous attempt be unsuccessful.	O& M Contractor	Operation
Where the vegetation is not re-establishing itself, particularly in areas of disturbance, soil samples must be collected and taken in for analysis at a registered laboratory for pH levels, electrical conductivity and major plant nutrients. The results must be submitted to a suitably qualified soil or agricultural scientist for recommendations to ensure that the vegetation cover is established and erosion is prevented.	O&M Contractor Developer	Duration of project
Where vegetation re-establishment still remains unsatisfactory, the bulk density of the soil should be measured with a penetrometer to determine whether compaction is an issue.	O&M Contractor Developer	Duration of project
Site access and access to adjacent areas should be controlled and only authorised staff and contractors should be allowed on-site.	O&M Contractor	Operation
All vehicles accessing the site should adhere to a low speed limit (40km/h max for heavy vehicles and 30km/h max for light vehicles) to avoid collisions with susceptible species such as snakes and tortoises.	O&M Contractor Developer	Operation
Maintain and augment natural vegetation around the proposed project	O&M Contractor	Operation

Mitigation: Action/Control	Responsibility	Timeframe
Vegetation control should be by manual clearing and herbicides should not be used except to control alien plants in the prescribed manner.	O&M Contractor	Operation
The use of herbicides and pesticides and other related horticultural chemicals should be carefully controlled and only applied by personnel adequately certified to apply pesticides and herbicides. It must be ensured that World Health Organisation (WHO) Recommended Classification of Pesticides by Hazard Class 1a (extremely hazardous) or 1b (highly hazardous) are not purchased, stored or used on site along with any other nationally or internationally similarly restricted/banned products.	O&M Contractor Developer	Operation
Soil surfaces where no revegetation seems possible will have to be covered with gravel or small rock fragments to increase porosity of the soil surface, slow down runoff and prevent wind and water erosion.	O&M Contractor	Operation
Any vegetation clearing that needs to take place as part of the maintenance activities must be done in an environmentally friendly manner, including avoiding the use of herbicides and using manual clearing methods wherever possible.	O&M Contractor	Operation
Vehicle movements must be restricted to designated access roads.	O&M Contractor	Operation
Existing roads must be maintained to ensure limited erosion and impact on areas adjacent to roadways.	O&M Contractor Developer	Operation
Maintain erosion control measures implemented during the construction phase (i.e. run-off attenuation on slopes (bags, logs), silt fences, storm water catch-pits, and shade nets).	O&M Contractor Developer	Operation
Develop and implement an appropriate Stormwater Management Plan (**Appendix G**) for the operation phase of the facility.	O&M Contractor	Operation
No harvesting of plants for firewood, medicinal or any other purposes is to be permitted	O&M Contractor	Operation
No killing and poaching of any wild animal to be allowed. This should be clearly communicated to all employees, including subcontractors.	O&M Contractor & sub-contractor(s)	Operation
Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities must be removed to a safe location by a suitably qualified person.	O&M Contractor & sub-contractor (s)	Operation
An on-going alien plant monitoring and eradication programme (**Appendix C**) must be implemented, where necessary.	Developer	Operation
Undertake an annual site inspection for erosion or water flow regulation problems – with follow up remedial action where problems are identified.	Developer	Operation

Performance Indicator	» Limited soil erosion around site. » No further disturbance to vegetation or terrestrial faunal habitats. » No disturbance of breeding raptors, if present (i.e. no nest abandonment due to disturbance).

	» No disturbance of red-listed avifaunal species perched or foraging in the vicinity of the development area. » No poaching or collecting of avifauna or their products (e.g. eggs and nestlings) by maintenance personnel. » Removal to safety of entrapped/injured avifauna encountered during routine maintenance. » Low impact on nocturnal and crepuscular species along roads. » Continued improvement of rehabilitation efforts.
Monitoring	» Observation of vegetation on-site by environmental manager. » Regular inspections to monitor plant regrowth/performance of rehabilitation efforts and weed infestation compared to natural/undisturbed areas. » No birds or eggs are disturbed or removed by personnel. » Perimeter fencing is maintained in a manner that ensures it is bird friendly, with respect to ground-dwelling species. » Any raptor nests (especially of red-listed species) discovered on site or nearby, are monitored weekly until post-fledging period. » Any open reservoirs on site are covered with mesh to exclude birds.

