
NORTHAM PV SOLAR FACILITY, LIMPOPO PROVINCE

ENVIRONMENTAL MANAGEMENT PROGRAMME

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Prepared for

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PROJECT DETAILS

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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 requirements of a proposed activity. They may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

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

Biodiversity: 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, if such investigation or feasibility study does not constitute a listed activity or specified activity.

Commissioning: Commissioning commences once construction is completed and covers all activities.

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. It 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.

Development footprint: The development footprint is the defined area (located within the project area) where the PV panel array and associated infrastructure for the Northam Solar PV Facility is planned to be constructed. This is the anticipated actual footprint of the facility, and the area which would be disturbed. The exact size of this area is subject to finalisation of the layout; however, following initial layout optimisation is ~19.5ha.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and 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.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. It 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.

Emergency: An undesired/ unplanned event that results in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

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 (Limpopo Department of Economic Development, Environment and Tourism (LEDET)) of a listed activity or specified activity in terms of the National Environmental Management Act (No 107 of 1998) (NEMA) and the EIA Regulations promulgated under the NEMA.

Environmental Assessment Practitioner (EAP): An individual responsible for the planning, management and coordinating of EMPRs 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 conditions of the EA.

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

Environmental Impact Assessment (EIA): 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 it 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, to guide the implementation of a project or facility and its ongoing maintenance after implementation, in accordance with section 24 of NEMA.

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 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.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

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 in a free state in nature but excludes a species that has been introduced in South Africa as a result of human activity.

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 (I&AP): 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.

No-go areas: Areas of environmental sensitivity that should not be impacted on or utilised during the development of a project as identified in any environmental reports.

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 EA (e.g. geotechnical surveys).

Project area: The project area is that identified area (located within the study area) where the Northam solar PV facility is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints, and has been assessed within this report and by the respective specialists. The project area is approximately 20ha in extent.

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

Study area: The study area is that identified area within which the project area and development footprint are located. It is the broader geographic area assessed as part of the BA process within which direct effects of the proposed project may occur. The project area is ~126ha in extent.

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.

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:

BAR	Basic Assessment Report
CEMP	Construction Environmental Management Plan
DM	District Municipality
DMRE	Department of Mineral Resources and Energy
DHSWS	Department of Human Settlements, Water and Sanitation
EAP	Environmental Assessment Practitioner
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GA	General Authorisation
ha	Hectare
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IBA	Important Bird Area
IDP	Integrated Development Plan
km	Kilometres
kV	Kilo Volt
LEDET	Limpopo Department of Economic Development, Environment and Tourism
LM	Local Municipality
m	Metres
m ²	Square metres
MW	Mega Watt
NEMA	National Environmental Management Act
NEMAA	National Environmental Management Amendment Act
NEMBA	National Environmental Management: Biodiversity Act
NHRA	National Heritage Resources Act
NWA	National Water Act
SACAA	South African Civil Aviation Authority
SAHRA	South African National Heritage Resources Agency
SANBI	South Africa National Biodiversity Institute
SANS	South Africa National Standards
SDF	Spatial Development Framework
SMME	Small, Medium and Micro Enterprise

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CHAPTER 1: INTRODUCTION

This Environmental Management Programme (EMPr) has been compiled for the 10MW Northam solar photovoltaic (PV) facility and associated infrastructure (the project) proposed by Northam Platinum Limited (NHM). The project is to be developed on Portion 2 of the Farm Zondereinde 384, located approximately 35km south and 18km northwest of the towns of Thabazimbi and Northam, respectively, between the R510 in the west and the R511 in the east. The project site falls within jurisdiction of the Thabazimbi Local Municipality (TLM), which forms part of the Waterberg District.

This EMPr has been developed on the basis of the findings of the Basic Assessment (BA) undertaken for the project. It must be implemented to protect sensitive on-site and off-site features, through controlling construction, operation and decommissioning activities that could have a detrimental environmental effect; and avoiding or minimising potential impacts. This EMPr is applicable to all employees and contractors working on the project's pre-construction, construction, and operation and maintenance phases, and must be adhered to and updated as relevant throughout the project life cycle. This document fulfils the requirements of the EIA Regulations, 2014, as amended, and forms part of the BA Report for the project.

In terms of the Duty of Care provision in S28(1) of National Environmental Management Act (NEMA) NHM 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 EMPr must therefore be adhered to and updated as relevant throughout the project life cycle. In terms of the NEMA, it has become the legal duty of a project proponent to consider a project holistically and the cumulative effect of a variety of impacts.

CHAPTER 2: PROJECT DETAILS

The Applicant, NHM, is proposing the construction of a photovoltaic (PV) solar energy facility on Portion 2 of the Farm Zondereinde 384 (affected property), located approximately 35km south and 18km northwest of the towns of Thabazimbi and Northam, respectively, between the R510 in the west and the R511 in the east (refer to **Figure 2.1**). The study area falls within jurisdiction of the TLM, which forms part of the Waterberg District in the Limpopo Province.

The solar PV facility will have a contracted capacity of 10MW and will use fixed tilt, single or double axis tracking PV technology to harness the solar resource on the project area. The purpose of the proposed project is to generate electricity for exclusive use by NHM's Zondereinde Mine, following which any excess power produced will be distributed to the national grid, if applicable. The construction of the PV facility aims to reduce the Zondereinde Mine's dependency on direct supply from Eskom's national grid for operation activities, while simultaneously decreasing its carbon footprint.

To evacuate the generated power to the Zondereinde Mine, a grid connection needs to be established. An overhead power line will be established to connect the on-site facility substation to the existing substation at the Zondereinde Metallurgical Complex. The overhead power line will run for approximately 500m from the PV site to the side of the Eskom yard and will be at a minimum height of 5.5m. The power line is designed to have a capacity of 33kV, but will be operated at 6.6kV.

Infrastructure associated with the solar PV facility will include the following:

- » Solar PV array comprising PV modules and mounting structures.
- » Inverters and transformers.
- » Cabling between the project components.
- » On-site substation to facilitate the connection between the Solar PV Facility and the mine electrical distribution system as needed.
- » Combined gatehouse, site offices and storage facility.
- » A 33kV overhead power line for the distribution of the generated power, which will be connected to the existing substation at the Zondereinde Metallurgical Complex.
- » Temporary laydown areas.
- » Access gravel road, internal gravel roads and fencing around the project area.

A project area of 20ha- and a development footprint (area to be cleared) of 19.5ha have been identified within the affected property (~126ha) by NHM for the project. Site-specific studies and assessment have delineated areas of potential sensitivity within the identified study area. These have been excluded from the layout proposed for the facility (refer to **Figure 2.3**).

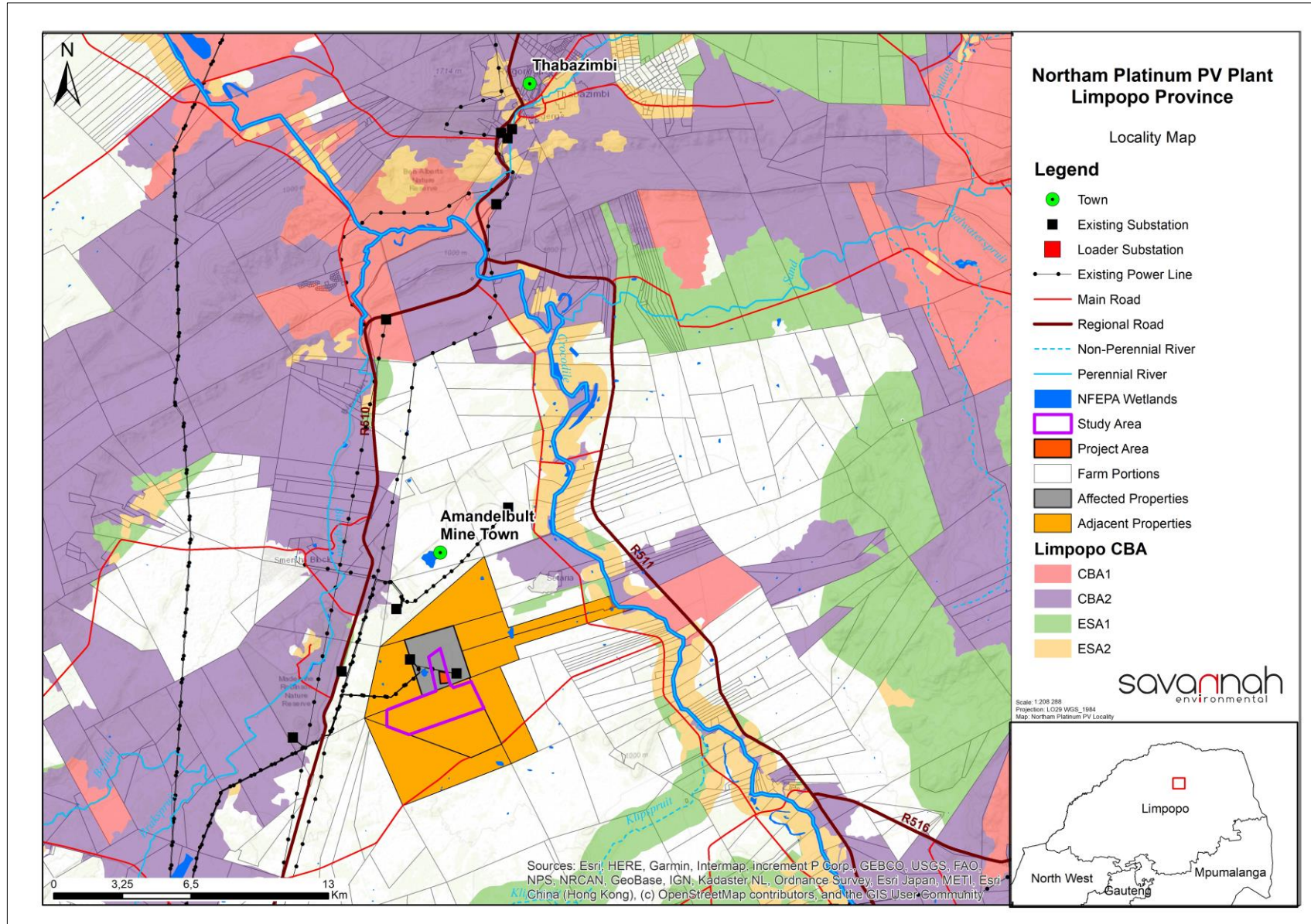


Figure 2.1: Locality map showing the location of the Northam solar PV facility

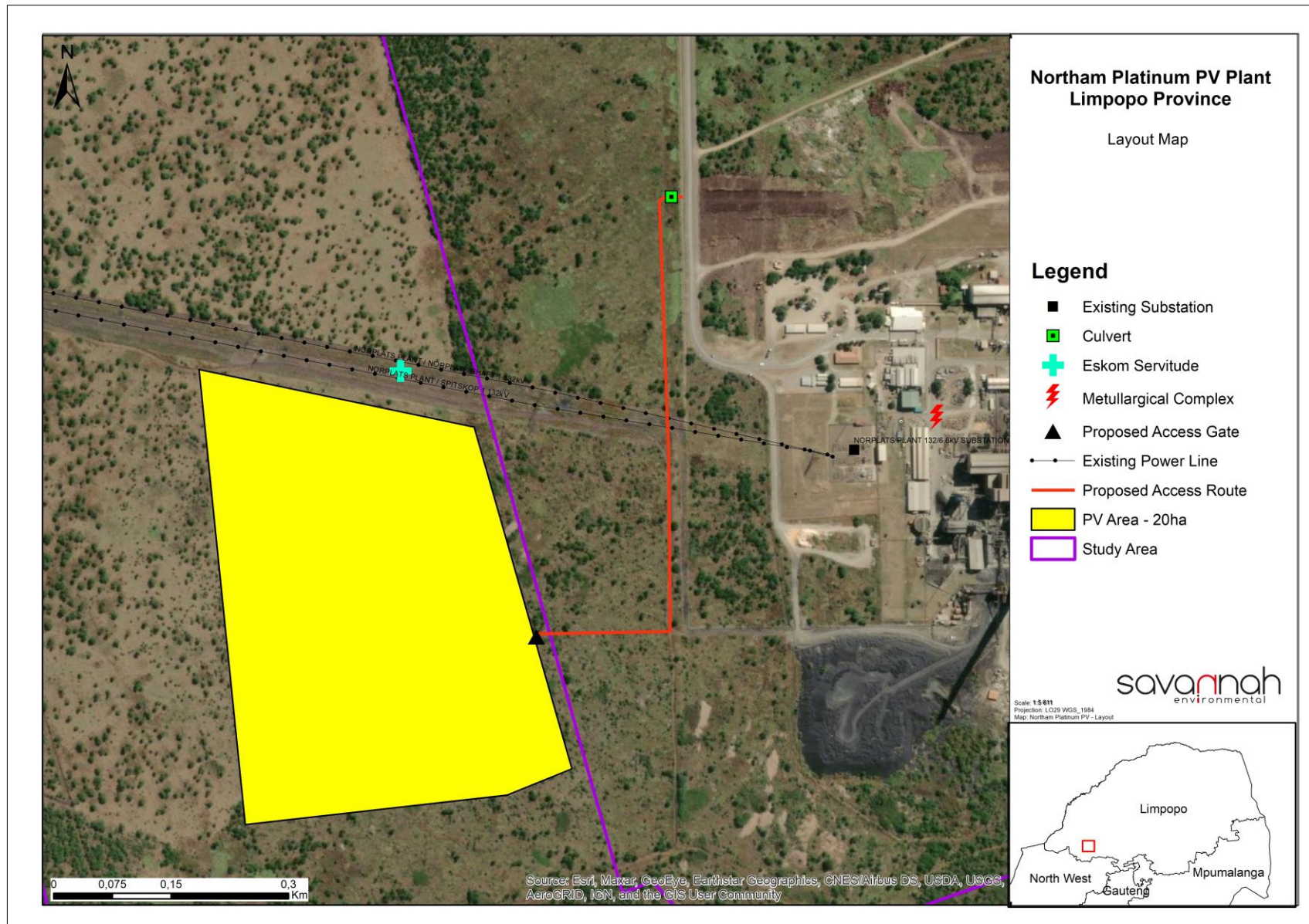


Figure 2.2: Layout of the Northam solar PV facility

Table 2.1 provides information regarding the project area.

Table 2.1: Detailed description of the project

Infrastructure	Dimensions/ Details
Contracted capacity of the facility	» 10MW.
Technology	» Fixed tilt, single or double axis tracking photovoltaic (PV) panel technology.
PV panels	<ul style="list-style-type: none"> » Height: ~3.5m from ground level (installed). » Constructed over an area of up to 15ha. » Between 80 000 – 110 000 panels required.
On-site facility substation	<ul style="list-style-type: none"> » Located within the project area and close to the site access point. » Approximately 1ha in extent. » On-site substation to facilitate the connection between the Solar PV Facility and the mine electrical distribution system as needed.
Grid connection	<ul style="list-style-type: none"> » 33kV power line (to be operated at 6.6kV). » Length up to ~500m from tie-in point. » Height up to 5.5m.
Access paved roads and internal gravel roads	<ul style="list-style-type: none"> » Direct access to the study area is provided by the existing Mine Road, which is connected to the R510. » A 6m wide main access <u>gravel</u> road will be constructed to provide direct access to the project area. » A network of 5m wide (with a total length of 8km) gravel internal access roads will be constructed to provide access to the various components of the Northam PV development.
Laydown area	» Up to 5ha (Temporary Laydown Area).
Other infrastructure	<ul style="list-style-type: none"> » Inverters and transformers. » Cabling between project components. » Combined gatehouse. » Site offices. » Storage facility.
Services required	<ul style="list-style-type: none"> » <i>Waste</i> – waste generated as a result of the construction activities will be handled in accordance with the Zondereinde Mine Waste Management Plan and collected by a private contractor and disposed of at a licensed waste disposal site off site. » <i>Sanitation</i> – since the project is located within the Zondereinde Mine Area, it is proposed that contractors utilise the existing toilet facilities available at the Mine <u>during both the construction and operational phase</u>. Alternatively, chemical toilets will be placed close to the project area. These facilities will be maintained and serviced regularly by an appropriate waste contractor. » <i>Water supply</i> – during construction, water will be required for concrete, washing of solar panels and associated equipment, dust suppression, potable water for construction workers, etc. Once the facility is operational, water will be required for various purposes, such as washing of the solar panels. This water will be sourced from municipal supply via the existing mine supply network; or from groundwater abstraction, utilising the already authorised boreholes at the Zondereinde Mine.

Infrastructure	Dimensions/ Details
	» <i>Electricity supply</i> – Construction power will be sourced via a temporary overhead power line from the existing mine substation at the metallurgical complex which is adjacent to the project area.

2.1. Activities and components associated with the construction, operation and decommissioning of the Northam solar PV facility

A series of activities are proposed as part of the design, pre-construction, construction, operation, and decommissioning phases associated with the project. These are discussed in more detail under the respective sub-headings below.

