



Appendix 8
Draft EMPr



WONDERHEUVEL SOLAR POWER (PTY) LTD

Proposed Development of the Wonderheuvel Solar Photovoltaic (PV) Energy Facility and Associated Infrastructure near Noupoot in the Northern Cape Province


Draft Environmental Management Programme

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GLOSSARY OF TERMS

Construction Phase: The activities pertaining to the preparation for and the physical construction of the proposed development.

Contractor: Persons/organisations contracted by the Holder of the EA to carry out parts of the work for the proposed development.

Decommissioning: Means 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 recommissioned.

Engineer (E) / Project Manager (PM): Person/ organisation appointed by the Holder of the EA to oversee the work of all consultants, sub-developers, contractors, residents and visitors.

Environmental Control Officer (ECO): Person/organisation appointed by the Holder of the EA who will provide direction to the Project Manager concerning the activities within the Construction one, and who will be responsible for conducting the environmental audit of the project during the construction phase of the project according to the provisions of the Environmental Management Programme.

Environmental Management Programme (EMPr): The EMPr is a detailed plan for the implementation of the mitigation measures to minimise negative environmental impacts during the life-cycle of a project. The EMP contributes to the preparation of the contract documentation by developing clauses to which the contractor must adhere for the protection of the environment. The EMPr specifies how the construction of the project is to be carried out and includes the actions required for the Post-Construction Phase to ensure that all the environmental impacts are managed for the duration of the project's life-cycle.

Operational Phase (Post Construction): The period following the Construction Phase, during which the proposed development will be operational.

Pre-Construction Phase: The period prior to commencement of the Construction Phase, during which various activities associated with the preparation for the Construction Phase will be undertaken.

Rehabilitation: Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was in before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement re-vegetation of a disturbed area and the insurance of a stable land surface. Re-vegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.

Site Manager: The person, representing the Contractor, responsible for all the Contractor's activities on the site including supervision of the construction staff and activities associated with the Construction Phase. The Site Manager will liaise with the Project Manager in order to ensure that the project is conducted in accordance with the Environmental Management Programme

ABBREVIATIONS

CLO	Community Liaison Officer
CMP	Contractor Project Manager
DEA	Department of Environmental Affairs
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EO	Environmental Officer
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
ELO	Environmental Liaison Officer
EMPr	Environmental Management Programme
EP	Equator Principles
HOD	Head of Department
IFC	International Finance Corporation (World Bank Group)
I&APs	Interested and Affected Parties
MC	Main Contractor
MSDS	Material Safety Data Sheets
NEMA	National Environmental Management Act
OECD	Organisation for Economic Co-operation and Development
PM	Project Manager
PS	Performance Standards
SAHRA	South African Heritage Resources Agency

WONDERHEUVEL SOLAR POWER (PTY) LTD

PROPOSED DEVELOPMENT OF THE WONDERHEUVEL SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE NEAR NOUPOORT IN THE NORTHERN CAPE PROVINCE

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

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1 INTRODUCTION

Wonderheuvél Solar Power (Pty) Ltd (hereafter referred to as Wonderheuvél Solar Power) (DEA Reference: 14/12/16/3/3/2/1134) is proposing to construct a Photovoltaic (PV) Energy Facility of up to 400 megawatt (MW) near Noupoort in the Umsobomvu Local Municipality, which falls within the Pixley ka Seme District Municipality in the Northern Cape Province of South Africa (Figure 1). Figure 2 shows the preferred layout of the PV Energy Facility in relation to all sensitivities identified by specialist impact assessments.

Wonderheuvél Solar Power energy facility forms one (1) of three (3) solar PV energy facilities that are being proposed on adjacent farms as part of the greater Umsobomvu PV project (**Figure 1**). The proposed developments which form part of the greater Umsobomvu PV project include the following:

- Mooi Plaats Solar PV – **DEA Reference Number: 14/12/16/3/3/2/1134** (part of a separate on-going EIA process); and
- Paarde Valley Solar PV – **DEA Reference Number: 14/12/16/3/3/2/1136** (part of a separate on-going EIA process).

This Environmental Management Programme (EMPr) has been compiled in line with the recommendations in the above-mentioned EIA, appendix 8 of the NEMA EIA Regulations as well as from issues identified by SiVEST.