OBJECTIVE 3: Protection of avifauna

Project component/s	» PV panels. » Access roads. » Cabling between project components. » Substation. » All other associated infrastructure.
Potential Impact	» Disturbance to or loss of birds as a result of collision with the PV panels and project components. » Destruction of habitat. » Displacement of birds. » Electrocution on power line. » Traffic to and from site.
Activity/risk source	» PV panels. » Substation.
Mitigation: Target/Objective	» More accurately determine the impact of the operating PV facility on collision-prone Red Data species. » Minimise impacts associated with the power line and the substation.

Mitigation: Action/control	Responsibility	Timeframe
Any No-go areas identified should be adhered to.	Operator	Operation phase
Lighting should be kept to a minimum to avoid attracting insects and birds, light sensors/switches should be utilised to keep lights off when not required; and	Operator	Operation phase
Cattle grids should be modified to allow for any chicks that fall in to escape (e.g. by placing a ramp inside the structure. Prior to commencing work each day, two individuals should traverse the working area in order to disturb any fauna so that they have a chance to vacate.	Operator	Operation phase

Mitigation: Action/control	Responsibility	Timeframe
Lighting fixtures should be hooded and directed downward where possible, to minimize the skyward and horizontal illumination, lighting should be motion activated where possible.	Operator	Operation phase
Post-construction monitoring should commence as soon as possible during the commencement of the construction phase to ensure that the immediate effects of the facility on resident and passing birds are recorded, before they have time to adjust or habituate to the development. However, it should be borne in mind that it is also important to obtain an understanding of the impacts of the facility as they would be over the lifespan of the facility. Over time the habitat in the area may change, birds may become habituated to, or learn to avoid the facility. It is therefore necessary to monitor over a longer period than just an initial one year. Monitoring should take place in Year 1 and 2 of the operational phase, and then repeated in Year 5 and every five years after that. After the first year of monitoring, the programme should be reviewed in order to incorporate significant findings that have emerged. This may entail the revision of the search protocol, and the size of the search plots, depending on the outcome of the first year of monitoring. If significant impacts are observed and mitigation is required, the matter should be taken up with the operator to discuss potential mitigation. In such instances the scope of monitoring could be reduced to focus only on the impacts of concern.	Operator	Operation phase
If birds nest on the infrastructure of the facility and cannot be tolerated due to operational risks of fire, electrical shorts, soiling of panels or other concerns, birds should be prevented from accessing nesting sites by using mesh or other manners of excluding them. Birds should not be shot, poisoned or harmed as this is not an effective control method and has negative ecological consequences. Birds with eggs or nestlings should be allowed to fledge their young before nests are removed.	O&M Contractor	Operation
If there are any persistent problems with avifauna, then an avifaunal specialist should be consulted for advice on further mitigation.	O&M Contractor Developer Specialist	Operation
Should any open reservoirs be required, these should be covered with fine mesh or other exclusion material in order to prevent birds from falling in and drowning.	O&M Contractor Developer	Operation

Performance Indicator	» Minimal additional disturbance to bird populations on the PV facility site. » Continued improvement of bird protection devices, as informed by the operational monitoring.
Monitoring and Reporting	» Observation of avifaunal populations and incidence of injuries/death from collisions with PV panels. » Monitoring of facility and reporting where fatalities do occur.

OBJECTIVE 3: Minimise the establishment and spread of alien invasive plants

Major factors contributing to invasion by alien invader plants include high disturbance activities and negative grazing practices. Consequences of this may include:

- Loss of indigenous vegetation;
- Change in vegetation structure leading to change in various habitat characteristics;
- Change in plant species composition;
- Change in soil chemical properties;
- Loss of sensitive habitats;
- Loss or disturbance to individuals of rare, endangered, endemic, and/or protected species;
- Fragmentation of sensitive habitats;
- Change in flammability of vegetation, depending on alien species; and
- Hydrological impacts due to increased transpiration and runoff.