2.1.1. Design and Pre-Construction Phase

Planning: Several post-authorisation factors are expected to influence the final design of the solar energy facility and could result in small-scale modifications of the PV array and/or associated infrastructure. A final detailed design will only be available once adjudication of the contract is complete and a contractor is appointed for the project. An objective of the Engineering, Procurement and Construction (EPC) Contractor, who will be responsible for the project's overall construction, will be to comply with the approved facility design, as far as possible. It should be understood however, that the construction process is dynamic and unforeseen changes to the project specifications may take place. The final facility design is required to be approved by the LDEDET prior to construction. Importantly, should there be any substantive changes or deviations from the project's original scope or layout, the LDEDET will need to be notified and where relevant, environmental approval obtained.

Conduct Surveys: Prior to initiating construction, a number of surveys will be required, including, but not limited to, confirmation of the micro-siting footprint (i.e. the precise location of the PV panels, on-site facility substation and associated infrastructure) and a geotechnical survey. Geotechnical surveys acquire information regarding the physical characteristics of soil and rocks underlying a proposed project site and informs the design of earthworks and foundations for structures.

2.1.2. Construction Phase

Procurement and employment

At the peak of construction, the project is likely to create a maximum of temporary 100 employment opportunities, which will last for a period of approximately 12 - 18 months (i.e. the length of construction); and include low skilled, semi-skilled, and skilled opportunities. Solar PV projects make use of high levels of unskilled and semi-skilled labour so there will be good opportunity to use local labour, where available. Employment opportunities will peak during the construction phase and significantly decline during the operation phase. The injection of income into the area in the form of wages will represent an opportunity for the local economy and businesses in the area.

A significant portion of the labour force is expected to be sourced from the surrounding towns. No on-site housing is envisaged, with daily commute to and from site expected of construction staff.

Establishment of an Access Road

Access to the study is possible through the use of the existing Zondereinde Mine access road, which is connected to the R510 and the access road to the metallurgical complex. Within the project area itself, access will be required from new/existing roads for construction purposes (and limited access for maintenance during operation).

Undertake Site Preparation

Site preparation activities will include clearance of vegetation. These activities will require the stripping of topsoil, which will need to be stockpiled, and thereafter backfilled and/or spread on site during rehabilitation activities.

Transport of Components and Equipment to Site

The national, regional, secondary and proposed internal access roads will be used to transport all components and equipment required during the construction phase. Some of the components (i.e. substation transformer) may be defined as abnormal loads in terms of the National Road Traffic Act (No. 93 of 1996) (NRTA)¹ by virtue of the dimensional limitations. Typical civil engineering construction equipment will need to be brought to the project area (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.); and components required for the mounting of the PV support structures, construction of the on-site facility substation and site preparation.

Establishment of Laydown Areas on Site

Laydown and storage areas will be required for typical construction equipment. Once the required equipment has been transported to site, a dedicated equipment construction camp and laydown area will need to be established. The laydown area will be used for the assembly of the PV panels, and the general placement/storage of construction equipment. It is anticipated that the temporary laydown area will be included within the project area of the solar energy facility, and will be ~3ha in size.

Erect PV Panels and Construct Substation and Inverters

The construction phase involves installation of the PV solar panels; and structural and electrical infrastructure required for its operation. In addition, preparation of the soil and improvement of the access roads are likely to continue for most of the construction phase. For array installations, vertical support posts will be driven into the ground and will hold the support structures (tables) on which the PV modules will be mounted. Brackets will attach the PV modules to the tables. Trenches are to be dug for the underground AC and DC cabling, and the foundations of the inverter enclosures and transformers will be prepared. While cables are being laid and combiner boxes are being installed, the PV tables will be erected. Wire harnesses will connect the PV modules to the electrical collection systems. Underground cables and overhead circuits will connect the Power Conversion Stations (PCS) to the on-site AC electrical infrastructure, and ultimately the on-site facility substation.

¹ A permit will be required in accordance with Section 81 of the NRTA, which pertains to vehicles and loads which may be exempted from provisions of Act.

The construction of the on-site facility substation will require a survey of the footprint; site clearing and levelling and construction of access road(s) (where applicable); construction of a level terrace and foundations; assembly, erection, installation and connection of equipment; rehabilitation of any disturbed areas; and protection of erosion sensitive areas.

Establishment of Ancillary Infrastructure

The establishment of the ancillary infrastructure and support buildings will require vegetation clearance; levelling of the project area; and the excavation of foundations prior to construction. Laydown areas for building materials and equipment associated with these buildings will also be required.

Undertake Site Rehabilitation

Once construction is completed and all construction equipment has been removed, the project area will be rehabilitated, where practical and reasonable. In addition, on full commissioning of the facility, any access points which are not required during operation will be closed and rehabilitated accordingly.

2.1.3. Operation Phase

The project is expected to operate for a minimum of 20 years. The facility will operate continuously, 7 days a week. While the solar facility will be largely self-sufficient, monitoring and periodic maintenance activities will be required. Key elements of the Operation and Maintenance (O&M) plan include monitoring and reporting the performance of the solar energy facility; conducting preventative and corrective maintenance; receiving visitors; and maintaining security.

The operation phase will create approximately 10 - 12 full-time equivalent employment positions, which will include low-skilled, semi-skilled and skilled personnel. Employees that can be sourced from the local municipal area include the less skilled and semi-skilled personnel (such as safety and security staff and certain maintenance crew). Highly skilled personnel may need to be recruited from outside the local area, if these resources are not available within the area.

2.1.4. Decommissioning Phase

Depending on the continued economic viability of the project following the initial 20-year operation lifespan, the solar energy facility will either be decommissioned, or the operation phase will be extended. If it is deemed financially viable to extend the operation phase, existing components would either continue to operate; or be disassembled and replaced with new, more efficient technology / infrastructure available at the time. If the decision is made to decommission the facility, the following decommissioning activities will take place:

Site Preparation

Site preparation activities will include confirming the integrity of the access to the site to accommodate the required decommissioning equipment.

Disassembly and removal of existing components

When the solar energy facility is ultimately decommissioned, the equipment to be removed will depend on the land use proposed for the project area at the time. All above ground facilities that are not intended for future use will be removed. Much of the above ground wire, steel, and PV panels, of which the system is comprised, are recyclable materials and would be recycled to the extent feasible. The components of the solar energy facility would be deconstructed and recycled, or disposed of in accordance with applicable regulatory requirements. Where concrete footings will be removed with the panels, these will be covered with soil to a depth sufficient for the re-growth of natural vegetation. The site will be rehabilitated where required and can potentially be returned to a beneficial land-use.

Since it is not currently known which disposal facilities will be available at the time of disposal (i.e. in 20 years' time), it is not possible to identify specific landfill facilities at this stage. When the time comes for decommissioning, the nearest facilities registered to receive waste and recycled material from the solar facility will be identified and utilised.

Future plans for the site and infrastructure after decommissioning

Should it be decided not to extend the project's operational lifespan beyond 20 years, it will be decommissioned. Decommissioning involves removing the solar panels and associated infrastructures; and covering the concrete footings with soil, to a depth sufficient for the regrowth of natural vegetation. Components that may be reused by NHM may remain in place. Any other supporting infrastructure no longer in use will be removed from the project area; and either disposed of at the registered local municipal disposal facility or recycled, if possible.

2.2 Findings of the Basic Assessment (BA)

The BA Report, together with the specialist studies contained within **Appendices D1 – D4** of the BA Report provide a detailed assessment of the potential impacts that may result from the project.

No environmental fatal flaws were identified in the detailed specialist studies conducted, provided that the recommended mitigation measures are implemented. These measures include, amongst others, the avoidance of features of high sensitivity within the project area, as specified by the specialists. As shown in **Figure 2.3**, areas of sensitivity have been avoided by the appropriate placement of infrastructure planned for the facility

The potential environmental impacts associated with the project identified and assessed through the BA process are summarised below:

2.1.1. Impacts on Biodiversity (including flora and fauna) and Wetlands

The project area is located within the Zondereinde Mine's boundary. As such, the land has been extensively altered, which is evident in the disturbed and transformed habitats within the project area.

Six terrestrial habitats were identified within the study area, namely, Degraded Bushveld, Disturbed Bushveld, Rocky Koppie, Rocky Outcrops, Transformed Habitat and Wetlands. Historically, overgrazing from cattle and mismanagement has led to the deterioration of the area to a disturbed Bushveld that is encroached upon

by exotic plant species. However, the degraded Bushveld habitat, rocky outcrops/koppie and wetlands/watercourses can be regarded as important, within the local landscape and regionally, as they are used for habitat, foraging and movement corridors for fauna, within a landscape fragmented by development. The habitat sensitivity of the rocky koppie habitat and wetland/water resources is regarded as high, due to the species recorded as well as the role of this intact unique habitat to biodiversity within a very fragmented local landscape; and identified sensitivity, according to various ecological datasets. It should however be noted that neither the rocky koppie habitat nor wetlands are located within the boundary of the project area.

A total of six (6) water resources were identified and delineated within the 500m regulated area surrounding the study area, four (4) of which are relevant to the project area. These comprised both natural and artificial systems, with the artificial systems comprising of an impoundment, a dam and a drainage feature associated with the smelter. Of the four (4) water resources relevant to the project area, only one is classified as a natural system, namely hydrogeomorphic (HGM)3, which is a seepage wetland. A portion/segment of the seepage wetland (HGM3) encroaches into the study area, but not within the project area. This wetland unit is situated approximately 300m from the project area. Overall, HGM3 scored Intermediate in terms of its wetland ecosystem services and is considered relatively important for regulating and supporting benefits. The wetland is considered highly important in terms of its direct provisioning of harvestable resources and cultivated foods for humans, as the systems are actively cultivated. The integrity (or health) for HGM 3 was rated as being in a Moderately Modified state (class: C). The ecological importance of HGM3 was determined to be Moderate.

Areas regarded as being of high sensitivity have been designated as 'no-go' areas. Thus, the identified wetland features are accompanied by 22m buffer zones, and development activities within the wetlands and their associated buffer zones are prohibited.

The Terrestrial Biodiversity and Wetland Assessment (**Appendix D1** of the BA Report) (BWIA) determined that there are no impacts associated with the project that cannot be mitigated to an acceptable level; and, as such, the assessed layout was considered acceptable. Potential impacts expected to occur with the development of the project are:

- » Destruction, fragmentation and degradation of habitats and ecosystem.
- » Spread and/or establishment of alien and/or invasive species (AIPs).
- » Direct mortality of fauna.
- » Reduced dispersal/migration of fauna.
- » Environmental pollution due to water runoff, spills from vehicles and erosion.
- » Disruption/alteration of ecological lifecycles (breeding, migration, feeding) due to noise, dust and light pollution.
- » Staff and others interacting directly with fauna (potentially dangerous) or poaching of animals.
- » Disturbance/degradation/loss to wetland soils or vegetation due to the construction of the solar facility.
- » Increased erosion and sedimentation.
- » Potential contamination of a wetland with machine oils and construction materials.
- » Potential for increased stormwater runoff, leading to increased erosion and sedimentation.
- » Potential for increased contaminants entering the wetland systems.
- » Potential loss or degradation of nearby wetlands through inappropriate closure.

Most impacts associated with the project would occur during the construction phase, due to disturbance associated with heavy machinery operating at the project area and the presence of construction personnel.

Mitigation measures provided by the specialists can be implemented to reduce the identified impacts' significance. Considering that the broader study area has been identified as being of significance for biodiversity maintenance and ecological processes (ESAs), development may proceed but with caution and only with the implementation of mitigation measures.

No fatal flaws are evident for the proposed project. It is the opinion of the specialists that the project may be favourably considered, on condition that all prescribed mitigation measures and supporting recommendations are implemented.

2.1.2. Impacts on Avifauna

On-site surveys were conducted on 29 – 31 March 2021, as part of the Avifauna Impact Assessment (**Appendix D2** of the BA Report) (AIA), during which a total of 102 species were observed within the study area through a combination of 38-point counts and incidental observations. Four main avifaunal habitats were identified within the area of influence around the study area, namely Flat Black Turf Thornveld, Rocky Black Turf Thornveld, Wetlands and Transformed Grassland. Of the four habitats, the highest avian diversity was observed in the Flat Black Turf Thornveld, followed by Wetland, Transformed Grassland and lastly Rocky Black Turf Thornveld.

No avifauna species of conservation concern (SCC) were identified in the study area. In terms of avifaunal sensitivity, all watercourses and modelled hotspots of collision prone species were designated as being of Very High sensitivity.

The project area mainly comprises Flat Black Turf Thornveld. The northern section of the project area was assigned a Low sensitivity, while the southern section was assigned a Medium sensitivity. The flat rocky outcrops in the project area and wider study area were assigned a Medium Sensitivity. The koppie and wetlands in the wider study were assigned High sensitivity.

The following impacts were identified by the specialist:

- » Habitat loss, degradation and fragmentation.
- » Collision and electrocution of birds.
- » Direct loss of nests for SCC.
- » Sensory disturbance and extirpation of SCC.

No fatal flaws are evident for the proposed project in terms of avifauna. It is therefore the opinion of the specialist that the project may be favourably considered, on condition all prescribed mitigation measures and supporting recommendations are implemented.

2.1.3. Impacts on Soil and Agricultural Potential

A soil and agricultural potential assessment (SAA) of the project area was undertaken as part of the BA process (refer to **Appendix D3** of the BA Report). The study found that the project area falls within Land Type Ea70. The immediate area around the project area also consists of this land type, with Land Type Fb147 and

Land Type Ae64 approximately 5km south-west and 5km south-east of the area, respectively. The SAA found that the project area comprises two natural soil forms, both with vertic topsoil, namely the Mkuze and Rustenburg soil forms. The Mkuze soil form makes up the northern and western sections of the project area (i.e., 11ha) and has a soil depth of 1.5m or deeper. The Rustenburg soil form makes up the southern and eastern sections of the project area (i.e., 8.7ha) and ranges in depth from 0.7m to 1.5m.

The largest portion of the project area (11ha) has land with Moderate (Class 08) land capability, suitable for rainfed crop production. 8.7ha of the project area has land with Low – Moderate (Class 07) land capability; and the remaining 0.3ha is of Very low (Class 02) land capability. Although the area with Moderate land capability has suitability for rainfed crop production, it was never previously used for grain crops production or pasture. Approximately 11ha of the project area has Moderate agricultural sensitivity; and the remaining 9ha is of Low agricultural sensitivity.

The following impacts were identified by the specialist:

- » Soil erosion due to vegetation clearance and the resultant exposure of soil surfaces.
- » Soil compaction due to the clearing and levelling of land for construction of infrastructure.
- » Soil pollution due to hydrocarbon spills; pollution from concrete mixing; road-building materials; and any construction material remaining within the project area once construction is completed.

The agricultural specialist determined that since the project area is within an area with Moderate to Low agricultural sensitivity, the proposed project is considered an acceptable development.

2.1.4. Impacts on Heritage Resources (archaeological and palaeontological)

The project area was thoroughly assessed in the field assessment, as detailed in the Heritage Impact Assessment (refer to **Appendix D4** of the BA Report) (HIA). During the field survey, no heritage sites of significance were identified within the project area. Therefore, there will be no impact on heritage resources due to the proposed project.

Two main site complexes (stone walling) previously recorded by Van Vollenhoven (2013) were identified within the broader study area, namely, Northam Site 4 Complex and Northam Site 5 Complex, which have high heritage significance and a heritage rating of IIIA. These areas are avoided by the proposed project.

In terms of palaeontology, the project area is underlain by sediments that have zero palaeontological sensitivity. As such, no palaeontological resources will be impacted by the proposed project and no further specialist palaeontological assessment is recommended.

There is no objection to the development of the proposed project, on condition that:

- » The proposed PV facility is located in the low or moderate sensitivity areas identified as preferred for development.
- » The areas identified as having high archaeological sensitivity in the broader study area are avoided and no development activities associated with the project take place within these areas.
- » Should any previously unrecorded archaeological resources or possible burials be identified during construction activities, work must cease in the immediate vicinity of the find, and the South African Heritage Resources Agency (SAHRA) must be contacted regarding an appropriate way forward.

2.1.5. Assessment of Cumulative Impacts

Cumulative impacts are expected to occur with the development of the project throughout all phases of its lifecycle and within all areas of study considered as part of the BA Report. The main aim for the assessment of cumulative impacts is to test and determine whether the project will be acceptable within the landscape proposed for the development; and whether the impact, from an environmental and social perspective, will be acceptable without whole-scale change.

There are only three other solar facilities proposed within a 30km radius of the project. Based on the specialist cumulative assessment and findings, and consideration of the project's development and its contribution to the overall impact of all existing and proposed solar energy facilities within a 30km radius, it was concluded that cumulative impacts will be of Low to Medium significance. The project will not result in unacceptable, high cumulative impacts nor a whole-scale change of the environment and is therefore considered acceptable from a cumulative impact perspective.