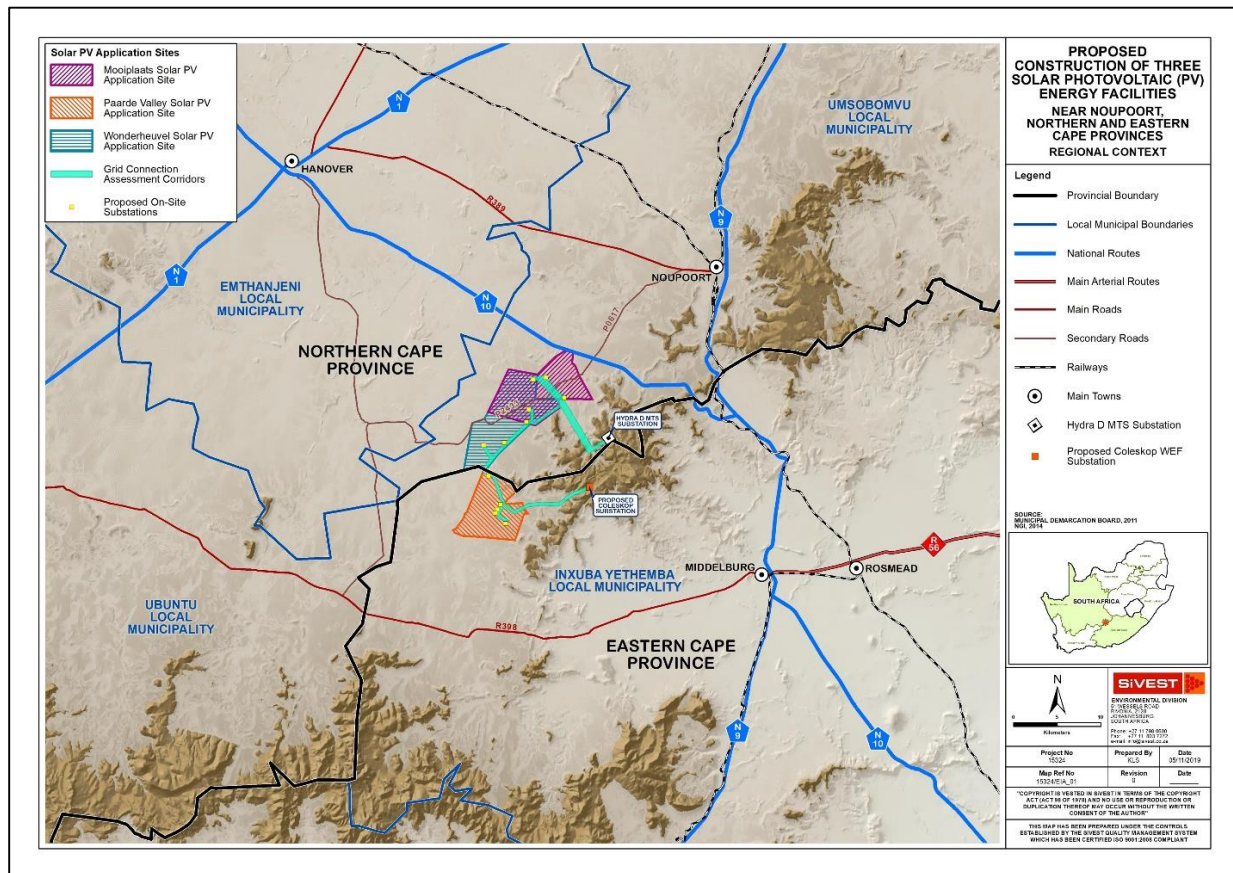


Figure 1: Regional Context Map

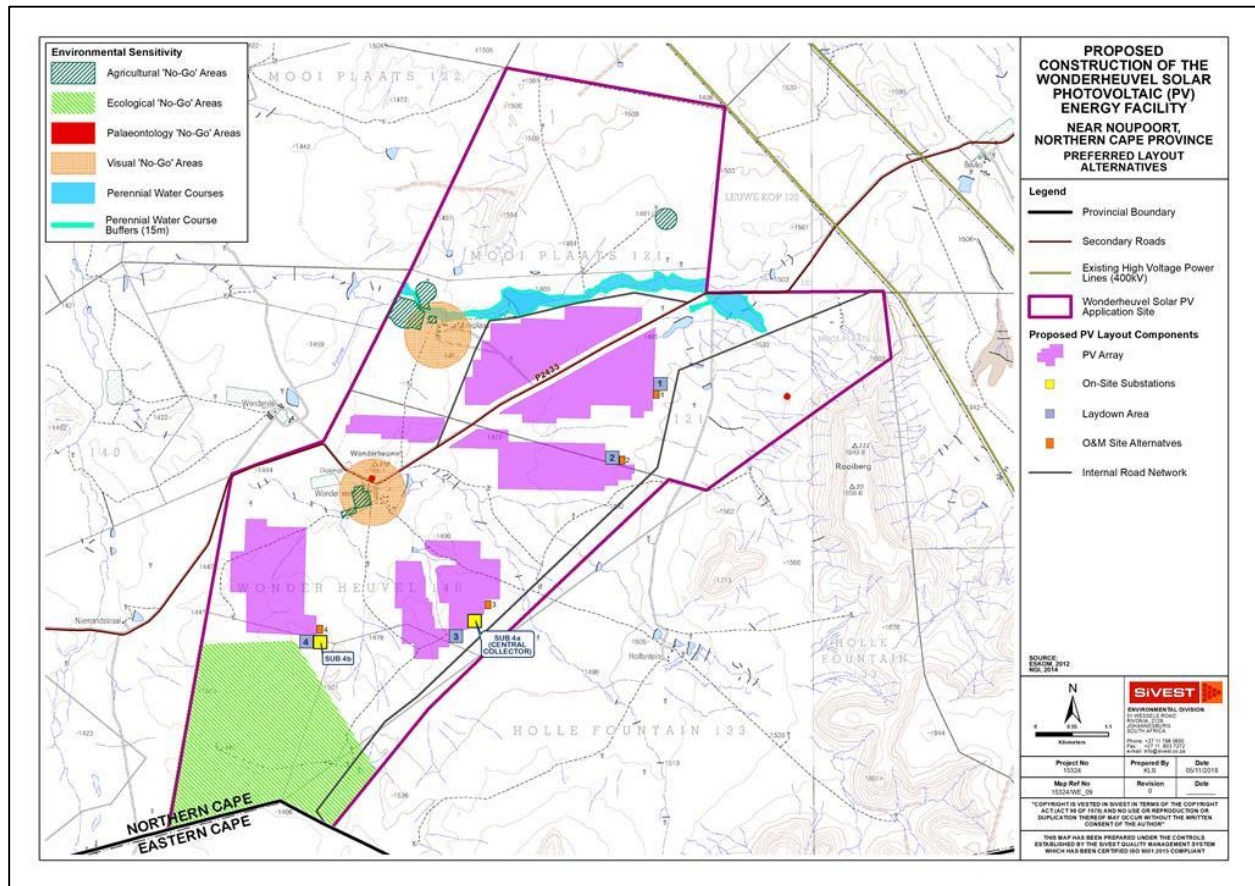


Figure 2: Preferred Layout and Sensitivity Map

1.1 Site Description

The entire study area is largely in a natural state, but used for animal production. There is well-established farm infrastructure on each landholding, including homesteads, farm buildings, camps, dams, small areas of cultivated lands, and some stands of exotic trees used as shade and wind-screens. There are also access roads, narrow gravel roads, jeep tracks and fences. The vegetation in the study area is used primarily for livestock grazing and is affected to some degree by this usage, but not to the extent that any severe degradation was noted on-site. This natural pattern extends beyond the study area in all directions and gives the general area a sense of being relatively untransformed and largely natural.

The study area is situated in an area along the boundary between plains and mountain ranges, with moderately to steeply sloping topography in the south-eastern parts, and relatively flat to undulating terrain in the remainder of the area. The elevation on-site varies from 1430 to 1855m above sea level, an elevation difference of approximately 425m across a distance of around 15,0km. The mountains rise fairly steeply from the surrounding plains resulting in much steeper gradients along this interface. The mountain areas are incised by steep valleys and are dissected and variable in topography. The plains are relatively flat to undulating, but with regular low ridges and koppies to break the landscape, some isolated and others linked into long, low ridges.

The development area is underlain by a series of Karoo sandstones, mudstones and shales, deposited under fluvial environments of the Adelaide Subgroup that forms part of the Beaufort Group. The Beaufort group overlays the Ecca Group and consists essentially of sandstones and shales. The Beaufort Group covers a total land surface area of approximately 200 000km² in South Africa and is the first fully continental sequence in the Karoo Supergroup. The Beaufort Group is divided into the Adelaide subgroup and the overlying Tarkastad subgroup (Johnson et al., 2006).

The study area is within an arid environment. Rainfall for the site is given as a low 378 mm per annum (The World Bank Climate Change Knowledge Portal, 2015). Rainfall can potentially occur at any time of the year, but is more likely in summer to late-summer, most often from October to April. Winters can be cold, with mean minimum temperatures approaching zero in July. Winter frost is common and occurs on average 30 days per year. In contrast, summers can be very hot with mean maximum temperatures in January exceeding 30 °C.