Project Component/s	» PV facility. » Access road. » Associated infrastructure.
Potential Impact	» Invasion of natural vegetation surrounding the site by declared weeds or invasive alien species. » Impacts on soil. » Impact on faunal habitats. » Degradation and loss of agricultural potential.
Activities/Risk Sources	» Transport of construction materials to site. » Movement of construction machinery and personnel. » Site preparation and earthworks causing disturbance to indigenous vegetation. » Construction of site access roads. » Stockpiling of topsoil, subsoil and spoil material. » Routine maintenance work – especially vehicle movement.
Mitigation: Target/Objective	» To significantly reduce the presence of weeds and eradicate alien invasive species. » To avoid the introduction of additional alien invasive plants to the development area. » To avoid distribution and thickening of existing alien plants in the development area. » To complement existing alien plant eradication programs in gradually causing a significant reduction of alien plant species throughout the development area.

Mitigation: Action/Control	Responsibility	Timeframe
Develop and implement an AIP Control and Eradication Programme.	O&M Contractor	Operation
Avoid creating conditions in which alien plants may become established: » Keep disturbance of indigenous vegetation to a minimum. » Rehabilitate disturbed areas as quickly as possible. » Do not import soil from areas with alien plants.	O&M Contractor	Operation
Annual monitoring for alien plant species - with follow up clearing as needed – or as per the frequency stated in the Alien Invasive Management Plan to be developed for the site. When alien plants are detected, these must be controlled and cleared using	O&M Contractor	Operation

Mitigation: Action/Control	Responsibility	Timeframe
the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur.		
Eradicate all weeds and alien invasive plants as far as practically possible and ensure that material from invasive plants are adequately destroyed and not further distributed.	O&M Contractor	Operation
Any alien and invasive vegetation removed should be taken to a registered landfill site to prevent the proliferation of alien and invasive species	O&M Contractor	Operation

Performance Indicator	» Low abundance of alien plants. For each alien species: the number of plants and aerial cover of plants within the site and immediate surroundings.
Monitoring	» Annual audit of development footprint and immediate surroundings by qualified botanist. » If any alien invasive species are detected then the distribution of these should be mapped (GPS co-ordinates of plants or concentrations of plants), number of individuals (whole site or per unit area), age and/or size classes of plants and aerial cover of plants. » The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the site. » The environmental manager/site agent should be responsible for driving this process. » Reporting frequency depends on legal compliance framework.

OBJECTIVE 4: Minimise dust and air emissions

During the operation phase, limited gaseous or particulate emissions are anticipated from exhaust emissions (i.e. from operational vehicles). Windy conditions and the movement of vehicles on site may lead to dust.

Project Component/s	» Gravel surfaces. » On-site vehicle movement.
Potential Impact	» Dust and particulates from vehicle movement to and on site. » Release of minor amounts of air pollutants (for example NO_2, CO and SO_2) from vehicles.
Activities/Risk Sources	» Re-entrainment of deposited dust by vehicle movements. » Wind erosion from unsealed roads and surfaces. » Fuel burning vehicle engines.
Mitigation: Target/Objective	» To ensure emissions from all vehicles are minimised, where possible. » To minimise nuisance to the community from dust emissions and to comply with workplace health and safety requirements. » To ensure emissions from the power generation process are minimised.

Mitigation: Action/Control	Responsibility	Timeframe
Implement appropriate dust suppression on gravel roads on a regular basis.	O&M Contractor	Operation
Ensure all vehicles are roadworthy and drivers are qualified and made aware of the potential noise and dust issues.	Developer	Operation
Speed of vehicles must be restricted on site to 40km/h max (for light duty vehicles) and 30km/h max for heavy duty vehicles.	Developer	Operation

Mitigation: Action/Control	Responsibility	Timeframe
Vehicles and equipment must be maintained in a road-worthy condition at all times.	Developer	Operation

Performance Indicator	» No complaints from affected residents or community regarding dust or vehicle emissions. » Dust suppression measures implemented where required. » Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed.
Monitoring	» Immediate reporting by personnel of any potential or actual issues with nuisance or dust to the Operations Manager. » A grievances register must be maintained, in which any complaints from residents/the community will be logged, and thereafter complaints will be investigated and, where appropriate, acted upon. » An incident reporting system must be used to record non-conformances to the EMPr.