2.1.6. Environmental Sensitivity Mapping

As part of the specialist investigations undertaken within the project area and broader study area, specific environmental features and areas were identified. The environmental features identified within and directly adjacent to the project area are illustrated in **Figure 2**; and specifically relate to ecological habitats, avifauna, freshwater resources and heritage resources.

The following features of very high and high sensitivity were identified within the broader study area. It should be noted that these features are not situated within the project area.

» **Ecological and freshwater features:**

- * All wetland features are deemed to be of High ecological sensitivity and a 22m 'no-go' buffer around them is recommended.

» **Avifaunal features:**

- * The wetland areas are deemed as important for avifauna and assigned a Very High importance and sensitivity. Wetland species account for the bulk of the regionally occurring avifauna SCC, which are most susceptible to collision with solar panels.
- * The koppies were assigned a High avifaunal sensitivity. Developers are therefore required to avoid these areas.

» **Heritage resources:**

- * The area where the stonewall complexes (Northam Site 4 Complex and Northam Site 5 Complex) are located within the broader study area is of Very High archaeological sensitivity, and it is recommended that no development activities associated with the proposed PV development take place within this area.

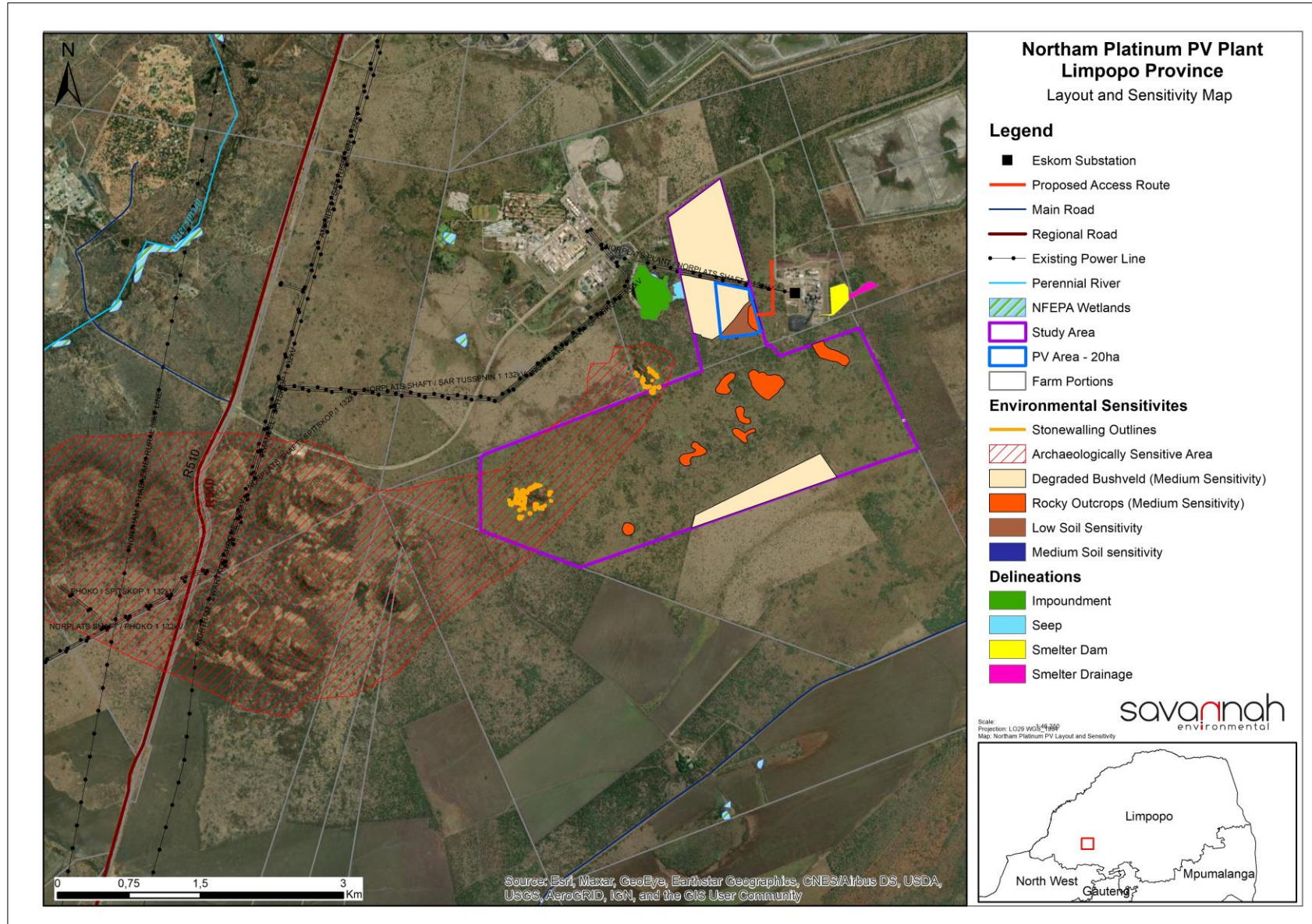


Figure 2.3: Sensitivity environmental features identified within the project area and broader study area assessed for the Northam solar PV facility

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 the 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 projects immediate outcome and long-term impacts.

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); the construction activities themselves (erosion, noise, dust); site rehabilitation (soil stabilisation, re-vegetation) and operation. The EMPr also defines monitoring requirements 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 project. 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). This is a dynamic document and will be further developed in terms of specific requirements listed in any authorisations issued for project; or as it 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 project's planning, construction, rehabilitation and operation phases, to minimise the extent of environmental impacts; and manage environmental impacts associated with the project.
- » 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.

NHM must ensure that the project's implementation complies with the requirements of all EAs, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through development and 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 project area. Since this EMPr is part of the BA process for the project, it is important that it 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 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 operational 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 lifecycle.

CHAPTER 4: STRUCTURE OF THIS EMPr

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

- » Planning and design activities.
- » Construction activities.
- » Operation activities.
- » 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 project implementation, an overarching environmental **goal** is stated. To meet this goal, a number of **objectives** are listed. The management programme has been structured in table format, 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, which is necessary to meet the overall goals; which take into account the findings of the BA specialist studies

Project Component/s	List of project components affecting the objective, i.e.: <ul style="list-style-type: none"> » PV panels. » Access roads. » 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.
- » 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 the Northam solar PV facility. This EMPr has been prepared in accordance with the requirements as contained in Appendix 4 of the 2014 EIA Regulations (GNR 326), and 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 –	Chapter 4 Appendix J
(i) The EAP who prepared the EMPr.	
(ii) The expertise of that EAP to prepare an EMPr, including a curriculum vitae.	
(b) A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	Chapter 2
(c) A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.	Chapter 2 Figure 2.1 to Figure 2.3 Appendix A
(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 6
(ii) Pre-construction activities.	Chapter 6
(iii) Construction activities.	Chapter 7
(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 –	
(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.	Chapters 6 - 9

Requirement	Location in this EMPr
(g) The method of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Chapters 6 - 9
(h) The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Chapters 6 - 9
(i) An indication of the persons who will be responsible for the implementation of the impact management actions.	Chapters 6 - 9
(j) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented.	Chapters 6 - 9
(k) The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f).	Chapters 6 - 9
(l) A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations.	Chapter 7
(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 7
(n) Any specific information that may be required by the competent authority.	N/A
(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

4.2 Project Team

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326), the Applicant appointed Savannah Environmental (Pty) Ltd as the independent environmental consultants responsible for managing the application for EA and the supporting BA process. The application for EA and BA process is being managed in accordance with the requirements of NEMA, the 2014 EIA Regulations (GNR 326), and all other relevant applicable legislation.

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

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. Savannah Environmental's team have been actively involved in undertaking environmental studies over the past 15 years, for a wide variety of projects throughout South Africa, including those associated with electricity generation and infrastructure development.

The project team responsible for this BA process include:

- » **Mmakoena Mmola** holds a BSc Honours in Geochemistry from the University of the Witwatersrand. She is the principle author of this EMPr. She has 3.5 years of experience in the environmental management field. Her key focus is on undertaking environmental impact assessments (EIA), environmental permitting and authorisations, compliance auditing, public participation, and environmental management programmes. She is registered as a Candidate Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP), Registration Number: 126748.

- » **Jo-Anne Thomas** 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 is the registered EAP for this project. 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 EMPs, 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.
- » **Nicolene Venter** holds a Higher Secretarial Diploma and has over 20 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.

Savannah Environmental's team have been actively involved in undertaking environmental studies over the past 15 years, for a wide variety of projects throughout South Africa, including those associated with electricity generation and infrastructure development, and therefore have extensive knowledge and experience in EIAs and environmental management, having managed and drafted EMPs for numerous other power generation projects throughout South Africa.

4.2.2 Details of the Specialist Consultants

A number of independent specialist consultants have been appointed as part of the BA project team, to adequately identify and assess potential impacts associated with the project (refer to **Table 4.1**). The specialist consultants have provided input into the BA Report and this EMP.

Table 4.1: Specialist consultants which form part of the BA project team.

Specialist Study	Specialist Company	Specialist Name
Biodiversity and Wetland Impact Assessment	The Biodiversity Company	Marnus Erasmus
Avifauna Impact Assessment	The Biodiversity Company	Tyron Clark
Soils and Agricultural Compliance Statement	TerraAfrica Consult cc	Mariné Pienaar
Heritage Impact Assessment	CTS Heritage	Jenna Lavin and Nicholas Wiltshire

CHAPTER 5: ROLES AND RESPONSIBILITIES

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

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Technical Director/Manager, Site Manager, Internal Environmental Officer, 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.

i) The Developer

As the Proponent, NHM, must ensure that the project's implementation complies with the requirements of all EAs and all other permits, and obligations emanating from relevant environmental legislation.

ii) Construction Manager

The 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 NHM 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 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.

iii) Site Manager

The Project Manager/Site Manager is responsible for overall management of project and EMPr implementation. The following tasks will fall within his/her responsibilities:

- » Be fully conversant with the EIA for the project, the EMPr, the EA's conditions (once issued), and all relevant environmental legislation.
- » Be fully knowledgeable with the contents of all relevant licences and permits.
- » Be familiar with this EMPr's recommendations and mitigation measures; and implement these measures.
- » 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.
- » Monitor site activities on a daily basis for compliance.
- » Ensure that the EMPr is correctly implemented throughout the project through site inspections and meetings. This must be documented as part of the site meeting minutes.
- » Conduct internal audits of the construction site against the EMPr.
- » Confine the construction site to the demarcated area.
- » Rectify transgressions through the implementation of corrective action.

iv) Environmental Control Officer

A suitably qualified Environmental Control Officer (ECO)² must be appointed by NHM 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 EA. Accordingly, the ECO will:

- » Be fully knowledgeable of:
 - * The contents of the BA Report.
 - * The contents of the conditions of the EA (once issued).
 - * The contents of the EMPr.
 - * All the licences and permits issued for the project.
 - * The contents of all relevant environmental legislation.
- » 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.
 - * Compliance with the EMPr, EA and the legislation is monitored through regular and comprehensive inspection of the site and surrounding areas.
 - * The Site Manager has input into the review and acceptance of construction methods and method statements or site-specific plans.
 - * If the EMPr, EA and/or the legislation conditions, regulations or specifications are not followed then appropriate measures are undertaken to address any non-compliances (for example an ECO may cease construction or an activity to prevent a non-compliance from continuing).
 - * 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 LDEDET in terms of compliance with the specifications of the EMPr and EA's conditions (once issued).
- » Keep records of all reports submitted to LDEDET.

The ECO must be present full-time on site for the site preparation and initial clearing activities, to: ensure the correct demarcation of no-go areas; facilitate environmental induction with construction staff and 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, monthly compliance audits can be undertaken, provided that adequate compliance with the EA, environmental permits and EMPr is achieved. 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.

NHM must also instruct a designated Environmental Officer (EO) at Zondereinde Mine to deal with any environmental issues at the project area as they arise.

² The ECO should have a relevant degree or technical diploma in environmental management and at least 2 years of experience in the field

v) Contractors

The Lead Contractor is responsible for the following:

- » Ensure compliance with the EA, environmental permits and the EMPr at all times during construction.
- » The EMPr and its Implementation.
- » Ensure that all appointed contractors and sub-contractors are aware of the EMPr and their respective responsibilities.
- » Provide all necessary supervision during the project's execution.
- » Comply with any special conditions, as stipulated by the landowner (NHM).
- » Inform and educate all employees about the environmental risks associated with the various activities to be undertaken; and highlight those activities which must be avoided during the construction process, to minimise significant impacts to the environment.
- » Maintain an environmental register, which keeps a record of all incidents which occur on the site during construction, including:
 - * Public involvement / complaints.
 - * Health and safety incidents.
 - * Hazardous materials stored on the project area.
 - * Non-compliance incidents.
 - * 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 project area.
- » Conduct audits, to ensure compliance to the EMPr.
- » Ensure there is communication with the Project Manager, the ECO, and relevant discipline engineers on environmental matters.
- » Should the Contractor require clarity on any aspect of the EMPr, the Contractor must contact the Environmental Consultant/Officer for advice.

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

- » Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment.
- » A copy of the EMPr must be easily accessible to all on-site staff members.
- » Employees must be familiar with the requirements of this EMPr and the environmental specifications as they apply to the construction of the solar facility.
- » Prior to commencing any site works, all employees and sub-contractors must have attended an environmental awareness training course, which must provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- » Staff will be informed of environmental issues as deemed necessary by the ECO.

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

- » There is adherence to the environmental management specifications.

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

Any lack of adherence to the above will be considered as non-compliance to the EMPr's specifications.

vi) Contractor's Safety, Health and Environment Representative/Environmental Officer

The Contractor's Safety, Health and Environment (SHE) Representative/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. In addition, the SHE/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.

The Contractor's SHE/EO should:

- » Be well versed in environmental matters.
- » Understand the relevant environmental legislation and processes.
- » 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.

OBJECTIVE 2: Establish clear reporting, communication, and responsibilities during operation in relation to overall implementation of the EMPr during operation

Formal responsibilities are necessary to ensure that key procedures are executed during operation. Several professionals will form part of the operation team. For the purposes of the EMPr, the generic roles that need to be defined are those of the:

- » Operations Manager.
- » Environmental Manager.

It is acknowledged that the specific titles for these functions may vary once the project is implemented. The purpose of this section of the EMPr is to give a generic outline of what these roles typically entail. It is expected that this will be further defined during project implementation.

i) Operations Manager

The Plant 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 findings and recommendations in management reviews and audits.
- » Provide forums to communicate matters regarding environmental management.

ii) Environmental Manager

The Environmental Manager will:

- » Develop and Implement an Environmental Management System (EMS) for the project.
- » Manage and report on the solar 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 LDEDET and conservation authorities) on environmental performance and other issues.
- » Conduct environmental training and awareness for the employees who operate and maintain the solar facility.
- » Compile environmental policies and procedures.
- » Liaise with interested and affected parties (I&APs) on environmental issues of common concern.
- » Track and control the lodging of any complaints regarding environmental matters.

The Environmental Manager must provide fourteen (14) days written notification to the LDEDET that the project's operation phase will commence.

CHAPTER 6: 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.
- » The pre-construction activities are undertaken in accordance with all relevant legislative requirements.
- » Adequate regard has been taken of any landowner and community concerns and these are appropriately addressed through design and planning (where appropriate).
- » The best environmental options are selected for the linear components (underground cable network, short distribution power line), including the access roads.
- » The construction activities are undertaken without significant disruption to other land uses and activities in the area.

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

6.1 Objectives

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

Subject to approval by LDEDET, the proposed layout within the project area detailed in **Figure 2.2** must be implemented. Cognisance of sensitive areas defined in **Figure 2.3** and within the BA Report must be taken when undertaking the final design of the layout.

Project Component/s	<ul style="list-style-type: none"> » PV panels » Grid connection » Access road and internal roads » Inverter stations » Transformer » Underground cabling » Temporary laydown area » Associated buildings
Potential Impact	<ul style="list-style-type: none"> » Impact on identified sensitive areas. » Design fails to respond optimally to the environmental considerations.
Activities/Risk Sources	<ul style="list-style-type: none"> » 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	<ul style="list-style-type: none"> » The design of the PV facility and grid connection responds to the identified environmental constraints and opportunities, including the constraints identified through the BA process. » To ensure the pre-construction activities are undertaken in an environmentally friendly manner by, for example, avoiding identified sensitive areas.