1.2 Project Team

SiVEST SA (Pty) Ltd has been appointed by Wonderheuveld Solar PV Energy Facility (Pty) Ltd the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA) for the proposed construction of the Wonderheuveld Wind Energy Facility and associated infrastructure. As per the requirements of the EIA Regulations 2014 (as amended), the project team is provided in Table 5 and the details and level of expertise of the persons who prepared the EMP are provided in Table 6 below.

Table 5: Project Team

Name	Organisation
Compilers	
Stephan Jacobs	SiVEST
Liandra Scott-Shaw	SiVEST
Merri Schwartz	SiVEST
Specialist Input	
David Hoare	Terrestrial Ecology
Merri Schwartz	GIS, Mapping and Visual
Chris van Rooyen	Avifauna
Steve Burton	Surface Water
Johann Lan	Agriculture & Soils
Salversan Mullen and Cecilia Canahai	Geotechnical
Sanja Erwee	Visual Peer Reviewer
Wouter Fourie	Heritage, Archaeology & Cultural Landscape
Eliene Butler	Palaeontology
Neville Bews	Socio-Economic
Merchand Le Maitre	Transportations

Table 6: Expertise of the EAP

Environmental Assessment Practitioner (EAP)	SiVEST SA (Pty) Ltd - Stephan Jacobs
Contact Details	stephan.j@sivest.co.za
Qualifications	B.Sc. Environmental Sciences (undergraduate) and B.Sc. (Hons) Environmental Management and Analysis
Expertise	Stephan joined SiVEST in May 2015 and holds the position of Environmental Consultant in the Johannesburg and Pretoria offices. Stephan specialises in the field of Environmental Management and has been extensively involved in Environmental Impact Assessment (EIA) and Basic Assessment (BA) processes for various types of projects / developments, particularly energy generation and electrical distribution projects. Stephan thus has vast experience with regards to the compilation of EIAs and BAs. Additionally, Stephan has extensive experience in undertaking public participation and stakeholder engagement processes. Stephan has also assisted extensively in the undertaking of fieldwork and the compilation of reports for specialist studies such as Surface Water and Visual Impact Assessments. Stephan also has experience in Environmental Compliance and Auditing and has acted as an Environmental Control Officer (ECO) for several infrastructure projects.
Lead Project Coordinator / Environmental Consultant	SiVEST SA (Pty) Ltd – Liandra Scott-Shaw
Contact Details	liandra.s@sivest.co.za
Qualifications	B.Sc. Biological Science and B.Sc. (Hons) Ecological Science
Expertise	Liandra joined SiVEST in January 2014 and holds the position of Environmental Consultant in the Pietermaritzburg office. Liandra specialises in the field of Vegetation Ecology and Environmental Management and has been involved in the compilation of Environmental Impact Assessments (EIAs) and Basic Assessments (BAs) and specialist vegetation studies since joining SiVEST.

CV's of SiVEST personnel are attached in **Annexure A** of the EIA report.

2 LEGISLATIVE REQUIREMENTS FOR WONDERHEUVEL SOLAR POWER PV

Table 1: Compliance with National Environmental Management Act, 1998 (Act No. 107 of 1998) and Environmental Impact Regulations (2017) Content of Environmental Management Programmes (Appendix 4)

Requirements of Appendix 4 – GN R326 EIA Regulations of 7 April 2017	Section of Report
1. (1) An EMP must comply with section 24N of the Act and include— (a) details of—	Details of the EAP and full project team are in Section 1.2 and CVs are included in Annexure A.

<p>(i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;</p>	
<p>(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;</p>	<p>Detailed descriptions of the aspects of the activities that are covered by the EMPr can be found in Sections 4 and 5.</p>
<p>(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;</p>	<p>This map can be found in Section 1, Figure 2. It shows the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;</p>
<p>(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; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;</p>	<p>Descriptions 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 can be found in Section 8.</p>
<p>(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; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;</p>	<p>Descriptions of proposed impact management actions, identifying the manner in which the impact management outcomes above are contemplated can be found in Section 8 and in Section 9.</p>
<p>(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);</p>	<p>Refer to Sections 8 and 9 which outline High Level monitoring methods.</p>
<p>(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);</p>	<p>Refer to Sections 8 and 9 which outline High Level monitoring methods including the frequency monitoring is to be implemented.</p>

(i) an indication of the persons who will be responsible for the implementation of the impact management actions;	Refer to Section 7 which outlines the roles and responsibilities for the Proposed Solar farm.
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Refer to Sections 8 and 9 which outline the time periods monitoring is to be implemented
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	This EMPr inclusive of Method statements ensure compliance.
(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	This EMPr inclusive of Method statements ensure compliance.
(m) an environmental awareness plan describing the manner in which— (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	This plan can be found in Chapter 9.13 and addresses all risks associated with the proposed development.
(n) any specific information that may be required by the competent authority.	Any information required by the competent authority will be included.
(2) Where a government notice <i>gazetted</i> by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	Noted.

3 PROJECT DETAILS

Wonderheuvell Solar Power is proposing the construction of a solar PV energy facility and associated infrastructure (which includes, but is not limited to, internal access roads, on-site and collector substations, temporary laydown / staging areas and O&M buildings) with a maximum total generation capacity of up to approximately 400MW on the development site near Noupoot. As mentioned, the overall objective of the proposed development is to generate electricity by means of renewable energy technologies capturing solar energy to feed into the National Grid. The proposed on-site and collector substations will have voltage capacities of up to 33/132kV and will be step-up substations (Table 2).

Table 2: Summary of Technical Details

Component	Description / dimensions
Height of PV modules	Between 1m and 4m in height, depending on mounting type.
Area of PV Array	Combined area of approx. 777ha
Number of inverters required	Maximum of approx. 2 667
Area occupied by substations	One (1) on-site and one (1) collector substation, each occupying an area of up to approx. 4ha. Total combined footprint of approx. 8ha.
Capacity of on-site substation	Each substation (on-site and collector) will have a capacity of 33/132kV.
Area occupied by both permanent and construction laydown areas	Each PV array area will require a temporary construction laydown / staging area. Thus three (3) temporary construction

3.1 Alternatives for Infrastructure

The developer has identified possible alternatives of the O&M sites, construction camp sites and the substation site. These alternatives, as shown in Figure 4 and are described below.

These include alternative locations for the laydown / staging areas and O&M buildings¹. These were informed by the identified environmental sensitive areas as various environmental specialists assessed the application site during the scoping phase. The identified sensitive areas were used during the EIA phase to perform a comparison of layout alternatives. The results of the comparative assessment of layout alternatives are summarised in **section 8.2 of the DEIR**.