OBJECTIVE 5: Ensure the implementation of an appropriate fire management plan and general management measures during the operation phase

The following recommendations below must be considered with regards to fire protection on site:

» Alien Invasive species should be completely eradicated in order to decrease the fire risk associated with the site.
» Cigarette butts may not be thrown in the veld, but must be disposed of correctly. Designated smoking areas must be established with suitable receptacles for disposal.
» In case of a fire outbreak, contact details of the local fire and emergency services must be readily available.
» Contractors must ensure that basic firefighting equipment is available on site as per the specifications defined by the health and safety representative / consultant.
» The fire risk on site is a point of discussion that must take place as part of the environmental induction training prior to commencement of construction.
» The contractor must also comply with the requirements of the Occupational Health and Safety Act with regards to fire protection.

The following below can be used as a guide for appropriate fire management (also refer to **Appendix J** of the EMPr):

Project Component/s	» Operation and maintenance of the solar PV facility and associated infrastructure.
Potential Impact	» Veld fires can pose a personal safety risk to local farmers and communities, and their homes, crops, livestock and farm infrastructure, such as gates and fences. In addition, fire can pose a risk to the solar PV facility infrastructure.
Activities/Risk Sources	» The presence of operation and maintenance personnel and their activities on the site can increase the risk of veld fires.
Mitigation: Target/Objective	» To avoid and or minimise the potential risk of veld fires on local communities and their livelihoods.

Mitigation: Action/Control	Responsibility	Timeframe
Provide adequate firefighting equipment on site and establish a fire-fighting management plan during operation.	O&M Contractor	Operation
Provide fire-fighting training to selected operation and maintenance staff.	O&M Contractor	Operation
Ensure that appropriate communication channels are established to be implemented in the event of a fire.	O&M Contractor	Operation
Fire breaks should be established where and when required. Cognisance must be taken of the relevant legislation when planning and burning firebreaks (in terms of timing, etc.).	Contractor	Operation
Upon completion of the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency.	O&M Contractor	Operation
Contact details of emergency services should be prominently displayed on site.	O&M Contractor	Operation
Road borders must be regularly maintained to ensure that vegetation remains short and that they therefore serve as an effective firebreak.	O&M Contractor	Operation
Should panels be required to be replaced, the following will apply: » Materials and panels are to be stored within the previously disturbed construction laydown area. No disturbance of areas outside of these areas should occur. » Full clean-up of all materials must be undertaken after the removal and replacement of the solar panel arrays and associated infrastructure is complete, and disturbed areas appropriately rehabilitated. » Most of the materials used for solar panel systems can be recycled. The majority of the glass and semiconductor materials can be recovered and re-used or recycled. Recyclable materials must be transported off-site by truck and managed at appropriate facilities in accordance with relevant waste management regulations. No waste materials may be left on-site. » Waste material which cannot be recycled shall be disposed of at an appropriately licensed waste disposal site or as required by the relevant legislation.	O&M Contractor	Operation

Performance Indicator	» Firefighting equipment and training provided before the operation phase commences. » Appropriate fire breaks in place.
Monitoring	» The O&M contractor must monitor indicators listed above to ensure that they have been met.

OBJECTIVE 6: Maximise local employment, skills development and business opportunities associated with the operation phase

The development of Montana 2 Solar Energy Facility will result in positive socio-economic benefits for the local communities near Beaufort West and Nelspoort, particularly through the creation of direct and indirect employment opportunities, which will result in an economic effect multiplier effect for the local businesses.

Project Component/s	» Operation and maintenance activities associated with the solar PV facility.
Potential Impact	» The opportunities and benefits associated with the creation of local employment and business should be maximised.
Activities/Risk Sources	» Limited use of local labour, thereby reducing the employment and business opportunities for locals. » Sourcing of individuals with skills similar to the local labour pool outside the municipal area. » Unavailability of locals with the required skills resulting in locals not being employed and labour being sourced from outside the municipal area. » Higher skilled positions might be sourced internationally, where required.
Enhancement: Target/Objective	» The Developer / O&M Contractor should aim to employ as many low-skilled and semi-skilled workers from the local area as possible. » Employment of a maximum number of the low-skilled and/or semi-skilled workers from the local area where possible. » Appropriate skills training and capacity building.