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

Mitigation: Action/Control	Responsibility	Timeframe
Plan and conduct pre-construction activities in an environmentally acceptable manner that does not lead to unnecessary impacts and disturbance.	Developer Contractor	Pre-construction
Consider design level mitigation measures recommended by the specialists, as detailed within the BA Report and relevant appendices.	Developer EPC Contractor	Design phase
Clear rules and regulations for access to the proposed site must be developed.	Developer Contractor	Pre-Construction
Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development	Developer Design engineer	Design and planning
<u>Appropriate buffers stipulated by relevant specialists must be established around medium sensitive habitats (i.e., wetlands).</u>	Developer Design engineer	Design and planning
Reduce the construction period as far as possible through careful planning and productive implementation of resources.	Developer Contractor	Pre-construction
Plan vegetation clearance activities for dry seasons (late autumn, winter and early spring).	Developer Contractor	Pre-construction planning
Where possible, the construction activities must be planned to be undertaken outside of the rainy season.	Developer EPC Contractor	Pre-construction planning
Stormwater channels must be designed to minimise soil erosion risk resulting from surface water runoff.	Developer Design engineer	Design and planning
The proposed facility must be limited to areas marked as having low or moderate archaeological sensitivity. Areas marked as having very high and high archaeological sensitivity, as shown in Figure 2.3 , must be avoided by all development activities associated with the PV facility.	Developer EPC Contractor	Design phase
Avoid placing solar panels and associated infrastructure within the areas demarcated as being of high and, wherever possible, moderate avifaunal sensitivity.	Developer EPC Contractor	Design phase
Restrict the surface infrastructure to the west central portion of the broader project site.	Developer EPC Contractor	Design phase
Attempt as far as possible to conduct the majority of the high intensity construction activities during winter, to minimise disturbance of avifauna during sensitive life stages, such as lekking, courting, nesting and fledging.	Developer EPC Contractor	Pre-construction planning
Areas rated as being of High ecological sensitivity in proximity to the project area as shown in Figure 2.3 should be declared as 'no-go' areas during the life of the project; and all efforts must be made to prevent access to these areas from construction workers and machinery.	Developer EPC Contractor	Design phase
All laydown areas, chemical toilets etc. should be restricted to very low/ low ecologically sensitive areas.	Developer EPC Contractor	Design phase
Outside lighting should be designed and limited to minimise impacts on fauna.	Developer Design engineer	Design and planning
Schedule activities during least sensitive periods, to avoid migration, nesting and breeding seasons.	Developer EPC Contractor	Pre-construction planning

Mitigation: Action/Control	Responsibility	Timeframe
No activities are permitted within the wetlands and associated 22m buffer areas as indicated on Figure 2.3 .	Developer EPC Contractor	Design phase
A qualified ECO must be on site when construction begins.	Developer	Pre-construction/construction
The area must be walked through prior to construction, to ensure no faunal species remain in the habitat and get killed.	Developer Specialist	Pre-construction
<u>All cabling must be water tight with cable sleeves used where appropriate.</u>	<u>Developer</u> <u>EPC Contractor</u>	<u>Design Phase</u>
<u>Pre-drilled piles must be utilised to found the PV structures in the competent material below the clay at a depth of 1.6m to 2m</u>	<u>Developer</u> <u>EPC Contractor</u>	<u>Design Phase</u>

Performance Indicator	<ul style="list-style-type: none"> » The design meets the objectives and does not degrade the environment. » Design and layouts respond to the mitigation measures and recommendations in the EIA Report.
Monitoring	<ul style="list-style-type: none"> » Ensure that the design implemented meets the objectives and mitigation measures in the BA Report through review of the facility design by the Project Manager and ECO prior to construction commencing.

OBJECTIVE 2: Ensure relevant permits and site-specific plans are in place to manage environmental impacts

Project Component/s	<ul style="list-style-type: none"> » PV panels » Grid connection » Access road and internal roads » Inverter stations » Transformer » Underground cabling » Temporary laydown area » Associated buildings
Potential Impact	<ul style="list-style-type: none"> » Impact on identified sensitive areas. » Design fails to respond optimally to the environmental considerations.
Activities/Risk Sources	<ul style="list-style-type: none"> » Positioning of all project components. » Pre-construction activities, e.g. geotechnical investigations, site surveys and internal access roads and environmental walk-through surveys. » Positioning of temporary sites.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure that the facility design 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
Obtain any additional environmental permits required prior to construction commencing. Copies of permits/licenses must be submitted to LDEDET and kept on site during the project's construction and operation phases.	Developer	Pre-construction

Mitigation: Action/Control	Responsibility	Timeframe
Obtain abnormal load permits for transportation of project components to site (if required).	Contractor(s)	Pre-construction
Pre-construction walk-through of the final project area, access route and power line route must be undertaken <u>to ensure that sensitive habitat species are avoided where possible, and</u> to locate plant SCC that can be translocated. Any relocation must be undertaken in accordance with the relevant permits.	Developer Specialist	Pre-construction
Develop and implement an Alien and Invasive Plant Control Plan.	Developer Specialist	Pre-construction
Develop, budget for and implement a decommissioning and rehabilitation plan to re-instate the black turf thornveld following decommissioning.	Developer Specialist	Pre-construction
A hydrocarbon spill management plan must be compiled and implemented, to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas.	Contractor	Pre-construction
A fire management plan must be compiled and implemented to restrict the impact fire might have on the surrounding areas.	Developer	Pre-construction
A pest control plan must be compiled and implemented.	Developer Specialist	Pre-construction
A stormwater management plan must be compiled and implemented.	Contractor	Pre-construction
Develop a detailed method statement for the implementation of the alien invasive management plan and open space management plan for the site (refer to Appendix C).	Developer	Pre-construction
Develop a detailed method statement for the implementation of the plant rescue and protection plan for the site (refer to Appendix E).	Developer	Pre-construction
Develop a detailed method statement for the implementation of the re-vegetation and habitat rehabilitation plan for the site (refer to Appendix D).	Developer	Pre-construction
Develop a detailed method statement for the implementation of the traffic and transportation management plan for the site (refer to Appendix F).	Developer	Pre-construction

Performance Indicator	<ul style="list-style-type: none"> » Permits are obtained and relevant conditions complied with. » Relevant management plans and Method Statements prepared and implemented.
Monitoring	<ul style="list-style-type: none"> » Review of the design by the Project Manager and the ECO prior to construction commencing. » Monitor ongoing compliance with the EMPr and method statements.

OBJECTIVE 3: Ensure appropriate planning is undertaken by contractors and ensure compliance of required mitigation measures and recommendations by contractors

Project Component/s	<ul style="list-style-type: none"> » PV panels » Grid connection
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	<ul style="list-style-type: none"> » Access road and internal roads » Inverter stations » Transformer » Underground cabling » Temporary laydown area » Associated buildings
Potential Impact	<ul style="list-style-type: none"> » Impact on identified sensitive areas. » Design and planning fail to respond optimally to the environmental considerations.
Activities/Risk Sources	<ul style="list-style-type: none"> » Positioning of all project components. » Pre-construction activities. » Positioning of temporary sites. » Employment and procurement procedures.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure that the design of the 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
The EMPr 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. The implementation of this EMPr for all life cycle phases of the project is considered to be key in achieving the appropriate environmental management standards as detailed for this project.	Developer Contractor	Tender Design and Design Review Stage
A local procurement policy must be adopted to maximise the benefit to the local economy.	Developer Contractor	Pre-construction
The local authorities, community representatives, and organisations on the I&AP database must be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that NHM intends following for the project's construction phase.	Developer Contractor	Pre-construction
All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife.	Contractor and EPC	Pre-construction
All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area, to inform contractors and site staff of the presence of Red / Orange List species; their identification, conservation status and importance; biology, habitat requirements and management requirements in the EA and EMPr. The avoidance and protection of the wetland areas must be included into a site induction. Contractors and employees must all undergo the induction and made aware of the "no-go" to be avoided.	Contractor and EPC EO	Pre-construction

Mitigation: Action/Control	Responsibility	Timeframe
Educate staff and relevant contractors on the identified wetlands' location and importance, through toolbox talks and including them in site inductions and the overall master plan.	Contractor and EPC EO	Pre-construction
An ECO must be appointed to oversee the construction process and ensure compliance with the EA's conditions and the EMPr.	Developer	Pre-construction

Performance Indicator	» Conditions of the EMPr form part of all contracts.
	» Local employment and procurement is encouraged.
Monitoring	» Monitor ongoing compliance with the EMPr and method statements.

OBJECTIVE 4: Ensure effective communication mechanisms

It is important to maintain ongoing communication with the public (including surrounding landowners) during the project's construction and operation phases. Any issues and concerns raised must be addressed as far as possible in as short a timeframe as possible.

Project component/s	» PV panels » Grid connection » Access road and internal roads » Inverter stations » Transformer » Underground cabling » Temporary laydown area » Associated buildings
Potential Impact	» Impacts on affected and surrounding landowners 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 procedure for the public (including the affected and surrounding landowners) (using Appendix B) to be implemented during both the construction and operation phases of the solar facility and if applicable during decommissioning. This procedure must include the details of the contact person who will be receiving issues raised by I&APs; and the process that will be followed to address issues. The mechanism must also include procedures to lodge complaints, in order for the local community to express any complaints or grievances with the construction process. A Public Complaints register must be maintained by the Contractor, to record all complaints and queries relating to the project and actions taken to resolve the issue.	Developer EPC Contractor O&M Contractor	Pre-construction (construction procedure) Pre-operation (operation procedure)

Mitigation: Action/control	Responsibility	Timeframe
A Project Specific Grievance Mechanism must be developed and implemented prior to construction.		
Develop and implement a grievance mechanism for the project's construction, operation and closure phases for all employees, contractors, subcontractors and site personnel. This procedure should be in line with the South African Labour Law.	Developer EPC Contractor O&M Contractor	Pre-construction (construction procedure) Pre-operation (operation procedure)
<u>Engage the community in line with the approved Northam stakeholder engagement procedures during the recruitment process.</u>	EPC Contractor	Pre-construction
Develop an incident reporting system to record non-conformances to the EMPr.	Contractor	Pre-construction Duration of construction
Clearly inform the local municipality of the potential impact of the proposed project in order for the necessary preparations to take place	Developer	Pre-construction

Performance Indicator	» Effective communication procedures in place for all phases as required.
Monitoring	<ul style="list-style-type: none"> » A Public Complaints 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. » 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. » An incident reporting system used to record on-conformances to the EMPr. » Grievance mechanism procedures implemented.

CHAPTER 7: 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.
- » Minimises impacts on fauna (including birds) in the study area.
- » Minimises the impact on heritage sites, should they be uncovered.
- » Ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed.

An environmental baseline must be established during the undertaking of construction activities, where possible.

7.1 Objectives

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

OBJECTIVE 1: Securing the site and minimising impacts related to inappropriate site establishment

Project component/s	<ul style="list-style-type: none"> » PV panels » Grid connection » Access road and internal roads » Inverter stations » Transformer » Underground cabling » Temporary laydown area » Associated buildings
Potential Impact	<ul style="list-style-type: none"> » Hazards to construction employees and NHM personnel. » Security of materials. » Substantially increased damage to natural vegetation. » Potential impact on fauna and avifauna habitat. » Potential scarring of the landscape, due to vegetation clearing and resulting erosion.
Activities/risk sources	<ul style="list-style-type: none"> » Open excavations (foundations and cable trenches). » Movement of construction employees, vehicles and plant equipment in the area and on-site.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To secure the project area against unauthorised entry. » To protect construction employees and NHM personnel. » No loss of or damage to sensitive vegetation in areas outside the project area. » Intact vegetation cover outside of the immediate construction work areas.

Mitigation: Action/control	Responsibility	Timeframe
Secure the site, working areas and excavations in an appropriate manner.	Contractor EO	Construction
The Contractor must take all reasonable measures to ensure the safety of its employees and NHM personnel. Where the construction employees and NHM personnel could be exposed to danger by any of the works or site activities, suitable flagmen, barriers and/or warning signs in English and any other relevant indigenous languages, all to the Site Manager's approval must be provided. All unattended open excavations shall be adequately demarcated and/or fenced.	Contractor	Construction
Site access must be controlled and no unauthorised persons must be allowed onto the site.	Contractor	Construction
Establish appropriate bunded areas for the storage of hazardous materials and hazardous waste.	Contractor	Construction
Establish the necessary ablution facilities with chemical toilets and provide adequate sanitation facilities and ablutions for construction workers (1 toilet per every 15 workers) at appropriate locations on site. These must be situated outside of the delineated wetlands and their associated buffer zones.	Contractor	Construction
Supply adequate weather and vermin proof waste collection bins and skips (covered at minimum with secured netting or shade cloth) at sites where construction is being undertaken. Separate bins must be provided for general and hazardous waste. As far as possible, provision must be made for separation of waste for recycling.	Contractor	Construction
Ensure that no activities infringe on identified 'no-go', very high and high sensitivity areas, as detailed in Figure 2.3.	Contractor	Duration of construction
Ensure that vegetation is not unnecessarily cleared or removed during the construction phase.	Contractor	Site establishment, and duration of 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 through the use of approved dust suppression techniques, as and when required (i.e. whenever dust becomes apparent).	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
Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing but must be temporarily stored in a demarcated area, removed from site and appropriately disposed of.	Contractor	Construction

Performance Indicator	<ul style="list-style-type: none"> » Site is secure and there is no unauthorised entry. » No construction employees or NHM personnel injured as a result of construction activities. » Fauna (including birds) and flora is protected, as far as practically possible.
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	<ul style="list-style-type: none"> » Appropriate and adequate waste management and sanitation facilities 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.
Monitoring	<ul style="list-style-type: none"> » Regular visual inspection of the fence for signs of deterioration/forced access. » An incident reporting system must be used to record non-conformances to the EMPr. » A complaints register must be developed and maintained on site. » ECO/ EO to monitor all construction areas on a continuous basis until all construction is completed; immediate reporting back to the site manager. » ECO/ EO to address any infringements with responsible contractors, as soon as these are recorded. » Monitoring of vegetation clearing during construction (by contractor as part of construction contract).

OBJECTIVE 2: Appropriate management of the construction site and construction workers

Project Component/s	<ul style="list-style-type: none"> » PV panels » Grid connection » Access road and internal roads » Inverter stations » Transformer » Underground cabling » Temporary laydown area » Associated buildings
Potential Impact	<ul style="list-style-type: none"> » 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	<ul style="list-style-type: none"> » 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 EMPr's requirements, leading to unnecessary impacts on the surrounding environment.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Limit equipment storage within demarcated designated areas. » Ensure adequate sanitation facilities and waste management practices. » Ensure appropriate management of actions by on-site personnel, to minimise impacts to the surrounding environment.

Mitigation: Action/Control	Responsibility	Timeframe
Contractors and construction workers must be clearly informed of the 'no-go', very high and high sensitivity areas within the project area and surrounds.	Developer Contractor	Prior to the commencement of construction
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 project area. Contractors and their sub-contractors must be	Contractors	Construction

Mitigation: Action/Control	Responsibility	Timeframe
familiar with the conditions of the EA, the BA Report, this EMP, and the requirements of all relevant environmental legislation.		
Contractors must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct.	Contractor and sub-contractor/s	Pre-construction
Introduce an incident reporting system to be tabled at weekly/monthly project meetings.	Contractor and sub-contractor/s	Pre-construction
All construction vehicles must adhere to clearly defined and demarcated roads.	Contractor	Construction
Ensure all construction equipment and vehicles are properly maintained at all times.	Contractor	Construction
Ensure that construction workers are clearly identifiable. All workers should carry identification cards and wear identifiable clothing.	Contractor	Construction
Pre-construction environmental induction must be undertaken for all construction staff on site, to ensure that basic environmental principles are adhered to. This includes awareness to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas etc.	Contractor	Construction
Regular toolbox talks must be undertaken, to ensure appropriate levels of environmental awareness.	Contractor	Construction
Contact details of emergency services should be prominently displayed on site.	Contractor	Construction
No fires must be allowed on-site.	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
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 evidence of responsible disposal.	Contractor	Maintenance: duration of contract within a particular area
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	During construction.

Mitigation: Action/Control	Responsibility	Timeframe
Ensure ablution facilities are appropriately maintained. Ablutions must be cleaned regularly and associated waste disposed of at a registered/permited waste disposal site. They must be removed from site when construction is completed.	Contractor and sub-contractor/s	Duration of contract
Cooking and eating of meals must take place in a designated area.	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 must be compiled for pests and vermin management within the site, specifically relating to the canteen area, if applicable.	Contractor	Construction
Ensure proper health and safety plans in place during the construction period, to ensure safety on and around site during construction, including fencing of the project area and site access restriction.	Contractor and sub-contractor/s	Pre-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

Performance Indicator	<ul style="list-style-type: none"> » 'No-go' and sensitive areas are avoided by construction activities. » 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. » 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.
Monitoring	<ul style="list-style-type: none"> » 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 must 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 3: Maximise benefits to the social environment associated with the construction phase

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 PV facility.
Potential Impact	» The opportunities and benefits associated with the creation of local employment and business should be maximised.
Activities/Risk Sources	<ul style="list-style-type: none"> » 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.
Enhancement: Target/Objective	<ul style="list-style-type: none"> » 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
Where feasible, effort must be made to employ locally, to create maximum benefit for the communities. Ensure that the majority of the low-skilled workforce is recruited locally.	Contractor	Construction
Commence with skill development programmes within the first month of construction.	Contractor	Construction
The recruitment selection process must seek to promote gender equality and the employment of women wherever possible.	Contractor	Construction
Facilitate the transfer of knowledge between experienced employees and the staff.	Contractor	Construction
Identify opportunities for local businesses and ensure that the services from local businesses are prioritised.	Contractor	Construction

Performance Indicator	<ul style="list-style-type: none"> » Maximum number of semi and unskilled labour locally sourced where possible. » Local suppliers and SMMEs contracted where possible. » Skills transfer facilitated where required.
Monitoring	» Contractors and appointed ECO must monitor indicators listed above, to ensure that they have been met for the construction phase.