In addition, two (2) grid connection infrastructure alternatives (which include on-site and collector substation sites and 132kV power line corridors) have also been comparatively assessed by the respective specialists. These alternatives essentially provide for two (2) different route alignments with associated substations (on-site and collector) contained within an assessment corridor between approximately 400m and 900m wide. This is to allow for flexibility to route the power line on either side of the existing high voltage Eskom power lines. It should be noted that the substation sites included as part of this application are intrinsically linked to the associated electrical infrastructure project (part of a separate BA process which will be initiated at a later stage). Although the specialists assessed the grid connection infrastructure alternatives as part of their respective assessments, these will be comparatively assessed as part of the associated electrical infrastructure BA (part of a separate process which will be initiated at a later stage). The results of the comparative assessment of grid connection infrastructure alternatives have however been provided in this report as the alternatives which have been chosen as 'preferred' by the respective specialists will inform the location of the on-site and collector substation sites being proposed as part of this EIA application. The results of the comparative assessment of grid connection infrastructure alternatives are summarised in **section 8.2 of the DEIR**.

It should be noted that prior to the submission of the DSR, a preliminary PV development area was considered by the applicant. However, in order to ensure that the proposed development avoids the sensitive areas identified by the specialists, the preliminary PV development area was subsequently amended. In addition, the proposed PV development area was further refined following the submission of the DSR and prior to the submission of the FSR. During the scoping phase the preliminary PV development area was comparatively assessed with the proposed PV development area, which was informed by the identified sensitive areas and presented in the scoping phase, in order to confirm that it would be 'preferred' from an environmental perspective. Based on the results of the comparative assessment of the above-mentioned PV development areas, it was concluded that the proposed refined PV development area which was presented in the scoping phase was preferred from an environmental perspective when compared to the preliminary PV development area. In addition, the proposed PV development area that was presented in the DSR and FSR was further refined to avoid environmental sensitivities, and subsequently informed the location of the PV array areas and associated infrastructure alternatives which were investigated and comparatively assessed in the EIA phase. The results of the comparative assessment of the PV development areas is provided in **section 8.1 of the DEIR**.

¹Although the grid connection infrastructure alternatives (which include on-site and collector substation sites and 132kV power line corridors) will be comparatively assessed as part of the associated electrical infrastructure BA (part of a separate process which will be initiated at a later stage), the alternatives which have been chosen as 'preferred' by the respective specialists will inform the location of the substation sites proposed as part of this EIA application. As such, the results of the comparative assessment of grid connection infrastructure alternatives have been provided in this report to provide information regarding the substations proposed as part of this EIA application.

The proposed PV array areas and layout alternatives in relation to the identified environmental sensitive areas are presented in **Figure 4** below.

The proposed Solar Farm development will be located on a number of farms, the 21-digit surveyor general code is provided in the Table 3 below: (A map depicting the layout can be found in Figure 4)

Table 3: 21-digit SG code and center point coordinates

FARM DESCRIPTION		21 DIGIT SURVEYOR GENERAL (SG) CODE	
Portion 1 of the Farm Leuwe op No. 120		C0300000000012000001	
Remainder of the Farm Wonderheuveld No. 121		C03000000000012100000	
APPLICATION SITE			
CENTRE POINT COORDINATES (DD MM SS.sss)			
POINT	SOUTH		EAST
P	S31 18 21.531		E24 44 17.457
PV ARRAY AREAS			
CENTRE POINT COORDINATES (DD MM SS.sss)			
PHASE	SOUTH		EAST
PV ARRAY AREA 1	S31 18 30.712		E24 46 23.536
PV ARRAY AREA 2	S31 17 4.629		E24 45 43.640
PV ARRAY AREA 3	S31 18 11.940		E24 43 10.769

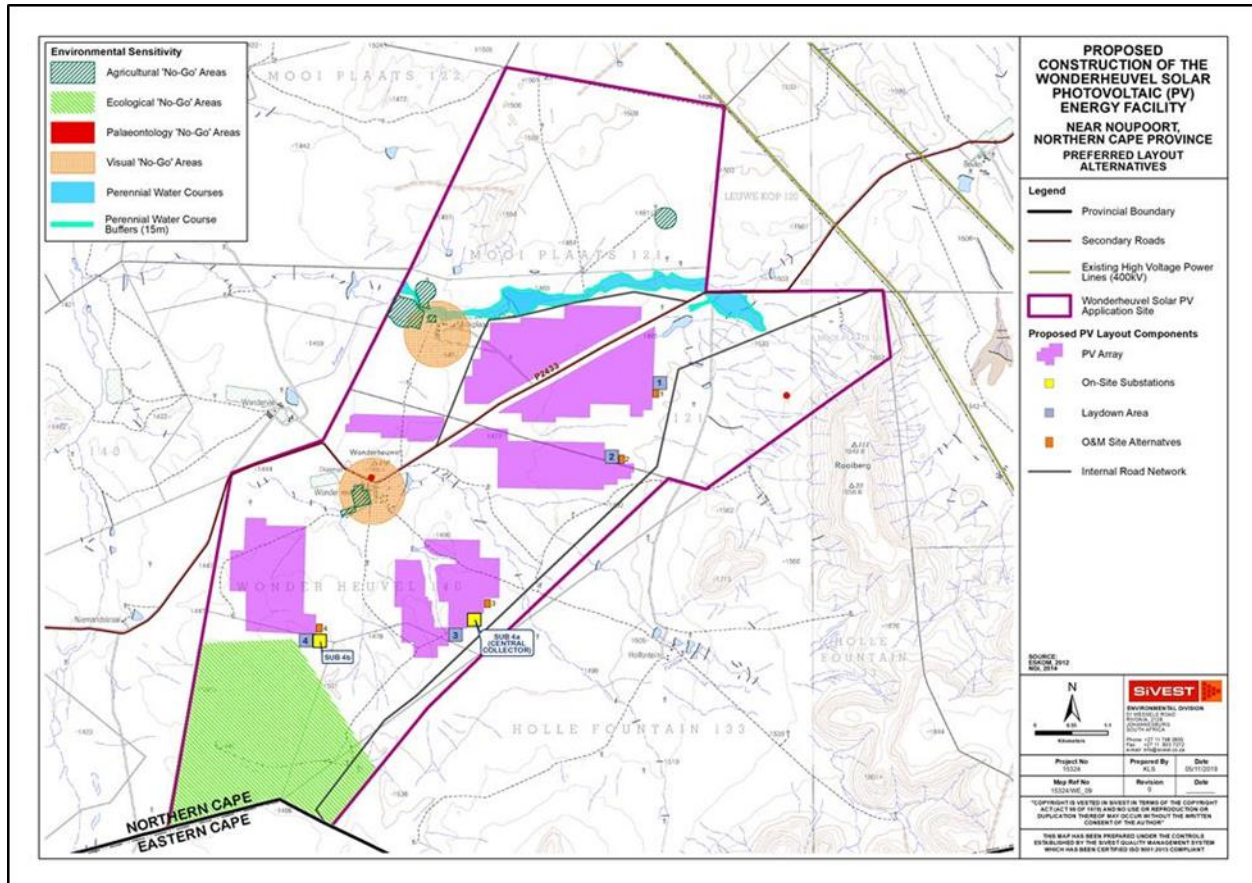


Figure 4: Layout Map with sensitivities overlaid.