Mitigation: Action/Control	Responsibility	Timeframe
Where feasible, effort must be made to employ locally in order to create maximum benefit for the communities.	O&M Contractor Developer	Operation
In order to maximise the positive impact, it is suggested that the Developer (including the O&M Contractor) provide training courses for employees where feasible to ensure that employees gain as much as possible from the work experience.	Developer O&M Contractor	Operation
Facilitate the transfer of knowledge between experienced employees and the staff.	O&M Contractor	Operation
Local Small and Medium Enterprises are to be approached to investigate the opportunities for supplying inputs required for the maintenance and operation of the facility, as far as feasible	Developer O&M Contractor	Operation

Performance Indicator	» Job opportunities, especially of low to semi-skilled positions, are primarily awarded to members of local communities as appropriate. » Locals and previously disadvantaged individuals (including women) are considered during the hiring process. » Labour, entrepreneurs, businesses, and SMMEs from the local sector are awarded jobs, where possible, based on requirements in the tender documentation. » The involvement of local labour is promoted. » Reports are not made from members of the local communities regarding unrealistic employment opportunities or that only outsiders were employed. » Skills training and capacity building initiatives are developed and implemented.
Monitoring	» Developer must keep a record of local recruitments and information on local labour to be shared with the ECO for reporting purposes.

OBJECTIVE 7: Appropriate handling and management of hazardous substances, waste and dangerous goods

The operation of the solar PV facility will involve the storage of chemicals and hazardous substances, as well as the generation of limited waste products. The main wastes expected to be generated by the operation activities includes general solid waste, hazardous waste and sewage waste.

Project Component/s	» PV facility. » Associated infrastructure.
Potential Impact	» Inefficient use of resources resulting in excessive waste generation. » Litter or contamination of the site or water through poor waste management practices. » Contamination of water or soil because of poor materials management.
Activity/Risk Source	» On-site facility substation, transformers, switchgear and supporting equipment. » Workshop / control room.
Mitigation: Target/Objective	» Comply with waste management legislation. » Minimise production of waste. » Ensure appropriate waste disposal. » Avoid environmental harm from waste disposal. » Ensure appropriate storage of chemicals and hazardous substances.

Mitigation: Action/Control	Responsibility	Timeframe
Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	O&M Contractor	Operation and maintenance
Storage areas for hazardous substances must be appropriately sealed and bunded.	O&M Contractor	Operation
All hazardous materials (such as used/new transformer oils, etc.) must be stored in the appropriate manner (stored in sealed containers within a clearly demarcated designated area) to prevent contamination of the site. 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.	O&M Contractor	Operation
All structures and/or components replaced during maintenance activities must be appropriately disposed of at an appropriately licensed waste disposal site or sold to a recycling merchant for recycling.	O&M Contractor	Operation
Care must be taken to ensure that spillage of oils and other hazardous substances are limited during maintenance. Handling of these materials should take place within an appropriately sealed and bunded area. Should any accidental spillage take place, it must be cleaned up according to specified standards regarding bioremediation.	O&M Contractor & sub-contractor(s)	Operation and maintenance
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	O&M Contractor	Operation
All food waste and litter at the site should be placed in bins with lids and removed from the site on a regular basis.	O&M Contractor	Operation
Waste handling, collection, and disposal operations must be managed and controlled by a waste management contractor.	O&M Contractor	Operation
All sewage disposal to take place at a registered and operational wastewater treatment works. Proof of disposal to be retained as proof of responsible disposal.	O&M Contractor	Operation
Used oils and chemicals:	O&M Contractor	Operation

Mitigation: Action/Control	Responsibility	Timeframe
» Appropriate disposal must be arranged with a licensed facility in consultation with the administering authority. » Waste must be stored and handled according to the relevant legislation and regulations.		
General waste must be recycled where possible or disposed of at an appropriately licensed landfill.	O&M Contractor	Operation
Hazardous waste (including hydrocarbons) and general waste must be stored and disposed of separately.	O&M Contractor	Operation
Separation and recycling of different waste materials should be supported.	O&M Contractor	Operation
Should a chemical spill take place, an aquatic ecologist must be contracted to identify the extent of the impact and assist with additional mitigation measures, where aquatic features are affected.	O&M Contractor Developer	Operation
Immediately report significant spillages and initiate an environmental site assessment for risk assessment and remediation if necessary.	O&M Contractor	Operation
Regular quality monitoring of waste before discharge must be undertaken.	O&M Contractor	Operation
Emergency response arrangements and systems such as foam pourers, fire-fighting systems and cooperation with emergency responders must be implemented. Preventive measures could include maintenance procedures to prevent the occurrence of a catastrophic loss of containment, as well as strict control of ignition sources and other measures which may be required according to standards such as those prescribed by the South African National Standards system.	O&M Contractor	Operation
Defective or broken PV panel must be removed and stored within a designated covered storage area prior to being removed from the site.	O&M Contractor	Operation