OBJECTIVE 4: Protection of sensitive areas, flora, fauna and soils

Project Component/s	<ul style="list-style-type: none"> » PV panels » Grid connection » Access road and internal roads » Inverter stations » Transformer » Underground cabling » Temporary laydown area » Associated buildings
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Potential Impact	<ul style="list-style-type: none"> » 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	<ul style="list-style-type: none"> » Vegetation clearing. » Site preparation and earthworks. » Excavation of foundations. » Construction of infrastructure. » Stockpiling of topsoil, subsoil and spoil material.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To minimise the project area as far as possible. » To minimise impacts on surrounding sensitive areas. » To minimise impacts on soils. » To minimise impacts on fauna. » Minimise spoil material. » Minimise erosion potential.

Mitigation: Action/Control	Responsibility	Timeframe
Land clearance must only be undertaken immediately prior to construction activities and only within the project area area.	Contractor	Site establishment
Unnecessary land clearance must be avoided.	Contractor	Construction
Level any remaining soil removed from excavation pits (where the PV modules will be mounted) that remained on the surface, instead of allowing small stockpiles of soil to remain on the surface.	Contractor	Construction
Vehicles and equipment must travel within demarcated areas and not outside of the construction footprint.	Contractor	Construction
Materials must be off-loaded and stored in designated laydown areas.	Contractor	Construction
Vehicles and equipment must park in designated parking areas.	Contractor	Construction
Maintenance must be undertaken regularly on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills.	Contractor	Construction
Any leftover construction materials must be removed from site.	Contractor	Construction
The construction site must be monitored by the ECO to detect any early signs of fuel and oil spills and waste dumping.	ECO	Construction
Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimised and avoided where possible.	Contractor	Construction
Where possible, existing access routes and walking paths must be made use of.	Contractor	Construction
All laydown areas, chemical toilets etc. should be restricted to very low/ low sensitivity areas.	Contractor	Construction
Materials must not be stored for extended periods of time and be removed from the project area once the construction/closure phase has been concluded.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
The Contractor must be in possession of an emergency spill kit that must always be complete and available on site.	Contractor	Construction
Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use.	Contractor	Construction
No servicing of equipment may take place on site unless necessary.	Contractor	Construction
Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.	Contractor	Construction
It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species, whether indigenous or exotic, should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.	Contractor	Construction
The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments. Signs must be put up to enforce this.	Contractor	Construction
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.	Contractor	Construction
No trapping, killing, or poisoning of any wildlife is to be allowed. Signs must be put up to enforce this.	Contractor	Construction
All outside lighting should be directed away from highly sensitive areas.	Contractor	Construction
Fluorescent and mercury vapour lighting should be avoided and sodium vapour (green/red) lights should be used wherever possible.	Contractor	Construction
A speed limit of 40km/h must be enforced, to ensure that road killings and erosion is limited.	Contractor	Construction
Any excavations or holes must be conducted in a progressive manner. Should the holes/excavations stay open overnight, they must be covered temporarily to ensure no small fauna species fall in.	Contractor	Construction
Should animals not move out of the area on their own, relevant specialists must be contacted to advise on how the species can be relocated.	Developer Specialist	Construction
The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated, to avoid unnecessary disturbances to adjacent areas.	Contractor	Construction
Toilets at the recommended Health and Safety standards must be provided. These should be emptied twice a day, to prevent staff from using the surrounding vegetation.	Contractor	Construction

Performance Indicator

- » No disturbance outside of designated work areas.
- » Minimised clearing of existing vegetation.
- » Vegetation and habitat loss restricted to infrastructure footprint.

	<ul style="list-style-type: none"> » 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, compaction and pollution around site. » No activity in restricted areas.
Monitoring	<ul style="list-style-type: none"> » Contractor's EO to provide supervision and oversight of vegetation clearing activities. » Supervision of all clearing and earthworks. » Ongoing monitoring of erosion management measures within the site. » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE 5: Minimise impacts to avifauna

Project Component/s	<ul style="list-style-type: none"> » Any infrastructure or activity that will result in disturbance to natural areas » PV Panels
Potential Impact	<ul style="list-style-type: none"> » Vegetation clearance and associated impacts on avifaunal habitats. » Loss of avifauna due to interactions with humans and site infrastructure.
Activity/Risk Source	<ul style="list-style-type: none"> » Site preparation and earthworks. » Foundations or plant equipment installation. » Mobile construction equipment. » Grid infrastructure.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To minimise footprints of habitat destruction. » To minimise disturbance to (and death of) resident and visitor avifaunal species.

Mitigation: Action/Control	Responsibility	Timeframe
Avoid placing solar panels and associated infrastructure within the areas demarcated as being of High avifaunal sensitivity.	Contractor	Construction
Demarcate these High sensitivity areas on the ground during construction and signpost them as "environmentally sensitive areas keep out".	Contractor EO	Construction
All exposed electrically charged components must be covered (insulated) to reduce electrocution risk.	Contractor	Construction
All power cables within the project area should be thoroughly insulated and preferably buried in demarcated corridors.	Contractor	Construction
White strips must be placed along the edges of the panels, to help reduce similarity to water and deter birds and insects following Horvath et al. (2010).	Contractor	Construction
Install bird deterrent devices around panels to limit collision risk	Contractor	Construction
Fit the entire length of the power line between the plant and the main road, especially nearer the dam, wetlands and koppies with bird flappers to minimise collision risk.	Contractor	Construction
If any overlooked nests of raptors or large terrestrial birds are found during construction, halt construction activities and call an avifaunal specialist immediately for advice on the way forward.	Contractor	Construction
Keep lighting to a minimum and fit external lighting with downward facing hoods.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
Performance Indicator	<ul style="list-style-type: none"> » Minimised clearing of existing/natural vegetation and habitats for avifauna. » Limited impacts on avifaunal species (i.e. noted/recorded fatalities). » Identification of avifauna carcasses. 	
Monitoring	<ul style="list-style-type: none"> » Avifaunal monitoring to detect movement through the 20ha project area. » Construction phase avifauna monitoring to record movement and abundance through the project area. 	

OBJECTIVE 6: Minimise the establishment and spread of alien invasive plants

Major factors contributing to invasion by AIPs 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.
- » Hydrological impacts due to increased transpiration and runoff.

Project Component/s	<ul style="list-style-type: none"> » PV panels » Grid connection » Access road and internal roads » Inverter stations » Transformer » Underground cabling » Temporary laydown area » Associated buildings
Potential Impact	<ul style="list-style-type: none"> » Invasion of natural vegetation surrounding the site by declared weeds or AIPs. » Impacts on soil. » Impact on faunal habitats. » Degradation and loss of agricultural potential.
Activities/Risk Sources	<ul style="list-style-type: none"> » Transport of construction materials to the project area. » Movement of construction machinery and personnel. » Site preparation and earthworks causing disturbance to indigenous vegetation. » Construction of main access road. » Stockpiling of topsoil, subsoil and spoil material. » Routine maintenance work – especially vehicle movement.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To significantly reduce the presence of weeds and eradicate AIPs. » To avoid the introduction of additional AIPs to the site. » To avoid distribution and thickening of existing AIPs in the site. » To complement existing alien plant eradication programs in gradually causing a significant reduction of AIPs throughout the site.

Mitigation: Action/Control	Responsibility	Timeframe
Develop and implement an Invasive Alien Plant Control and Eradication Programme (refer to Appendix C).	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 reoccur.	Contractor	Construction
No planting or importing any listed AIPs (all Category 1a, 1b and 2 invasive species) to the site for landscaping, rehabilitation or any other purpose must be undertaken.	Contractor	Construction
All alien plant re-growth must be monitored and should it occur these plants should be eradicated.	Contractor	Construction
Any AIPs removed should be taken to a registered landfill site, to prevent the proliferation of AIPs.	Contractor	Construction
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 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 site and immediate surroundings.
Monitoring	<ul style="list-style-type: none"> » On-going monitoring of area by EO during construction. » Annual audit of project area and immediate surroundings by qualified botanist. » If any AIPs 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 7: Minimise impacts on Wetlands

Project component/s	<ul style="list-style-type: none"> » Construction activities » Storage of dangerous goods » Ablution facilities
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Potential Impact	<ul style="list-style-type: none"> » 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 wetland habitat. » Compaction of soils within and surrounding the wetlands. » Erosion of soils surrounding wetlands. » Potential proliferation of AIPs within the wetlands.
Activity/risk source	<ul style="list-style-type: none"> » Development of PV facility in proximity to wetlands. » Increased hardened surfaces.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Reduce potential loss of habitat and ecological structure. » No incidents related to spills of chemicals and hazardous materials. » No release of contaminated water in wetlands. » No misbehaviour of construction workers (i.e. ablution activities, washing).

Mitigation: Action/control	Responsibility	Timeframe
Clearly demarcate the project area and restrict all construction activities to within the proposed infrastructure area.	Contractor	Construction
Minimise the project area and unnecessary clearing of vegetation outside of this area.	Contractor	Construction
Educate staff and relevant contractors on the identified wetlands' location and importance', through toolbox talks and by including them in site inductions and the overall master plan.	Contractor	Construction
All activities (including driving) must adhere to the 22 m wetlands buffer areas.	Contractor	Construction
Promptly remove / control all AIPs that may emerge during construction (i.e. weedy annuals and other alien forbs) must be removed.	Contractor	Construction
All alien vegetation along the power line should be managed in terms of the Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983, and any future amendments hereto.	Contractor	Construction
Limit construction activities near (< 50m) HGM 3 to winter (as much as possible) when rain is least likely to wash concrete and sand into the wetland.	Contractor	Construction
Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash.	Contractor	Construction
No activities are permitted within the wetland and associated buffer areas.	Contractor	Construction
Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility.	Contractor	Construction
Appropriately stockpile topsoil cleared from the project area.	Contractor	Construction
Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete), to prevent them leaking and entering the wetlands.	Contractor	Construction

Performance Indicator	» No degradation and erosion of wetlands.
Monitoring	» Monitor management measures in place for protection of freshwater resources.

OBJECTIVE 8: Protection of heritage resources

Project Component/s	<ul style="list-style-type: none"> » PV panels » Grid connection » Access road and internal roads » Inverter stations » Transformer » Underground cabling » Temporary laydown area » Associated buildings
Potential Impact	» Heritage objects or artefacts found on site are inappropriately managed or destroyed.
Activity/Risk Source	<ul style="list-style-type: none"> » 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 Heritage specialist	Duration of contract, particularly during excavations
Should any previously unrecorded archaeological resources or possible burials be identified during construction activities, work must cease in the immediate vicinity of the find, and SAHRA must be contacted regarding an appropriate way forward.	Contractor EO	Construction

Performance Indicator	<ul style="list-style-type: none"> » No disturbance outside of designated work areas. » All heritage items located are dealt with as per the legislative guidelines.
Monitoring	<ul style="list-style-type: none"> » Observation of excavation activities by the EO throughout the 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 9: Appropriate Stormwater Management

Stormwater management is covered under the Pre-construction and Construction Phase management, but aspects thereof will also continue into the Operation Phase. It is important that the engineers and contractors responsible for the detailed design of the stormwater systems take into account this EMP's requirements; and the participating specialists' recommendations.

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 impact on localised drainage systems.

Mitigation: Action/Control	Responsibility	Timeframe
Implement an effective storm water management plan. Its effectiveness must be regularly assessed and revised if necessary.	Contractor	Construction
Stormwater from hard stand areas, and roads must be managed using appropriate channels and swales when located within steep areas.	Contractor	Construction
Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities	Contractor	Construction
Stormwater run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any stormwater leaving the site.	Contractor and Engineers	Construction
Stormwater control systems must be implemented to reduce erosion on the project site.	Contractor	Construction
Stormwater channels must be designed to minimise soil erosion risk resulting from surface water runoff.	Contractor	Construction

Performance Indicator	<ul style="list-style-type: none"> » No impacts due to runoff. » Minimise erosion as far as possible. » Appropriate stormwater management system in place.
Monitoring	<ul style="list-style-type: none"> » Ongoing monitoring of erosion management measures within the site. » Monthly inspections of sediment control devices by the EO. » An incident reporting system will be used to record non-conformances to the EMP.

OBJECTIVE 10: Management of dust and emissions

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

Project component/s	<ul style="list-style-type: none"> » PV panels » Grid connection » Access road and internal roads » Inverter stations » Transformer » Underground cabling » Temporary laydown area » Associated buildings
Potential Impact	<ul style="list-style-type: none"> » Dust impacts can occur from cleared areas and vehicle movement along gravel roads. » Release of minor amounts of air pollutants (for example NO₂, CO and SO₂) from vehicles and construction equipment.
Activity/risk source	<ul style="list-style-type: none"> » Clearing of vegetation and topsoil. » Excavation, grading, scraping. » Transport of materials, equipment, and components. » 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. » Construction vehicle movement and their activities on the site.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure emissions from all vehicles are minimised, where possible, for the duration of the construction phase. » To avoid and or minimise the potential dust impacts associated with heavy vehicles, and also minimise damage to roads. » Suppression of dust, pollution control and minimise dust generation.

Mitigation: Action/control	Responsibility	Timeframe
Dust-reducing mitigation measures must be put in place and strictly adhered to. This includes wetting of exposed soft soil surfaces. No non environmentally friendly suppressants may be used, as this could result in pollution of water sources.	Contractor	Construction
Ensure that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.	Contractor	Duration of contract
Speed of construction vehicles must be restricted to 40km/hr on all roads within the site.	Contractor	Duration of contract
Disturbed areas must be re-vegetated as soon as practicable, in line with the progression of construction activities.	Contractor	Completion of construction
Vehicles and equipment must be maintained in a roadworthy condition at all times.	Contractor	Duration of contract
All vehicles and containers used for moving waste must encapsulate the waste, which prevents the waste from causing odours and escaping or blowing around the site. This will also prevent leachate material from spilling out of the containers, which is hazardous.	Contractor	Duration of contract

Performance Indicator	<ul style="list-style-type: none"> » Visual presence of dust. » 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.
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	<ul style="list-style-type: none"> » Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed. » All heavy vehicles equipped with speed monitors before they are used in the construction phase, in accordance with South African vehicle legislation. » Roadworthy certificates in place for all heavy vehicles at outset of construction phase and updated on a monthly basis.
Monitoring	<ul style="list-style-type: none"> » The appointed EO must monitor indicators listed above, to ensure that they have been met for the construction phase. » Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager. » 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: Conservation of the soil resource within the site and in the adjacent areas

The natural soil on the site needs to be preserved as far as possible, to minimise impacts on the environment. Soil degradation, including erosion (by wind and water) and subsequent deposition elsewhere, is of a concern. Uncontrolled run-off relating to construction activities (excessive wetting, etc.) will also lead to accelerated erosion. Degradation of the natural soil profile due to excavation, stockpiling, compaction, pollution and other construction activities will affect soil forming processes and associated ecosystems.

A set of strictly adhered to mitigation measures are required to be implemented to effectively limit the impact on the environment. The disturbed areas where human impact is likely are the focus of the mitigation measures laid out below.