3.2 Findings of the Environmental Impact Assessment

The EIA report together with the specialist studies provide a detailed assessment of the potential impacts that may result from the development of the Wonderheuvél PV Solar Farm.

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 sensitive features within the development footprint and the undertaking of the construction and operational monitoring and mitigation set forward by the specialists. The development footprint was designed by the Holder of the EA in order to respond to and avoid the sensitive features located within the project site. Therefore, it is concluded that the development footprint is suitable and appropriate from an environmental perspective for the solar farm and all detrimental or adverse impacts on sensitive features were avoided, reduced and/or mitigated

The potential environmental impacts associated with the Wonderheuvél Solar PV Energy Facility identified and assessed through the EIA process include:

- Impacts on Terrestrial Ecology;
- Impacts on Surface Water;
- Impacts on Avifauna;
- Impacts to Agriculture and Soils;
- Visual impacts on the area imposed by the components of the facility;
- Impacts on heritage resources, including archaeology, paleontology and the cultural landscape;
- Positive and negative socio- economic impacts; and
- Impacts on Traffic.

Summaries of the impacts identified by the specialist are detailed below:

Table 4: Specialist findings

Terrestrial Ecology	<p>There are various Acts that limit development or require permits before development can proceed. The most important of these are permits required in terms of protected species that could potentially occur on-site, including the National Environmental Management: Biodiversity Act, the Northern Cape Nature Conservation Act and the National Forests Act.</p> <p>Details of the description of the ecological receiving environment are summarised as follows:</p> <ol style="list-style-type: none"> 1. The study area is situated in an area that is on the boundary between relatively flat plains and a low mountain range with moderately to steeply sloping topography. Habitat on-site is in a largely natural state and is in a rural environment. There is very little transformation or serious degradation on site. 2. There are two (2) regional vegetation types occurring in the project study area, Eastern Upper aroo (most of the area), and Besemkaree oppies Shrubland (mountain areas). There are three (3) other national vegetation types in the vicinity, namely Southern aroo Riviere, Tarkastad Montane Shrubland and
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	<p>aroo Escarpment Grassland. Floristic components of all five (5) of these units occur in the study area, even though they are not all mapped as occurring within the study area. All these vegetation types are listed in the scientific literature as Least Threatened and none are listed in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011).</p> <ol style="list-style-type: none"> 3. All habitat in the Northern Cape part of the study area is mapped as “Critical Biodiversity Area 2” (CBA2) or “Critical Biodiversity Area 1” (CBA1) in the Provincial Conservation Plan and there are also patches mapped as “Ecological Support Area” (ESA). The remaining natural vegetation on-site on the Northern Cape side, therefore, has high value for the conservation of vegetation in the Province according to the broad-scale CBA maps. 4. Habitats on-site were divided into five (5) units, namely “Mountain Vegetation”, “Lowland Plains Vegetation”, “Low Ridges and Koppies”, “Broad Drainage Areas” and “Mountain Stream”. The vegetation on the plains on-site was found to be a karroid dwarf shrubland that resembles the description for Eastern Upper aaroo, but the mountain vegetation was a mixed grassy shrubland that appears to be a floristic mix of Besemkaree oppies Shrubland and aaroo Escarpment Grassland. The mountain vegetation has the highest local diversity and greatest variation in species composition. A map of natural habitats of the study area was produced by mapping from aerial imagery, based on information collected in the field. 5. There are no plant species occurring on-site or likely to occur on-site that are protected according to the National Environmental Management: Biodiversity Act (Act No 10. of 2004) (NEM:BA). 6. There are a number of plant species occurring on-site that are protected according to the Northern Cape Nature Conservation Act (Act 9 of 2009). It is likely that additional protected species occur there that were not observed during the field survey. None of these are of conservation concern, but a permit is required from the Provincial authorities to destroy them. These are listed in the text in the body of this report. 7. There are no protected tree species that are likely to occur in the study area. 8. A total of 79 mammal species have a geographical distribution that includes the general study area in which the sites are found. Of the species currently listed as threatened or protected (see Appendix 5 of Terrestrial Ecology Impact Assessment Report for list of protected species), the following are considered to have a very high, high or medium probability of occurring on-site, based on habitat suitability and evidence collected in the field: the Black-footed Cat (Vulnerable), the Cape Clawless Otter (Near Threatened), the South African Hedgehog (Near Threatened), Grey Rhebok (Near Threatened), White-tailed Rat (Vulnerable), and the Spectacled Dormouse (Near Threatened). There is strong evidence to suggest that the Black-footed Cat and the Cape Clawless Otter both definitely occur on-site.
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	<p>9. The study area contains habitat that is suitable for a small number of frog species. One (1) protected frog species, the Giant Bullfrog, could potentially occur on-site.</p> <p>10. A total of 55 reptile species have a geographical distribution that includes the general study area in which the sites are found. No reptile species of conservation concern could potentially occur in the study area.</p> <p>11. A preliminary sensitivity map of the study area was produced that identifies areas of higher sensitivity that should be taken into account during activities on-site. This includes drainage areas and associated wetland-related habitat, low ridges, parts of the mountain area, and CBA1 and CBA2 areas.</p> <p>The preliminary assessment of impacts indicates that all impacts are of low significance or can be reduced to low significance with mitigation, with the exception of loss of natural vegetation, for which the impact remains of medium significance after mitigation.</p> <p>Proposed mitigation measures include the following: shifting infrastructure positions to avoid sensitive habitats, select infrastructure options that cause the least amount of damage to natural habitats, cross watercourses at right angles, install appropriate structures at watercourse crossings to minimise impacts on these systems, minimise vegetation clearing and disturbance, formalise a rehabilitation programme, undertaking a pre-construction botanical walk-through survey of the footprint of the selected options, obtaining permits for any protected species that may be affected, undertaking a search and rescue of plants for which it is appropriate to rescue, compile an alien plant management plan and undertaking regular monitoring.</p> <p>The report concludes that there are some sensitivities in the study area related to natural habitat and to individual species, but that these can be minimised or avoided with the application of appropriate mitigation or management measures. There will be residual impacts, primarily on natural habitat, but the amount of habitat that will be lost to the project is insignificant compared to the area in hectares of the regional vegetation type that occurs on-site and therefore the residual impacts are considered acceptable, on condition local sensitivities of biodiversity importance are avoided. On this basis, it is recommended that the project be authorised.</p>
Avifauna	<p>The proposed PV facility will have some pre-mitigation impacts on avifauna at a site and local level which will range from Medium to Low.</p> <p>The impact of displacement due to disturbance during the construction phase is rated as Medium and will remain at a Medium level after mitigation. The impact of displacement of priority species due to habitat transformation associated with the operation of the plant and associated infrastructure is rated as Medium. This impact can be partially reversed through mitigation, but it will remain at a Medium level, after mitigation. The envisaged impacts in the operational phase, i.e. mortalities due to collisions with the solar panels and entrapment in perimeter fences are both rated as Low pre-mitigation and could be further reduced with appropriate mitigation. The impact of displacement due to disturbance during the decommissioning phase is rated as Medium, and it will remain at a Medium level after mitigation. The cumulative</p>