Performance Indicator	» No complaints received regarding waste on site or indiscriminate dumping. » Internal site audits identifying that waste segregation recycling and reuse is occurring appropriately. » Provision of all appropriate waste manifests. » No contamination of soil or water.
Monitoring	» Waste collection must be monitored on a regular basis. » Check vehicles and machinery monthly for oil, fuel and hydraulic oil leaks. » Undertake high standard maintenance of the vehicles and machinery. » Monitor hydrocarbon spills from vehicles and machinery during operations continuously and record the volume and nature of the spill, location and clean up actions. » Analyse soil samples for pollution in areas of known spills or where a breach of containment is evident. » Records of accidental spills and clean-up procedures and the results thereof must be audited by the EO & Environmental Manager during the operation phase. » Waste documentation must be completed and made available for inspection. » An incidents/grievances register must be maintained, in which any complaints from the community must be logged.

	» Complaints must be investigated and, if appropriate, acted upon. » Regular reports on exact quantities of all waste streams exiting the site must be compiled by the waste management contractor and monitored by the O&M Contractor. » All appropriate waste disposal certificates accompany the monthly reports.

CHAPTER 9: MANAGEMENT PROGRAMME: DECOMMISSIONING

The lifespan of the proposed Montana 2 Solar Energy Facility will be more than 20 years. Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life or if it is no longer required. The lifespan of Montana 2 Solar Energy Facility could be extended depending on the condition of the infrastructure. An assessment will be undertaken prior to the end of the lifecycle of the plant to determine whether the plant should be decommissioned or whether the operation of the plant should continue.

It is most likely that decommissioning activities of the infrastructure of the facility discussed in the BA process would comprise the disassembly, removal and disposal of the infrastructure. Decommissioning activities will involve disassembly of the production units and ancillary infrastructure, demolishing of buildings, removal of waste from the site and rehabilitation to the desired end-use. Future use of the site after decommissioning of the Montana 2 Solar Energy Facility could possibly form part of an alternative industry that would be able to utilise some of the existing infrastructure associated with the facility. This would however be dependent on the development plans of the area at the time.

As part of the decommissioning phase the developer will undertake the required permitting processes applicable at the time of decommissioning.

The relevant mitigation measures contained under the construction section should be applied during decommissioning and therefore are not repeated in this section.

9.1. Objectives

Within a period of at least 12 months prior to the decommissioning of the site, a Decommissioning Method Statement must be prepared and submitted to the Local Planning Authority, as well as the Provincial and National Environmental Authority. This method statement must cover site restoration, soil replacement, landscaping, conservation, and a timeframe for implementation. Furthermore, this decommissioning must comply with all relevant legal requirements administered by any relevant and competent authority at that time.

The objectives of the decommissioning phase of the proposed project are to:

- Follow a process of decommissioning that is progressive and integrated into the short- and long-term project plans that will assess the closure impacts proactively at regular intervals throughout project life.
- Implement progressive rehabilitation measures, beginning during the construction phase.
- Leave a safe and stable environment for both humans and animals and make their condition sustainable.
- Return rehabilitated land-use to a standard that can be useful to the post-project land user.
- Where applicable, prevent any further soil and surface water contamination by maintaining suitable storm water management systems.
- Maintain and monitor all rehabilitated areas following re-vegetation, and if monitoring shows that the objectives have been met, apply for closure.

9.2. Approach to the Decommissioning Phase

It is recommended that planning of the decommissioning of the project and rehabilitation of the site should take place well in advance (at least two years) of the planned decommissioning activities. Important factors that need to be taken into consideration are detailed below.