Project component/s	<ul style="list-style-type: none"> » PV panels » Grid connection » Access road and internal roads » Inverter stations » Transformer » Underground cabling » Temporary laydown area » Associated buildings
Potential Impact	<ul style="list-style-type: none"> » Erosion and soil loss. » Increased runoff. » Downstream sedimentation.
Activities/risk sources	<ul style="list-style-type: none"> » Rainfall and wind erosion of disturbed areas. » Excavation, stockpiling and compaction of soil. » Concentrated discharge of water from construction activity. » Stormwater run-off from sealed surfaces. » Mobile construction equipment movement on site. » Roadside drainage ditches. » Project related infrastructure, such as buildings and fences.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To minimise erosion of soil from site during construction. » To minimise damage to vegetation by erosion or deposition. » To retain all topsoil with a stable soil surface

Mitigation: Action/control	Responsibility	Timeframe
Vegetation clearing must occur in in a phased manner, to minimise erosion and/or run-off.	Contractor	Construction
Topsoil must be removed and stored separately from subsoil. It must be reapplied where appropriate as soon as possible, to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.	Contractor	Construction
Stockpile topsoil for re-use in rehabilitation phase. Maintain stockpile shape and protect from erosion.	Contractor	Construction
<p>Storing topsoil:</p> <ul style="list-style-type: none"> » Viability of stored topsoil depends on moisture, temperature, oxygen, nutrients and time stored. » Rapid decomposition of organic material in warm, moist topsoil rapidly decreases microbial activity necessary for nutrient cycling; and reduces the amount of beneficial micro-organisms in the soil. » Stockpile location must ideally be in a disturbed but weed-free area. » Storage of all topsoil that is disturbed must be of a maximum height of 2m and the maximum length of time before re-use is 18 months. » Topsoil handling must be reduced to stripping, piling (once), and re-application. Between the stockpiling and reapplication, stored topsoil must not undergo any further handling except control of erosion and (alien) invasive vegetation. » Where topsoil can be reapplied within six months to one year after excavation, it will be useful to store the topsoil as close as possible to the area of excavation and re-application, e.g. next to cabling trenches. » Do not mix overburden with topsoil stockpiles, as this will dilute the proportion of fertile soil (with less fertile subsoil or rock material). » Employ wind nets made from Hessian or similarly fibrous and biodegradable material, where required, to stabilise newly placed topsoil stockpiles and to reduce wind erosion. » In cases where topsoil has to be stored longer than 6 months or during the rainy season, soils must be kept as dry as possible and protected from erosion and degradation by: <ul style="list-style-type: none"> * Preventing ponding on or between heaps of topsoil. * Covering topsoil berms. * Preventing all forms of contamination or pollution. * Preventing any form of compaction. * Monitoring the establishment of all invasive vegetation and removing such if it appears. * Keeping slopes of topsoil at a maximal 2:1 ratio. * Monitoring and mitigating erosion where it appears. » Where topsoil needs to be stored in excess of one year, it is recommended to either cover the topsoil or allow an indigenous grass cover to grow on it – if this does not happen spontaneously, seeding must be considered. 	Contractor	Construction

Regular monitoring of the site (minimum of twice annually) must be undertaken to identify possible areas of erosion, particularly after large summer thunderstorms have been experienced. Problem areas must receive follow-up monitoring by the EO, to assess the success of the remediation.	Contractor EO	Construction
Any erosion problems observed to be associated with the project infrastructure must be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.	Contractor	Construction
Reinstate as much of the eroded area to its pre-disturbed, "natural" geometry (no change in elevation and any banks not to be steepened) where possible.	Contractor	Construction
Practical phased development and vegetation clearing must be practiced so that cleared areas are not left unvegetated and vulnerable to erosion for extended periods of time.	Contractor	Construction
Erosion control measures, such as silt fences (for areas of works) and gravel strips, may be considered at the impact zone where water falls from the solar panels onto the soil surface (due to deterioration in natural grassland because of poor maintenance or lack of solar radiation).	Contractor	Construction
Silt traps must be used where there is a danger of topsoil eroding and entering lower lying wetland resources.	Contractor	Construction
Construction of gabions and other stabilisation features must be undertaken to prevent erosion, if deemed necessary.	Contractor	Construction
Level any remaining soil removed from excavation pits that remained on the surface, instead of allowing small stockpiles of soil to remain on the surface.	Contractor	Construction
Reapplying topsoil: <ul style="list-style-type: none"> » Spoil materials and subsoil must be backfilled first, then covered with topsoil. » Immediate replacement of topsoil after the undertaking of construction activities within an area. » Generally, topsoil must be re-applied to a depth slightly greater than the topsoil horizon of a pre-selected undisturbed reference site. » The minimum depth of topsoil needed for revegetation to be successful is approximately 20 cm. » If the amount of topsoil available is limited, a strategy must be devised to optimise revegetation efforts with the topsoil available. » Reapplied topsoil must be landscaped in a way that creates a variable microtopography of small ridges and valleys that run parallel to existing contours of the landscape. The valleys become catch-basins for seeds and act as run-on zones for rainfall, increasing moisture levels where the seeds are likely to be more concentrated. This greatly improves the success rate of revegetation efforts. » To stabilise reapplied topsoil and minimise raindrop impact and erosion: <ul style="list-style-type: none"> * Use organic material from cleared and shredded woody vegetation, where possible. 	Contractor	Construction

<ul style="list-style-type: none"> * Alternatively, suitable geotextiles or organic erosion mats can be used as necessary. » Continued monitoring will be necessary to detect any sign of erosion early enough to allow timeous mitigation. 		
Re-applied topsoil must be revegetated as soon as possible.	Contractor	Construction

Performance Indicator	<ul style="list-style-type: none"> » Minimal level of soil erosion around site. » Minimal level of soil degradation. » No activity outside demarcated areas. » Acceptable state of excavations. » No activity in restricted areas. » Acceptable state of excavations, as determined by EO and ECO. » No indications of visible topsoil loss.
Monitoring and Reporting	<ul style="list-style-type: none"> » Continual inspections of the site by the EO. » Reporting of ineffective sediment control systems and rectification as soon as possible. » If soil loss is suspected, acceleration of soil conservation and rehabilitation measures must be implemented.

OBJECTIVE 12: Appropriate handling and management of waste

The construction of the project will involve the generation of various wastes. 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 major waste stream during the Construction Phase are:

- » Cardboard waste from the panels.
- » Rubber caps placed on all eight corners of the PV panels – volumes uncertain.
- » Wooden pallets on which the PV boxes arrive.
- » Plastic wrap.

Other wastes include:

- » Other general solid waste.
- » Hazardous waste.
- » Inert waste (rock and soil).
- » Liquid waste (including grey water and sewage).

Project Component/s	<ul style="list-style-type: none"> » PV panels » Grid connection » Access road and internal roads » Inverter stations » Transformer » Underground cabling » Temporary laydown area » Associated buildings
Potential Impact	<ul style="list-style-type: none"> » 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	<ul style="list-style-type: none"> » Packaging. » Other construction wastes. » Hydrocarbon use and storage. » Spoil material from excavation, earthworks and site preparation.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » 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.

Mitigation: Action/Control	Responsibility	Timeframe
Construction method and materials should 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 to deal with all waste streams. This must be in line with the Zondereinde Mine's Waste Management Plan.	Contractor	Duration of contract
Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises is placed, dumped or deposited on adjacent/surrounding properties, and that the waste is disposed of at a an appropriately registered waste disposal facility.	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. The 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
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
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. This must be regularly removed and recycled (where possible) or disposed of at an appropriately licensed landfill site.	Contractor	Duration of contract
Waste must be stored in accordance with the relevant legislative requirements.	Contractor	Construction
Waste must be kept to a minimum and be transported by approved waste transporters to sites designated for their disposal.	Contractor	Duration of contract
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.	Contractor	Construction
All liquid wastes should be contained in appropriately sealed vessels/ponds within the project's footprint; and be disposed of at a designated waste management facility after use.	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
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. The onus is on the Contractor to identify and interpret the applicable legislation. Hazardous waste to be disposed of at a registered landfill site.	Contractor	During and post construction.
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
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
If 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
Ensure that the below ground storage of the septic tank can withstand the external forces of the surrounding pressure. The area above the tank must be demarcated to prevent any vehicles or heavy machinery from driving around the tank.	Contractor	Duration of construction
Under no circumstances may waste be burnt or buried on site.	Contractor	Duration of construction
Any waste generated during construction must be stored in designated containers and removed from the site by the construction teams.	Contractor	Construction
Waste management must be a priority and all waste must be collected and stored adequately.	Contractor	Construction
It is recommended that all waste be removed from site on a weekly basis, to prevent rodents and pests entering the site.	Contractor	Construction
The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility. Under no circumstances may domestic waste be burned on site.	Contractor	
Refuse bins must be emptied and secured. Temporary storage of domestic waste must be in covered waste skips. Maximum domestic waste storage period must be 10 days.	Contractor	

Performance Indicator	<ul style="list-style-type: none"> » 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	<ul style="list-style-type: none"> » 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. » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE 13: Appropriate handling and storage of chemicals and/or hazardous substances

The construction phase may involve the storage and handling of a variety of chemicals including adhesives, abrasives, oils and lubricants, paints and solvents.

Project Component/s	<ul style="list-style-type: none"> » PV panels » Grid connection » Access road and internal roads » Inverter stations » Transformer » Underground cabling » Temporary laydown area » Associated buildings
Potential Impact	<ul style="list-style-type: none"> » Release of contaminated water from contact with spilled chemicals. » Generation of contaminated wastes from used chemical containers. » Soil pollution.
Activity/Risk Source	<ul style="list-style-type: none"> » Vehicles associated with site preparation and earthworks. » Construction activities of area and linear infrastructure. » Hydrocarbon spills by vehicles and machinery during levelling; vegetation clearance; 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	<ul style="list-style-type: none"> » To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons. » To ensure that the storage and maintenance of machinery on-site does not cause pollution of 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 during the construction phase.	Contractor	Construction
Any liquids stored on site, including fuels and lubricants, should be stored in accordance with applicable legislation.	Contractor	Construction
Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	Contractor	Construction
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 Stores, which is in accordance with the Hazardous Substance Amendment Act, No. 53 of 1992. This should include but not be limited to: <ul style="list-style-type: none"> » Designated area; » All applicable safety signage; 	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
<ul style="list-style-type: none"> » Firefighting equipment; » Enclosed by an impermeable bund; » Protected from the elements; » Lockable; » Ventilated; and » Has adequate capacity to contain 110% of the largest container contents. 		
<p>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 LDEDET within 14 days of the incident.</p>	Contractor	Construction
<p>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.</p>	Contractor	Construction
<p>Spilled concrete must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.</p>	Contractor	Construction
<p>Check vehicles and machinery daily for oil, fuel and hydraulic fluid leaks and undertake regular high standard maintenance on vehicles.</p>	Contractor	Construction
<p>Accidental spillage of potentially contaminating liquids and solids must be cleaned up immediately, in line with procedures by trained staff with the appropriate equipment.</p>	Contractor	Construction
<p>Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.</p>	Contractor	Construction
<p>Routine servicing and maintenance of vehicles must not 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.</p>	Contractor	Construction
<p>Fuel storage areas must be inspected regularly, to ensure bund stability, integrity, and function.</p>	Contractor	Construction
<p>Construction machinery must be stored in an appropriately sealed area.</p>	Contractor	Construction
<p>The storage of flammable and combustible liquids, such as oils, must be in designated areas which are appropriately bunded, and stored in compliance with Material Safety Data Sheets (MSDS) files.</p>	Contractor	Construction
<p>Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals compiled with.</p>	Contractor	Construction
<p>Transport of all hazardous substances must be in accordance with the relevant legislation and regulations</p>	Contractor	Construction
<p>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.</p>	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
Precautions must be in place to limit the possibility of oil and other toxic liquids from entering the soil or clean stormwater system.	Contractor	Construction
As much material must be pre-fabricated and then transported to site, to avoid the risks of contamination associated with the mixing, pouring and storage of chemicals and compounds on site.	Contractor	Construction
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. All waste generated on-site during construction must be adequately managed.	Contractor	Construction
Implement a contingency plan to handle spills, so that environmental damage is avoided.	Contractor	Construction
Drip trays must be used during al fuel/chemical dispensing.	Contractor	Construction
Drip trays to be placed beneath standing machinery/plant.	Contractor	Construction
In the case of petrochemical spillages, the spill should 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
The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site.	Contractor	Construction
Appropriately contain any generator diesel storage tanks and machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) to prevent them leaking and entering the environment.	Contractor	Construction

Performance Indicator	<ul style="list-style-type: none"> » 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	<ul style="list-style-type: none"> » Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase. » 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 volume and nature of 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.

OBJECTIVE 14: 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 should be undertaken in an area as soon as possible after the completion of construction activities within that area.

Project Component/s	<ul style="list-style-type: none"> » Construction camps. » Laydown areas. » Access roads. » Ancillary buildings.
Potential Impact	» Environmental integrity of the site undermined, resulting in reduced visual aesthetics, erosion and increased runoff, and the requirement for ongoing management intervention.
Activity/Risk Source	<ul style="list-style-type: none"> » Temporary construction areas. » Temporary access roads/tracks. » Other disturbed areas/footprints. » Site preparation and earthworks. » Excavation of foundations and trenches. » Temporary laydown areas.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » 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
A site rehabilitation programme must be compiled and implemented (refer to Appendix D).	Contractor	Following execution of the works
Areas that are denuded during construction need to be revegetated with indigenous vegetation, to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species.	Contractor	Construction
Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion.	Contractor	Construction
Landscape and revegetate all denuded areas as soon as possible.	Contractor	Construction
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
All voids must be backfilled.	Contractor	Following completion of construction activities in an area
Where disturbed areas are not to be used during the operation of the PV facility, they must be rehabilitated/revegetated with appropriate natural indigenous vegetation and/or local seed	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area

Mitigation: Action/Control	Responsibility	Timeframe
mix. A seed mix must be applied to rehabilitated and bare areas. No exotic plants must be used for rehabilitation purposes.		
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
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
Revegetated areas may need to be protected from wind erosion and maintained until an acceptable plant cover has been achieved.	Proponent in consultation with rehabilitation specialist	Post-rehabilitation
Ongoing alien plant monitoring and removal must be undertaken on all areas of natural vegetation on an annual basis.	Proponent	Post-rehabilitation
Rehabilitate or manage all non-developed areas within the project area, to support a far more open black turf thornveld through appropriate fire and grazing veld management strategies.	Contractor	Following completion of construction activities in an area
Appropriately rehabilitate the project area by ripping, landscaping and revegetating with locally indigenous species.	Contractor	Following completion of construction activities in an area

Performance Indicator	<ul style="list-style-type: none"> » All portions of the site, including construction equipment camp and working areas, cleared of equipment and temporary facilities. » Topsoil replaced on all areas and stabilised where practicable or required after construction and temporally utilised areas. » Disturbed areas rehabilitated and acceptable plant cover achieved on rehabilitated sites. » Completed site free of erosion and alien invasive plants.
Monitoring	<ul style="list-style-type: none"> » Rehabilitated areas should 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 rehabilitated to a satisfactory level. » On-going inspection of rehabilitated, to determine 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.

7.2 Detailing Method Statements

OBJECTIVE 15: 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.
- » 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,; and 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 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 its 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 as a method statement has been submitted and approved.

7.3 Awareness and Competence: Construction Phase

OBJECTIVE 16: 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 EMP. The ECO is responsible for monitoring compliance during construction and until rehabilitation is complete. The Contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications; and ensuring that employees are adequately experienced and properly trained 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 its location and have access to its. 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 EMPr's contents and requirements; 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 should have a 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 site.

Therefore, prior to the commencement of construction activities on site and before any person commences with work on site thereafter, adequate environmental awareness and responsibility are to be appropriately presented to all staff present onsite, 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:

7.3.1 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 should 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 EA;
- » 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 should 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 should 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 NHM'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 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/ECO on site.

7.3.2 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. They should also include discussions on possible common incidents occurring on site and ones recommended by the onsite EO; and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

7.4 Monitoring Programme: Construction Phase

OBJECTIVE 17: To monitor the performance of the control strategies employed against environmental objectives and standards

A monitoring programme must be in place, to ensure conformance with the EMPr; and monitor any environmental issues and impacts which have not been accounted for in the EMPr that 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, NHM 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, 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 must be submitted to the LDEDET in terms of the EA.

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 project.

7.4.1. 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.

7.4.2. Monitoring Reports

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to the LDEDET for its records. This report should 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, to inform and update the LDEDET regarding waste related activities.

7.4.3. Audit Reports

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

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

7.4.4. Final Audit Report

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

CHAPTER 8: OPERATION MANAGEMENT PROGRAMME

Overall Goal: To ensure that the operation of the PV1 does not have unforeseen environmental impacts; and that all impacts are monitored and the necessary corrective action taken in all cases. 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.
- » Minimise impacts on fauna using the site.

8.1. Objectives

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

OBJECTIVE 1: Securing the site and general maintenance during operation

Safety issues may arise with public access to the solar facility (e.g. unauthorised entry to the site) or to the onsite substation. Prevention and control measures to manage public access are therefore important.

General maintenance at the Northam solar PV facility will be required during its operation. The maintenance required may also include the replacement of PV panels, if necessary during the operation lifetime of the facility.

Project component/s	<ul style="list-style-type: none"> » PV panels » Grid connection » Access road and internal roads » Inverter stations » Transformer » Underground cabling » Temporary laydown area » Associated buildings
Potential Impact	» Hazards to NHM personnel and operation and maintenance staff.
Activities/risk sources	» Uncontrolled access to the solar facility and associated infrastructure.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To secure the site against unauthorised entry. » To protect Northam personnel and operation and maintenance staff.