	<p>impact of the proposed PV facilities within a 35km radius is rated as Low, both pre- and post-mitigation.</p> <p>The impact of displacement due to disturbance associated with the construction of the proposed substations, is assessed to be Medium and can be mitigated to a Low level. The potential for displacement due to habitat destruction associated with the construction of the substations is rated as Low and could be further reduced with appropriate mitigation. The impact of displacement due to disturbance associated with the decommissioning of the proposed substations is assessed to be Medium and can be mitigated to a Low level.</p> <p>IMPACT STATEMENT</p> <p>From an avifaunal impact perspective, there is no objection to the proposed development of the PV facility, provided the proposed mitigation measures are strictly implemented. No further monitoring will be required during the operational phase.</p>
Surface Water	<p>Findings were based on the method for delineating wetlands and riparian habitats as per the DWAF (2005 & 2008) guidelines. At a broad level, the study site is located within the Orange Catchment. More specifically, the study area is situated within the quaternary catchments D32B & D32C. The fieldwork assessment found that there are no wetlands on the study site. However, a number of watercourses, both perennial and non-perennial, were identified throughout the entire study area.</p> <p>In terms of the Ecological Condition of the non-perennial, and perennial watercourses, Ecological Condition was assessed to be a class C – Moderately Modified systems.</p> <p>The Environmental Importance and Sensitivity Class for the watercourses was determined. The results showed that the EISC for the watercourses were categorised as a Class B (High). The classification of high EISC was primarily due to the condition of the watercourses assessed, as well as the presence of endangered species.</p> <p>The buffer one determination for the watercourses took into account the type of the proposed development, potential impacts, condition of the habitat as well as other characteristics of the watercourse. As a result, the following buffer ones were assessed and are to be implemented as far as possible:</p> <ul style="list-style-type: none"> ▪ Construction Phase Buffer: 15m ▪ Operation Phase Buffer: 15m <p>Foreseen potential negative impacts related to the proposed development were identified and assessed. The potential construction-related impacts included impacts to watercourses (-20 low pre- and -8 low post-mitigation impact rating), hydrology of the watercourses (-20 low pre- and -9 low post-mitigation impact rating) and water quality impacts (-39 medium pre- and -9 low post-mitigation impact rating). The operational impacts identified included impacts to the hydrology of the watercourse (-36 medium pre- and -18 low post-mitigation impact rating). Overall, all impacts were assessed to be low, post-implementation of mitigation measures.</p>

	<p>In terms of potentially applicable environmental and water-related legislation, listed activities were identified to be triggered in terms of NEMA (1998) and the EIA Regulations (2014, as amended) from a surface water perspective. With respect to the NWA (1998), water uses (c) and (i) were identified as being potentially applicable. However, the application of the risk assessment matrix protocol as per Government Notice 509 of 2016 (No. 40229) was undertaken, the findings show that the risk of potential impacts on the watercourse was assessed to be in the LOW-risk class. Where risks were identified, a number of control measures have been stipulated which will assist in decreasing the level of risk to an even lower level. In accordance with the implementation of control measures, all potential risks are classed as LOW. Therefore, registration for General Authorisation (GA) can be undertaken where required and agreed upon with the Department of Water and Sanitation (DWS).</p> <p>The decision on whether the proposed development is to proceed will rest on environmental and water governmental departments whom will need to make a trade-off between meeting the conservation targets of the province or meeting the energy demands of the country. However, it is the opinion of the specialist that the proposed development may proceed where the relevant control measures and mitigation measures stipulated are implemented.</p> <p>There are a number of recommendations to be implemented for the proposed development. These include the following:</p> <ul style="list-style-type: none"> ▪ A stormwater management plan for all phases of the proposed development is required to be compiled and implemented which accounts for control of increased run-off, erosion and sedimentation; and ▪ An Alien Eradication and Removal Programme is to be compiled and implemented for the duration of the proposed development. <p>Based on the findings above, with the implementation of the control and mitigation measures stipulated, it is the opinion of the specialist that the proposed development may proceed.</p>
Agricultural and Soils (Desktop)	<p>It should be noted that a field investigation was not considered necessary. The assessment was based on a desktop analysis of existing soil and agricultural potential data and other data for the site, which is considered entirely adequate for a thorough assessment of all the agricultural impacts of the proposed development (see section 4.1 of the scoping phase Agricultural and Soils Impact Assessment Report).</p> <p>The key findings of the Agricultural and Soils Impact Assessment are provided below:</p> <ul style="list-style-type: none"> ▪ The proposed project area is dominated by shallow, loamy sands on underlying rock or less commonly clay. Dominant soil forms are Swartland, Hutton, Mispah, and Valsrivier. ▪ The major limitations to agriculture are the limited climatic moisture availability (low rainfall), the rugged terrain and the shallow, rocky soils. ▪ As a result of these limitations, the agricultural use of the study area is limited to low-intensity grazing only, except for some isolated patches of irrigation land.

	<ul style="list-style-type: none"> ▪ The proposed project area is classified with land capability evaluation values between 1 (very low) and 7 (low to moderate), with 6 being most predominant. ▪ The significance of all agricultural impacts is kept low by the limited agricultural potential of the land. ▪ The only parts of the study area that do not have low sensitivity are the small patches of irrigation. These are considered no-go areas for any footprint of development that will exclude cultivation. ▪ Two (2) potential negative impacts of the development on agricultural resources and productivity were identified. These are: <ul style="list-style-type: none"> ○ Loss of agricultural land use; and ○ Soil erosion and degradation. ▪ One (1) potential positive impact of the development on agricultural resources and productivity was identified as: <ul style="list-style-type: none"> ○ Increased financial security of farming operations through rental income ▪ Soil erosion and degradation was assessed as having medium significance before and after mitigation. The other two (2) impacts were assessed as having low significance before and after mitigation. ▪ The recommended mitigation measures are for implementation of an effective system of stormwater run-off control; maintenance of vegetation cover; and to strip, stockpile and re-spread topsoil. ▪ There is no material difference between the significance of impacts of any of the proposed project alternatives. All proposed alternatives have an equal impact. ▪ Due to the low agricultural potential of the site, and the consequent low to medium, negative agricultural impact, there are no restrictions relating to agriculture which preclude authorisation of the proposed development (including all alternatives) and therefore, from an agricultural impact point of view, the development should be authorised.
Visual	<p>Overall, sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. As such, solar PV development would alter the visual character and contrast significantly with the typical land-use and/or pattern and form of human elements present across the broader study area. The level of contrast will however be reduced by the presence of the N10 national route and existing high voltage power lines in the northern sector of the study area.</p> <p>The area is not typically valued for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. A total of twenty-six (26) potentially sensitive receptors were identified in the combined study area, three (3) of which are considered to be sensitive receptors as they are linked to leisure/nature-based tourism activities in the area. None of the receptors are</p>