Two possible scenarios for this decommissioning phase are detailed below:

SCENARIO 1: TOTAL DECOMMISSIONING OF PV FACILITY

If the decision is taken at the end of the project lifespan to totally decommission the facility, i.e. make the land available for an alternative land use, the following should take place:

- All concrete and imported foreign material must be removed from the PV facility i.e. panels, support structures etc.
- The holes where the panel support structures are removed must be levelled and covered with subsoil and topsoil.
- Infrastructure not required for the post-decommissioning use of the site must be removed and appropriately disposed of.
- Access roads and servitudes not required for the post-decommissioning use of the site must be rehabilitated. If necessary, an ecologist should be consulted to give input into rehabilitation specifications.
- Tracks that are to be utilised for the future land use operations should be left *in-situ*. The remainder of the tracks to be removed (ripped) and topsoil replaced.
- All ancillary buildings and access points are to be removed unless they can be used for the future land use.
- Underground electric cables are to be removed if they cannot be used in the future land use.
- All material (cables, PV Panels etc.) must be re-used or recycled wherever possible.
- Where not possible to recycle, materials should be appropriately disposed of.
- The competent authority may grant approval to the owner not to remove the landscaping and underground foundations.
- The site must be seeded with locally sourced indigenous vegetation (unless otherwise dictated by the future land use) to allow revegetation of the site.
- Monitor rehabilitated areas quarterly for at least three years (expected) following decommissioning, and implement remedial action as and when required.

SCENARIO 2: PARTIAL DECOMMISSIONING OF ENERGY FACILITY

Should more advanced technology become available it may be decided to continue to use the site as a solar PV facility. Much of the existing infrastructure is likely to be re-used in the upgraded facility. In this case, all infrastructure that will no longer be required for the upgraded facility must be removed as described for Scenario 1. The remainder of the infrastructure should remain in place or upgraded depending on the requirements of the new facility. Any upgrades to the facility at this stage must comply with relevant legislation.

9.2.1. Identification of structures for post-closure use

Access roads should be assessed in conjunction with the future land users to determine if these could be used. Where not required, these access roads should be decommissioned and rehabilitated.

9.2.2. Removal of infrastructure

All infrastructure must be dismantled and removed. Inert material must be removed from site and disposed of at a suitably registered landfill site. The solar PV facility components must be removed and recycled where possible or disposed of at a suitably registered landfill site. All foundations must be removed to a depth of 1m. Hard surfaces must be ripped to a depth of 1m and vegetated.

9.2.3. Soil rehabilitation

The steps that should be taken during the rehabilitation of soils are as follows:

- The deposited soils must be ripped to ensure reduced compaction;
- An acceptable seed bed should be produced by surface tillage;
- Restore soil fertility;
- Incorporate the immobile fertilisers in to the plant rooting zone before ripping; and
- Apply maintenance dressing of fertilisers on an annual basis until the soil fertility cycle has been restored.

9.2.4. Establishment of vegetation

The objective is to restore the development area to a self-sustaining cycle, i.e. to realise the re-establishment of the natural nutrient cycle with ecological succession initiated.

The objectives for the re-vegetation of reshaped and top-soiled land are to:

- Prevent erosion;
- Restore the land to the agreed land capability;
- Re-establish eco-system processes to ensure that a sustainable land use can be established without requiring fertilizer additions; and
- Restore the biodiversity of the area as far as possible.

9.2.5. Maintenance

Established vegetation requires regular maintenance. If the growth medium consists of low-fertility soils, then regular maintenance will be required until the natural fertility cycle has been restored.

9.2.6. Monitoring

The purpose of monitoring is to ensure that the objectives of rehabilitation are met and that the rehabilitation process is followed. The physical aspects of rehabilitation should be carefully monitored during the progress of establishment of desired final ecosystems.

The following items should be monitored continuously:

- Erosion status;
- Vegetation species diversity; and
- Faunal re-colonisation.
- Bird nests, eggs or nestlings are not disturbed or removed by personnel.
- Any raptor nests (especially of red-listed species) discovered on site or nearby, are monitored weekly to ensure zero disturbances.

APPENDIX A

APPENDIX B

APPENDIX C

APPENDIX D

APPENDIX E

APPENDIX F

APPENDIX G

APPENDIX H

APPENDIX I

APPENDIX J

APPENDIX K

APPENDIX L

APPENDIX M