Mitigation: Action/control	Responsibility	Timeframe
Site access must be controlled and no unauthorised persons allowed onto the site.	O&M Operator	Operation
General onsite maintenance of the solar facility during the operation phase must in no way impact or negatively affect the environment, and contractors or other service providers	O&M Operator	Operation

Mitigation: Action/control	Responsibility	Timeframe
providing onsite maintenance must be made aware of this EMPr and the content thereof.		
Post information boards about public safety hazards and emergency contact information.	O&M Operator	Operation
A grievance and consultation plan must be developed and kept on the site at all times during the project's operation. All grievances must be recorded and dealt with in the appropriate grievance channels as outlined in the grievance plan which must be established. Community consultation with surrounding landowners and community members must continue through the project's lifecycle; and be reported on as such in the grievance and consultation plan. This will allow the receipt of - and facilitate resolution of concerns and grievances about the project's social and environmental issues raised by individuals or groups during the project operational period.	O&M Operator	Operation
Should PV panels need to be replaced, the following will apply: <ul style="list-style-type: none"> » Site access must be confirmed for the transportation of the required components and equipment to the site. » Materials and PV 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 PV panels and associated infrastructure is complete, and disturbed areas appropriately rehabilitated. » Recycle components as far as possible. No waste materials may be left on-site following the replacement. » 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 Operator	Operation

Performance Indicator	<ul style="list-style-type: none"> » Site is secure and there is no unauthorised entry. » No operational and maintenance staff and NHM personnel are injured. » No complaints from adjacent landowners/ public.
Monitoring and Reporting	<ul style="list-style-type: none"> » Regular visual inspection of fence for signs of deterioration/forced access. » An incident reporting system must be used to record non-conformances to the EMPr. » A public complaints register must be developed and maintained on site.

OBJECTIVE 2: Protection of sensitive areas, indigenous natural vegetation, fauna (including avifauna), soils, wetland features and maintenance of rehabilitation

Indirect impacts on sensitive areas, vegetation, terrestrial, soils and wetland features during operation could result from maintenance activities and the movement of people and vehicles on site. To ensure the long-

term environmental integrity of the site following the construction, maintenance of the areas rehabilitated post-construction must be undertaken until these areas have successfully re-established.

Project component/s	<ul style="list-style-type: none"> » Areas requiring regular maintenance. » Solar facility, including access road and grid connection. » Areas disturbed during the construction phase and subsequently rehabilitated at its completion.
Potential Impact	<ul style="list-style-type: none"> » Impacts on sensitive areas. » Disturbance to or loss of vegetation and/or habitat. » Alien plant invasion. » Soil erosion and pollution. » Impacts on wetland features. » Environmental integrity of site undermined resulting in erosion, compromised land capability and the requirement for on-going management intervention.
Activity/Risk Source	<ul style="list-style-type: none"> » Movement of employee vehicles within and around site.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Maintain minimised footprints of disturbance of vegetation/ habitats on-site. » Ensure and encourage plant regrowth in non-operational areas of post-construction rehabilitation. » Minimise soil erosion and pollution.

Mitigation: Action/Control	Responsibility	Timeframe
The area around the project, including the internal access roads, must regularly be monitored to detect early signs of soil erosion on-set.	O&M Operator	Operation
If soil erosion is detected, the area must be stabilised using geo-textiles and facilitated re-vegetation.	O&M Operator	Operation
Maintenance must be undertaken regularly on all vehicles and maintenance machinery to prevent hydrocarbon spills.	O&M Operator	Operation
No domestic and other waste must be left at the site and must be transported with the maintenance vehicles to an authorised waste dumping area.	O&M Operator	Operation
Regularly monitor areas alongside the roads, parking area and workshop for any signs of oil, grease and fuel spillage; or the presence of waste.	O&M Operator	Operation
Where possible, existing access routes and walking paths must be made use of.	O&M Operator	Operation
No storage of vehicles or equipment will be allowed outside of the designated project area.	O&M Operator	Operation
No trapping, killing, or poisoning of any wildlife is to be allowed. Signs must be put up to enforce this.	O&M Operator	Operation
All outside lighting should be directed away from highly sensitive areas.	O&M Operator	Operation
A speed limit of 40km/h must be put in place to reduce erosion.	O&M Operator	Operation
Activities associated with operation must not encroach on identified sensitive areas (refer to Figure 2.3 of this EMPr).	O&M Operator	Operation
Any fauna directly threatened by the operation and maintenance activities must be removed to a safe location by a suitably qualified person.	O&M Operator	Operation

Mitigation: Action/Control	Responsibility	Timeframe
Regular monitoring for alien plants within the project area and adjacent areas which receive runoff from the facility must be undertaken, as these are also likely to be prone to invasion problems.	O&M Operator	Operation
Regular alien clearing must be conducted, using the best-practice methods for the species concerned.	O&M Operator	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 Operator	Operation
To increase general faunal protection, the use of any pesticide in the solar facility area must be prohibited.	O&M Operator	Operation
Noise and disturbance on the site must be kept to a minimum during operation and maintenance activities.	O&M Operator	Operation
Heat generated from the substation must be monitored, to ensure it does not negatively affect the local fauna, and the substation must be appropriately fenced to minimise the potential for impact on local fauna	O&M Operator	Operation
No plant species, whether indigenous or exotic, should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.	O&M Operator	Operation
Promote water infiltration into the ground beneath the solar panels. A covering of soil and grass (regularly cut and maintained) below the solar panels is ideal for infiltration. If not feasible, then gravel is preferable over concrete or paving.	O&M Operator	Operation
Stormwater leaving the project area should not be concentrated in a single exit drain but spread across multiple drains around the area, each fitted with energy dissipaters (e.g. slabs of concrete with rocks cemented in).	O&M Operator	Operation
A stormwater management must be implemented for the duration of the operational phase.	O&M Operator	Operation
Avoid excessively compacting the ground beneath the solar panels.	O&M Operator	Operation
Where possible, minimise the use of surfactants to clean solar panels and herbicides to control vegetation beneath the panels. If surfactants and herbicides must be used, do so well prior to any significant predicted rainfall events.	O&M Operator	Operation
Undertake stormwater run-off and discharge water quality monitoring.	O&M Operator	Operation

Performance Indicator	<ul style="list-style-type: none"> » No further disturbance to vegetation or terrestrial faunal habitats. » No soil erosion and pollution problems resulting from operational activities within the solar facility. » Low abundance of alien plants within affected areas. » Maintenance of a ground cover that resist erosion. » Continued improvement of rehabilitation efforts. » No impacts to wetland features.
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Monitoring	<ul style="list-style-type: none"> » 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. » Annual monitoring with records of alien species presence and clearing actions. » Annual monitoring with records of erosion problems and mitigation actions taken with photographs.
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OBJECTIVE 3: Minimise dust and emissions to air

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 creation.

Project Component/s	<ul style="list-style-type: none"> » Gravel roads and surfaces » On-site vehicle movement
Potential Impact	<ul style="list-style-type: none"> » Dust and particulates from vehicle movement to and on-site. » Release of minor amounts of air pollutants (for example NO₂, CO and SO₂) from vehicles.
Activities/Risk Sources	<ul style="list-style-type: none"> » Re-entrainment of deposited dust by vehicle movements. » Wind erosion from unsealed roads and surfaces. » Fuel burning vehicle engines.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure emissions from all vehicles are minimised, where possible. » To minimise nuisance to the community from dust emissions and 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 measures on a regular basis in any exposed surfaces.	O&M Operator	Operation
Revegetation of cleared areas as soon as practically feasible.	O&M Operator	Operation
Speed of vehicles must be restricted on site to 40km/hr.	O&M Operator	Operation
Vehicles and equipment must be maintained in a roadworthy condition at all times.	O&M Operator	Operation

Performance Indicator	<ul style="list-style-type: none"> » No complaints 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	<ul style="list-style-type: none"> » Immediate reporting by personnel of any potential or actual issues with nuisance or dust to the Plant Manager. » A complaints register must be maintained, in which any complaints will be logged, and thereafter investigated and, where appropriate, acted upon. » An incident reporting system must be used to record non-conformances to the EMPr.

OBJECTIVE 4: 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:

- » 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 construction commencing.
- » 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 I**):

Project Component/s	<ul style="list-style-type: none"> » PV Array. » Associated buildings
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 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 Operator	Operation
Provide fire-fighting training to selected operation and maintenance staff.	O&M Operator	Operation
Ensure that appropriate communication channels are established to be implemented in the event of a fire.	O&M Operator	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.).	O&M Operator	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 Operator	Operation
Contact details of emergency services should be prominently displayed on site.	O&M Operator	Operation
A fire management plan must be implemented, to restrict the impact fire might have on the surrounding areas.	O&M Operator	Operation

Performance Indicator	<ul style="list-style-type: none"> » Firefighting equipment and training provided before the operation phase commences. » Appropriate fire breaks in place.
Monitoring	<ul style="list-style-type: none"> » The O&M Operator must monitor indicators listed above to ensure that they have been met.

OBJECTIVE 5: Maximise local employment, skills development and business opportunities associated with the construction phase

Project Component/s	<ul style="list-style-type: none"> » Operation and maintenance activities associated with the facility. » Availability of required skills in the local communities for the undertaking of the operation and maintenance activities.
Potential Impact	<ul style="list-style-type: none"> » The opportunities and benefits associated with the creation of local employment and business should be maximised.
Activities/Risk Sources	<ul style="list-style-type: none"> » 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.
Enhancement: Target/Objective	<ul style="list-style-type: none"> » The Developer 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
Where feasible, effort must be made to employ locally, to create maximum benefit for the communities.	Developer	Operation
To maximise the positive impact, it is suggested that the Developer provide training courses for employees, where feasible, to ensure that employees gain as much as possible from the work experience.	Developer	Operation
Facilitate the transfer of knowledge between experienced employees and the staff.	Developer	Operation
Perform a skills audit to determine the potential skills that could be sourced in the area.	Developer	Operation
Effort should be made to use locally sourced inputs where feasible, to maximize the benefit to the local economy.	Developer	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	Operation

Performance Indicator	<ul style="list-style-type: none"> » 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.
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	<ul style="list-style-type: none"> » 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	<ul style="list-style-type: none"> » Developer must keep a record of local recruitments and information on local labour to be shared with the external auditor for reporting purposes.

OBJECTIVE 6: Appropriate handling and management of hazardous substances, waste and dangerous goods

The project's operation will involve the storage of chemicals and hazardous substances; and 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	<ul style="list-style-type: none"> » PV facility. » Associated infrastructure.
Potential Impact	<ul style="list-style-type: none"> » 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	<ul style="list-style-type: none"> » Transformers, switchgear and supporting equipment. » Fuel and oil storage.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » 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
Hazardous substances (such as used/new transformer oils, etc.) must be stored in sealed containers, within a clearly demarcated designated area.	O&M Operator	Operation
A hydrocarbon spill management plan must be implemented, to ensure that any chemical spill out or over does not run into the surrounding areas.	O&M Operator	Operation
Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use.	O&M Operator	Operation
All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers.	O&M Operator	Operation
Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	O&M Operator	Operation and maintenance
Storage areas for hazardous substances must be appropriately sealed and banded.	O&M Operator	Operation
All structures and/or components replaced during maintenance activities must be appropriately disposed of at an appropriately	O&M Operator	Operation

Mitigation: Action/Control	Responsibility	Timeframe
licensed waste disposal site or sold to a recycling merchant for recycling.		
All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.	O&M Operator	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 Operator	Operation and maintenance
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 Operator	Operation
Waste handling, collection, and disposal operations must be managed and controlled by a waste management contractor.	O&M Operator	Operation
Used oils and chemicals: » 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.	O&M Operator	Operation
General waste must be recycled where possible or disposed of at an appropriately licensed landfill.	O&M Operator	Operation
Hazardous waste (including hydrocarbons) and general waste must be stored and disposed of separately.	O&M Operator	Operation
All servicing and re-fuelling of machines and equipment must either take place off-site, or in controlled and bunded working areas.	O&M Operator	Operation
Separation and recycling of different waste materials should be supported.	O&M Operator	Operation
Immediately report significant spillages and initiate an environmental site assessment for risk assessment and remediation if necessary.	O&M Operator	Operation
Suitable temporary solid waste facilities are to be incorporated into the design to prevent unsanitary conditions. These are to be weekly cleared and waste collected by the local waste management department.	Developer O&M Operator	Operation
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	O&M Operator/ waste management contractor	Operation phase
No waste may be burned or buried on site.	O&M Operator	Operation phase

Performance Indicator	<ul style="list-style-type: none"> » 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.
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	» No contamination of soil.
Monitoring	<ul style="list-style-type: none"> » Waste collection must be monitored on a regular basis. » Waste documentation must be completed and available for inspection. » An incidents/complaints 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 operator. » All appropriate waste disposal certificates accompany the monthly reports.

8.2. Monitoring Programme: Operation Phase of the Northam Solar PV Facility

OBJECTIVE 7: To monitor the performance of the control strategies employed against environmental objectives and standards

A monitoring programme must be in place to ensure conformance with the EMPr; and monitor any environmental issues and impacts which have not been accounted for in the EMPr that could result in significant environmental impacts for which corrective action is required. An internal environmental audit must be conducted every 6 months and an external audit must be conducted once a year, to confirm compliance with the requirements of all environmental permits (including the EA, once issued) for the project, this EMPr, and all relevant legislation. The results of the audit reports must be made available to LDEDET and the relevant authorities on request and be part of monitoring and audit reports. An annual audit report must be compiled and submitted to LDEDET. The aim of the auditing process would be to routinely 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, to enhance the efficacy of environmental management on site.
- » Aid in the communication and feedback to authorities and stakeholders.

CHAPTER 9: MANAGEMENT PROGRAMME: DECOMMISSIONING

The facility's lifespan is expected to be ~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. It could be extended depending on the condition of the infrastructure. An assessment will be undertaken prior to the end of the facility's lifecycle, to determine whether it should be decommissioned or if its operation should continue.

It is most likely that decommissioning activities of the infrastructure of the facility discussed in the BA process would comprise of its disassembly, removal and disposal. 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 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 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 stormwater management systems.
- » Maintain and monitor all rehabilitated areas following revegetation 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 project area 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 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.
- » The competent authority may grant approval to the owner not to remove the landscaping and underground foundations.
- » The project area must be seeded with locally sourced indigenous vegetation (unless otherwise dictated by the future land use) to allow revegetation.
- » 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 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 to determine if these could be used post-closure. 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 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.
- » 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 project 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 ecosystem processes to ensure that a sustainable land use can be established without requiring fertilizer additions.
- » 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 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.
- » Faunal re-colonisation.