	<p>however expected to experience high levels of visual impact from the proposed PV facility. Although the N10 receptor road traverses the study area, motorists travelling along this route are only expected to experience moderate impacts from the proposed Wonderheuvel solar PV facility.</p> <p>An overall impact rating was also conducted in order to allow the visual impact to be assessed alongside other environmental parameters. The assessment revealed that impacts associated with the proposed Wonderheuvel solar PV facility would be of low significance during both construction and decommissioning phases.</p> <p>During operation, visual impacts from the solar PV facility would be of medium significance with relatively few mitigation measures available to reduce the visual impact.</p> <p>Although other renewable energy developments and infrastructure projects, either proposed or in operation, were identified within a 35km radius of the Wonderheuvel solar PV project, it was determined that only one (1) of these would have any significant impact on the landscape within the visual assessment one, namely Umsobomvu WEF. This proposed WEF, in conjunction with the proposed solar PV facility, will alter the inherent sense of place and introduce an increasingly industrial character into a largely natural, paroral landscape, thus giving rise to significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists. In light of this and the relatively low level of human habitation in the study area however, cumulative impacts have been rated as medium.</p> <p>No fatal flaws were identified for any of the proposed site alternatives for laydown areas and O&M buildings. A summary of the preference rating is provided below:</p> <ul style="list-style-type: none"> ▪ Wonderheuvel Solar PV Facility: No preference was determined for any of the laydown area and O&M building site options and all but two (2) sites were found to be favourable. The remaining options, Site Option 6 and Site Option 8 were found to be the least preferred due to their proximity to potentially sensitive receptors. <p>It is the specialist's opinion that the visual impacts associated with the proposed Wonderheuvel solar PV facility are of moderate significance. Given the low level of human habitation and the relative absence of sensitive receptors, the project is deemed acceptable from a visual perspective and the EA should be granted for the relevant EIA application. The specialist is of the opinion that the impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.</p>
Heritage (Desktop)	<p>The Heritage Impact Assessment (HIA) consisted of a scoping phase during which background information and landscape analysis was done to determine the heritage resources that can potentially occur within the study area. This was followed up with fieldwork by a team of archaeologist and a palaeontologist with the aim of identifying heritage resources in the development footprint areas and to make recommendations</p>

	<p>on the management of these resources and the possible chance finds during construction activities.</p> <p>The field work identified a total of ten (10) areas of heritage significance. Adjustments to the project layouts based on the various specialist input resulted in the total avoidance of three (3) heritage areas that was excluded from the reporting. The remaining seven (7) sites consist of three (3) large, low to medium density scatters of later stone age sites (UMS005,008 and 009). UMS004, 006 and 007 are all- round stone packed enclosure.</p> <p>UMS010 was identified as a fossil find spot and a 50-meter buffer around the fossil bearing material must be implemented. Any construction in the demarcated area must be monitored by a palaeontologist.</p> <p>The impact rating on the heritage resources indicated that pre-mitigation a negative high impact is projected but with the implementation of the recommended management measures this impact rating will be reduced to low negative.</p> <p>The results of the comparative assessment of the alternatives provided found there to be no preference between the layout alternatives. This is due to the fact that no heritage issues were identified for any of the footprints. The palaeontological sensitive area at UMS010 is the only heritage resources that influences the Options assessment, but those options affected is still favourable with the implementation of the recommended management measures.</p> <p>It is the specialist’s considered opinion, based on the current data available, that with the consideration of the position of heritage sensitivities during the layout design and the implementation of the proposed management measures, the project will have an acceptable low impact on heritage resources and can continue.</p>
<p>Palaeontology</p>	<p>The National Heritage Resources Act (No 25 of 1999, section 38) (NHRA), states that a Palaeontological Impact Assessment (PIA) is key to detect the presence of fossil material within the planned development footprint. This PIA is thus necessary to evaluate the effect of the construction on the palaeontological resources.</p> <p>These proposed development is underlain by the continental sediments of the Latest Permian sediments of the Balfour Formation (Upper Beaufort Group, Adelaide Subgroup) and earliest Triassic sediments of the atberg Formation (Upper Beaufort Group, Tarkastad Subgroup, aroo Supergroup) as well as urassic aroo Dolerite. These sediments are generally mantled by a thick layer of uaternary to Recent colluvium and alluvium. The uppermost Balfour and atberg Formations are of extraordinary interest in that they provide some of the best existing information on ecologically-complex terrestrial ecosystems during the catastrophic end-Permian mass extinction. According to the PalaeoMap of South African Heritage Resources Information System (SAHRIS), the Palaeontological Sensitivity of the Tarkastad and Adelaide Subgroups has a Very High Palaeontological Sensitivity, while that of the uaternary superficial deposits of the Central interior is high and the aroo dolerite (igneous rocks) is insignificant and rated as ero.</p>

	<p>A site-specific field survey of the development footprint was conducted on foot and by motor vehicle from the 24th – 28th anuary 2019. Elsewhere in the aroo Basin numerous fossils have been uncovered in these geological sediments but only two (2) sites on koppies with fossiliferous outcrops were identified. Although these localities do not currently fall in the proposed development sites, these fossiliferous sites have been identified as Highly Sensitive and No-go areas. It is recommended that a 50m buffer will be placed around these areas. If construction is a necessity in these sensitive areas, it is recommended that the fossils will be collected by a professional palaeontologist. Preceding excavation of any fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.</p> <p>With the above-mentioned in consideration, the proposed development, as well as all alternatives have a similar geology and therefore there is no preferences on the grounds of palaeontological fossil heritage for any specific layout among the different options under consideration. As impacts on fossil heritage usually only occur during the excavation phase, no further impacts on fossil heritage are expected during the operation and decommissioning phases of the Solar Energy Facility (SEF).</p> <p>The impact of development on fossil heritage are usually negative but it could also have a positive impact due to the discovery of newly uncovered fossil material that would have been unavailable for scientific research. The SEF could also provide a long-term benefit to the country by supplying renewable energy to the electricity grid.</p> <p>In the event that fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented by the Environmental Control Officer (ECO) in charge of these developments. These discoveries ought to be protected (if possible, in situ) and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: 27 (0)21 462 4509. Web: www.sahra.org. a) so that correct mitigation (e.g. recording and collection) can be carried out by a palaeontologist.</p> <p>It is consequently recommended that no further palaeontological heritage studies, ground-truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. From a Palaeontological Heritage view there is no fatal flaws in the proposed SEF development project. However, it is recommended that the mitigation measures are included in the Environmental Management Programme (EMPr) and fully implemented.</p>
Social	<p><u>APPROACH TO STUDY</u></p> <p>Data was gathered using the following techniques.</p> <p>Collection of data</p> <p>Data was gathered through:</p> <ul style="list-style-type: none"> ▪ The project description prepared by the project proponent.