**APPENDIX A:
FACILITY LAYOUT AND SENSITIVITY MAPS**

APPENDIX B:
GRIEVANCE MECHANISM FOR COMPLAINTS AND ISSUES

**APPENDIX C:
ALIEN PLANT AND OPEN SPACE MANAGEMENT PLAN**

**APPENDIX D:
RE-VEGETATION AND HABITAT REHABILITATION PLAN**

**APPENDIX E:
PLANT RESCUE AND PROTECTION PLAN**

**APPENDIX F:
TRAFFIC AND TRANSPORTATION MANAGEMENT PLAN**

**APPENDIX G:
STORMWATER AND EROSION MANAGEMENT PLAN**

**APPENDIX H:
WASTE MANAGEMENT PLAN**

**APPENDIX I:
EMERGENCY PREPAREDNESS, RESPONSE AND FIRE
MANAGEMENT PLAN**

**APPENDIX J:
CURRICULUM VITAE OF THE PROJECT TEAM**

**APPENDIX K:
APPLICABLE LEGISLATION**

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
National Legislation			
<p>Constitution of the Republic of South Africa (No. 108 of 1996)</p>	<p>In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that:</p> <p><i>“Everyone has the right –</i></p> <ul style="list-style-type: none"> » <i>To an environment that is not harmful to their health or well-being, and</i> » <i>To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:</i> <ul style="list-style-type: none"> * <i>Prevent pollution and ecological degradation,</i> * <i>Promote conservation, and</i> <p><i>Secure ecologically sustainable development and use of natural resources, while promoting justifiable economic and social development.”</i></p>	<p>Applicable to all authorities</p>	<p>The Constitution has no permitting requirements. The application of the Environmental Right however implies that environmental impacts associated with proposed developments are considered separately and cumulatively. It is also important to note that the “right to an environment clause” includes the notion that justifiable economic and social development should be promoted, through using natural resources and ecologically sustainable development.</p>
<p>National Environmental Management Act (Act No 107 of 1998)</p>	<p>In terms of the Duty of Care Provision in section 28(1), NHM must ensure that reasonable measures are taken throughout the lifecycle of this project, to ensure that any pollution or degradation of the environment associated with it is avoided, stopped or minimised.</p> <p>In terms of NEMA, it is the legal duty of a project proponent to consider a project holistically, and the cumulative effect of a variety of impacts.</p> <p>Considering the capacity of the proposed solar PV facility (i.e., contracted capacity of 10MW) and the triggering of Activity 1 of</p>	<p>Limpopo Department of Economic Development, Environment and Tourism (LDEDET) – competent authority</p>	<p>The listed activities triggered by the proposed solar PV facility have been identified and assessed as part of the BA process currently underway for the project. The BA process will culminate in the submission of a final BA Report to LDEDET for approval.</p>

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
National Environmental Management Act (Act No 107 of 1998)	<p>Listing Notice 1 (GN R.983), a Basic Assessment process is required in support of the application for EA.</p> <p>In terms of the “Duty of Care and Remediation of Environmental Damage” provision in Section 28(1) of NEMA, every person who causes, has caused or may cause significant pollution or environmental degradation must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.</p> <p>Under NEMA, it is the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.</p>	LDEDET	While no permitting or licensing requirements arise directly by virtue of the proposed project through this section, it finds application through the consideration of potential cumulative, direct, and indirect impacts. It will continue to apply throughout the lifecycle of the project.
Environment Conservation Act (Act No 73 of 1989) (ECA)	The Noise Control Regulations in terms of Section 25 of the ECA are applicable for noise control in the Limpopo Province.	LDEDET TLM	Noise impacts are expected to be associated with the project's construction phase. Considering the project area's location in relation to residential areas and provided that appropriate mitigation measures are implemented, construction noise is unlikely to present a significant intrusion to the local community. There is therefore no requirement for a noise permit in terms of this legislation.
National Water Act (Act No 36 of 1998)	A water use listed under Section 21 of the NWA must be licensed with the Regional DHSWS, unless it is listed in Schedule 1 of the NWA (i.e. is an existing lawful use); is permissible under a General Authorisation	Regional Department of Human Settlements, Water and Sanitation (DHSWS)	A WUL or GA is required to be obtained if water resources are impacted on. The project area is located within the 500m regulated area of one wetland feature (i.e., a seepage wetland). A General Authorisation for the project will therefore need to be registered with the DHSWS

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	<p>(GA); or if a responsible authority waives the need for a water use licence (WUL).</p> <p>Water use is defined broadly and includes consumptive and non-consumptive water uses; taking and storing water; activities which reduce stream flow; waste discharges and disposals; controlled activities (activities which impact detrimentally on a water resource); altering a watercourse; removing water found underground for certain purposes; and recreation.</p> <p>Consumptive water uses may include taking water from a water resource (Section 21(a)) and storing water (Section 21(b)).</p> <p>Non-consumptive water uses may include impeding or diverting of flow in a watercourse (Section 21(c)); and altering of bed, banks or characteristics of a watercourse (Section 21(i)).</p>		<p>for water uses 21(c)&21(i); however, the process will only be completed once a positive EA has been received.</p>
<p>National Water Act (Act No 36 of 1998) (NWA)</p>	<p>In terms of Section 19, NHM must ensure that reasonable measures are taken throughout the project's lifecycle to prevent and remedy pollution to water resources from occurring, continuing, or recurring.</p>	<p>Regional DHSWS</p>	<p>This section will apply with respect to the potential impact on the seepage wetland located just outside the broader study area but within the 500m regulated area of the project area, primarily during the construction phase (i.e., pollution from construction vehicles).</p>
<p>Minerals and Petroleum Resources Development Act (Act No 28 of 2002) (MPRDA)</p>	<p>In accordance with the MPRDA, a mining right permit is required where a mineral in question is to be mined, including the mining of materials from a borrow pit.</p> <p>Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary</p>	<p>Department of Mineral Resources and Energy (DMRE)</p>	<p>NHM is the holder of a mining right over the project area.</p> <p>In terms of Section 53 of the MPRDA, approval is required from the Minister of Mineral Resources and Energy to ensure that the</p>

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	<p>to any object of the Act, or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner.</p>		<p>proposed development does not sterilise a mineral resource that might occur on site.</p> <p>In this case, the project area is within the Zondereinde Mine Area and there is presumably no plan to conduct opencast operations on the project area. None of the MPRDA's objectives will be impeded by the solar PV facility and accordingly, Section 53 consent is not required.</p>
<p>National Environmental Management: Air Quality Act (Act No 39 of 2004) (NEM:AQA)</p>	<p>The National Dust Control Regulations (GNR 827), published under Section 32 of NEM:AQA, prescribe the general measures for dust control in all areas, and a standard for acceptable dustfall rates in residential and non-residential areas.</p> <p>In accordance with these Regulations any person who conducts any activity in such a way as to give rise to dust in quantities and concentrations that may exceed the dustfall standard set out in Regulation 3 must, upon receipt of a notice from the air quality officer, implement a dustfall monitoring programme.</p> <p>Any person who has exceeded the dustfall standard must, within three months after submission of the dustfall monitoring report, develop and submit a dust management plan to the air quality officer for approval.</p>	<p>LDEDET Waterberg District Municipality</p>	<p>If the project results in the generation of excessive levels of dust, a dustfall monitoring programme would be required for the project. Dustfall monitoring results from the dustfall monitoring programme would then need to be included in a dust monitoring report, and a dust management plan would need to be developed.</p>
<p>National Heritage Resources Act (Act No 25 of 1999) (NHRA)</p>	<p>Relevant sections include- Section 7 stipulates assessment criteria and categories of heritage resources according to their significance.</p>	<p>South African Heritage Resources Agency (SAHRA) Limpopo Heritage Resources Authority</p>	<p>A HIA (including palaeontology) was undertaken for the project as per the requirements of Section 38 of the NHRA (refer to Appendix D4).</p>

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	<p>Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites.</p> <p>Section 36 provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority.</p> <p>Section 38(1) lists activities which require developers or any person who intends to undertake a listed activity to obtain consent from the responsible heritage resources authority through the procedure set out in section 38. This is not required where a basic assessment is undertaken under NEMA, including a HIA, and SAHRA's requirements are considered the competent authority when granting the EA.</p> <p>Section 44 requires the compilation of a Conservation Management Plan and a permit from SAHRA for the presentation of archaeological sites as part of public enjoyment, education, research, tourism attraction.</p>		<p>No heritage resources of significance were identified within the project area.</p> <p>No palaeontological resources were identified within the project area, and no impacts to palaeontological heritage are expected, as the broader study area is underlain by Pyramid Gabbro-Norite, which has zero palaeontological sensitivity.</p> <p>Should a heritage resource be impacted upon, a permit may be required from SAHRA or Limpopo Heritage Resources Authority, in accordance with of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668).</p>
National Environmental Management: Biodiversity Act (Act No 10 of 2004)(NEM:BA)	<p>Section 53 of NEM:BA provides for the MEC / Minister to identify any process or activity in a listed ecosystem as a threatening process.</p> <p>Three government notices have been published in terms of Section 56(1) of NEM:BA as follows:</p>	DFFE and LDEDET	<p>Under NEM:BA, a permit would be required for any activity that is of a nature that may negatively impact on the survival of a listed protected species.</p> <p>A Biodiversity Impact Assessment has been undertaken as part of the BA process (refer to Appendix D1). No protected species which require a permit under NEM:BA were identified within the project area.</p>

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	<ul style="list-style-type: none"> » Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable, and protected species (GNR 151), as amended in 2020 (GN627). » TOPS Regulations (GNR 152). <p>NEM:BA provides for listing threatened or protected ecosystems in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process, including the: purpose and rationale for listing ecosystems; criteria used to identify listed ecosystems; implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (NEM:BA: National list of ecosystems that are threatened and in need of protection, (Government Gazette 1002, 9 December 2011, GG 34809.</p>		
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted activity involving a specimen of an AIP without a permit issued in terms of Chapter 7 of NEM:BA; and that a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out.	DFFE and LDEDET	The BWIA (refer to Appendix D1) was undertaken as part of the BA process to identify any AIPs present on site. Four (4) AIPs listed under the Alien and Invasive Species List 2020 as Category 1b were recorded within the study area, namely <i>Datura ferox</i> , <i>Flaveria bidentis</i> , <i>Jacaranda mimosifolia</i> and <i>Xanthium spinosum</i> .

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	Applicable, and exempted AIP are contained within the Alien and Invasive Species List 2020, GNR 1003 of Government Gazette No. 43726.		
<p>Conservation of Agricultural Resources Act (Act No 43 of 1983) (CARA) and</p> <p>Regulations (GN R1048) (CARA Regulations)</p>	<p>Section 5 of CARA provides for the prohibition of the spreading of weeds.</p> <p>Relevant sections include:</p> <p>Regulation 15 provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur.</p> <p>Regulation 15E provides requirements and methods to implement control measures for different categories of AIPs.</p>	<p>Department of Agriculture, Land Reform and Rural Development (DALRD)</p>	<p>CARA will apply throughout the project's lifecycle. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented.</p> <p>In terms of Regulation 15E, where Category 1, 2 or 3 plants occur a land user is required to control them by means of one or more of the following methods:</p> <ul style="list-style-type: none"> » Uprooting, felling, cutting or burning. » Treatment with a weed killer that is registered for use in connection with such plants, in accordance with the directions for the use of such a weed killer. » Biological control, carried out in accordance with the stipulations of the Agricultural Pests Act (No. 36 of 1983), the ECA and any other applicable legislation. » Any other method of treatment recognised by the executive officer that has as its object the control of plants concerned, subject to the provisions of sub-regulation 4. » A combination of one or more of the methods prescribed, save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods if the agents are destroyed or become ineffective.

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
National Forests Act (Act No. 84 of 1998) (NFA)	<p>According to the NFA, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the NFA was published in GNR 536.</p> <p>The prohibitions provide that <i>"no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister"</i>.</p>	DFFE	<p>A permit would need to be obtained for any protected trees that are affected by the project.</p> <p>The BWIA included a site visit which allowed for the identification of protected trees that may require a license in terms of the NFA within the project area (refer to Appendix D1). Two (2) species of protected trees under the NFA were observed in the study area, namely <i>Sclerocarya birrea. subsp. caffra</i> (Marula) and <i>Combretum imberbe</i> (Leadwood).</p> <p>Should individuals of these tree species be impacted directly by the project, a permit from LDEDET for the removal/relocation thereof will need to be applied for.</p>
National Veld and Forest Fire Act (Act 101 of 1998) (NVFFA)	<p>Chapter 4 places a duty on owners to prepare and maintain firebreaks; the procedure in this regard; and the role of adjoining owners and the fire protection association. The applicant must ensure that: firebreaks are wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land; it does not cause soil erosion; and it is reasonably free of inflammable material capable of carrying a veldfire across it.</p> <p>Chapter 5 places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn, or from whose land it may spread, must have such equipment; protective clothing; and</p>	DFFE	<p>Whilst the NVFFA has no permitting or licensing requirements, it will be applicable during the construction and operation of the project for the preparation and maintenance of firebreaks; and provision of appropriate equipment and trained personnel for firefighting purposes.</p>

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	<p>trained personnel for extinguishing fires. Such owners must ensure that in their absence responsible persons are present on or near their land who, in the event of fire, will extinguish it, or assist in doing so, and take all reasonable steps to alert adjoining landowners and the relevant fire protection association, if any.</p>		
<p>Hazardous Substances Act (Act No 15 of 1973)</p>	<p>This Act regulates the control of: (i) substances that may cause injury, ill health, or death (due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances); and (ii) certain electronic products. It provides for the: rating of such substances or products by the degree of danger; and prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.</p> <ul style="list-style-type: none"> » <i>Group I and II:</i> Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance. » <i>Group IV:</i> any electronic product, and » <i>Group V:</i> any radioactive material. <p>The use, conveyance, or storage of any hazardous substance (such as distillate fuel)</p>	<p>Department of Health</p>	<p>It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may be on the project area and in what operational context they are used, stored or handled. If applicable, a licence would be required to be obtained from the Department of Health.</p>

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<p>National Environmental Management: Waste Act, 2008 (Act No 59 of 2008) (NEMWA)</p>	<p>is prohibited without an appropriate licence being in force.</p> <p>The Minister may by notice in the <i>Gazette</i> publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment.</p> <p>The Minister may amend the list by –</p> <ul style="list-style-type: none"> » adding other waste management activities to the list; » removing waste management activities from the list; and » making other changes to the particulars on the list. <p>In terms of the Regulations published in terms of NEMWA (GN 921), a basic assessment or EIA is required to be undertaken for identified listed waste management activities.</p> <p>Any person who stores waste must at least take steps, unless otherwise provided by this NEMWA, to ensure that:</p> <ul style="list-style-type: none"> » the containers in which any waste are stored are intact and not corroded or in any other way rendered unfit for the safe storage of waste; » adequate measures are taken to prevent accidental spillage or leaking. » the waste cannot be blown away; » nuisances, such as odour, visual impacts and breeding of vectors, do not arise; and » environmental pollution and harm to health are prevented. 	<p>DFFE (hazardous waste)</p> <p>LDEDET (general waste)</p>	<p>No waste listed activities are triggered by proposed project, therefore, no Waste Management Licence is required to be obtained.</p> <p>General and hazardous waste handling, storage and disposal will be required during construction and operation. The National Norms and Standards for the Storage of Waste (GNR 926), published under Section 7(1)(c) of NEM:WA, will need to be considered in this regard.</p>

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
National Road Traffic Act (Act No 93 of 1996) (NRTA)	<p>The technical recommendations for highways (TRH 11): “<i>Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads</i>” outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads; and the prescribed procedures in applying for exemption permits are described and discussed.</p> <p>Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts.</p> <p>The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the NRTA and its relevant Regulations.</p>	<p>South African National Roads Agency Limited (national roads)</p> <p>Limpopo Department of Roads and Transport</p>	<p>An abnormal load/vehicle permit may be required to transport the various components to site for construction. These include route clearances and permits for vehicles carrying abnormally heavy or abnormally dimensioned loads; and transport vehicles exceeding the dimensional limitations (length) of 22m. Depending on the trailer configuration and height when loaded, some of the on-site substation components may not meet specified dimensional limitations (height and width).</p>
Astronomy Geographic Advantage Act (Act No. 21 of 2007) (AGA)	<p>The AGA provides for: the preservation and protection of areas within South Africa that are uniquely suited for optical and radio astronomy; intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas; and matters connected thereto.</p>	<p>Department of Science and Technology.</p>	<p>The study area is located within the Limpopo Province and well outside of those areas considered as nationally significant astronomy advantage areas. Therefore, the requirements of AGA are not considered applicable.</p>

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	<p>Chapter 2 of the AGA allows for the declaration of astronomy advantage areas. Chapter 3 pertains to the management and control of astronomy advantage areas, which includes the following:</p> <ul style="list-style-type: none"> » Restrictions on use of radio frequency spectrum in astronomy advantage areas; » Declared activities in core or central astronomy advantage area; » Identified activities in coordinated astronomy advantage area; and » Authorisation to undertake identified activities. 		
<p>Aviation Act (Act No 74 of 1962) 13th amendment of the Civil Aviation Regulations (CARS) 1997</p>	<p>Any communications structure, building or other structure, whether temporary or permanent, which has the potential to endanger aviation in navigable airspace or interfere with the operation of navigation or surveillance systems or Instrument Landing Systems, including meteorological systems for aeronautical purposes, is considered an obstacle and must be submitted to the Commissioner for Civil Aviation for evaluation (refer SA-CAR Part 139.01.33).</p> <p>The following structures require markings:</p> <ul style="list-style-type: none"> » Any structure exceeding 45m above ground level or structures where the top of the structure exceeds 150m above the mean ground level, the mean ground level considered to be the 	<p>South African Civil Aviation Authority (CAA)</p>	<p>This Act will find application during the operation phase of the project. Appropriate marking of project infrastructure >45m above ground level is required to meet the specifications. as detailed in the CAR Regulations Part 139.01.33. An obstacle approval (or confirmation that no approval is required) would be obtained from the South African CAA.</p>

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	<p>lowest point in a 3km radius around such structure.</p> <ul style="list-style-type: none"> » Structures lower than 45m, which are considered as a danger to aviation shall be marked as such when specified. » Overhead wires, cables etc., crossing a river, valley or major roads shall be marked; and, in addition, their supporting towers marked and lighted if an aeronautical study indicates it could constitute a hazard to aircraft. 		
Provincial Legislation			
Limpopo Environmental Management Act (Act No 7 of 2003) (LEMA)	LEMA relates to, <i>inter alia</i> , protected areas, wild and alien animals, professional hunting, aquatic biota and aquatic systems, invertebrates, indigenous plants, preservation of caves and case formations, limited development areas, mountain catchment areas, environmental pollution, and permits, permissions, exemptions, and exclusions.	LDEDET	The BWIA was undertaken as part of the BA process (refer to Appendix D4). Four (4) reptile and one (1) amphibian species protected under LEMA were recorded, namely, <i>Naja annulifera</i> , <i>Trachylepis punctatissima</i> , <i>Lygodactylus capensis</i> , <i>Psammophis mossambicus</i> , <i>Trachylepis varia</i> and <i>Schismaderma carens</i> . Should individuals of these species be impacted directly by the proposed facility, a permit from LDEDET for their removal/relocation † will need to be applied for.