- Statistics South Africa, Census 2011 and other relevant demographic data generated by Stats SA such as the quarterly Labour Force Survey and Mid-year population estimates.
- Discussions with the project proponents and Environmental Impact Assessment Consultants.
- A literature review of various documents such as the relevant Municipal Integrated Development Plans (IDPs) and other specialist reports and documents.
- A broader literature scan.

Impact assessment technique

The assessment technique used to evaluate the social impacts was provided by SiVEST Environmental Division and is attached in Appendix 1 of the Social Impact Assessment Report (**Appendix 6F**).

IMPACTS IDENTIFIED

The impacts are assessed in respect of the following phases of the project:

- Planning and design
- Construction
- Operational
- Decommissioning, and
- The ‘no go’ option.

Construction phase

Most of the impacts discussed above apply over the short-term to the construction phase of the project and include:

- Annoyance, dust and noise;
- Increase in crime;
- Increased risk of HIV infections;
- Influx of construction workers and job seekers;
- Hazard exposure;
- Disruption of daily living patterns;
- Disruptions to social and community infrastructure;
- Job creation and skills development; and
- Socio-economic stimulation.

Operational phase

The social impacts that apply to the operational phase of the project are:

- Transformation of the sense of place; and
- Economic.
 - Job creation and skills development.
 - Socio-economic stimulation.

Decommissioning

If the project were to be completely decommissioned the major social impacts likely to be associated with this would be the loss of jobs and revenue stream that stimulated the local economy and flowed into the municipal coffers.

'No Go' Alternative

The 'no go' option would mean that the social environment is not affected as the status quo would remain. On a negative front it would also mean that all the positive aspects associated with the project would not materialise. Considering that Eskom's coal-fired power stations are a huge contributor to carbon emissions the loss of a chance to supplement the National Grid through renewable energy would be significant at a national, if not at a global level.

Cumulative Impacts

In this regard the following cumulative impacts are addressed below:

- Risk of HIV
- Sense of place
- Service supplies and infrastructure, and
- The economic benefit.

No fatal flaws associated with the cumulative impacts are evident at a social level. The findings support the recommendations of the various reports undertaken for the different renewable energy projects in the region that, on an overall basis, the social benefits of renewable energy projects outweigh the negative benefits and that the negative social impacts can be mitigated.

COMPARATIVE ASSESSMENT OF LAYOUT ALTERNATIVES

As no social preference emerged in respect of any of the alternatives, the other specialist reports were perused to establish if there was any preference that would have an influence on the social. Based on this analysis the following preferences were identified and supported on a social basis:

- Laydown Area and O&M Building Site Option 1 Preferred
- Laydown Area and O&M Building Site Option 2 Preferred
- Laydown Area and O&M Building Site Option 3 Preferred
- Laydown Area and O&M Building Site Option 4 Preferred
- Laydown Area and O&M Building Site Option 5 Least Preferred
- Laydown Area and O&M Building Site Option 6 Least Preferred
- Laydown Area and O&M Building Site Option 7 Least Preferred
- Laydown Area and O&M Building Site Option 8 Least Preferred

CONCLUSION AND RECOMMENDATIONS

In assessing the social impact of the solar PV Facility, it was found that in respect of the energy needs of the country and South Africa's need to reduce its carbon emissions that the project fits with national, provincial and municipal policy.

Regarding the social impacts associated with the project it was found that most apply over the short term to the construction phase of the project. Of these impacts all can

	<p>be mitigated to within acceptable ranges and there are no fatal flaws associated with the construction or operation of the project.</p> <p>On a cumulative basis it is evident that the cumulative impacts associated with changes to the social environment of the region are more significant than those attached to the project in isolation. On a negative front there are two (2) issues associated with developments in the region that are of most concern. The first of these issues is the change to the sense of place of an area that was once considered a pristine region of South Africa. The second is the potential, through an influx of labour and an increase in transportation to constructions sites, of the risk for the prevalence of HIV to rise in an area that has a relatively low HIV prevalence rate. In this regard it is important that the relevant authorities recognise these issues and find ways of mitigating them to ensure that they do not undermine the benefit that renewable energy projects bring, both to the region as well as to the country as a whole. These issues are beyond a project-specific basis and as such will need to be addressed at a higher level.</p> <p>Impact Statement</p> <p>The project site and surrounding areas are sparsely populated with the agricultural potential of the area being low. Accordingly, the negative social impacts associated with the proposed Wonderheuveld solar PV facility are of low to moderate significance with most occurring over the short term construction phase. The project has a positive element which outweighs the negative in that it will contribute towards the supply of renewable energy into a grid system heavily reliant on coal- powered energy generation. In this sense the project forms part of a national effort to reduce South Africa’s carbon emissions and thus carries with it a significant social benefit and is thus supported and should proceed.</p> <p>As the area is sparsely populated and the negative social impacts associated with the solar PV facility is of moderate significance, it is most unlikely that any further social study will be necessary. This will, however, be dependent on the outcome of the public participation process which may result in a need to update the current report by incorporating the comments recorded and updating the social impacts accordingly.</p>
<p>Geotechnical (Desktop)</p>	<p>The desktop geotechnical assessment did not identify any fatal flaws that, from a geological and geotechnical perspective, would prevent the construction of the proposed Wonderheuveld Solar PV Energy Facility.</p> <p>The potential impacts the project may have on the geology, relate to soils that could be impacted by the construction activities. There may be a potential for soil erosion, due to removal of vegetation and exposure of the soils to the elements, during construction. The impacts were found to be of “negative low impact”.</p> <p>Various options were studied for the PV facility. The geological impacts will be similar. Due the very similar bedrock geology, similar geotechnical conditions are expected across all options.</p>

	<p>From a geological and geotechnical perspective, based on the minimal negative impacts on the geology and soils and the recommendations for mitigation measures, it is recommended that the project receives the 'go-ahead' from the Competent Authority.</p>
<p>Transportation</p>	<p>The following conclusions were made:</p> <ul style="list-style-type: none"> ▪ During the construction phase an additional 43 vehicles trips will commute at the peak of the construction phase, transporting staff and labour. Typically, these trips will be in the morning between 6:00 – 7:00 and in the afternoons between 16:00 – 17:00. ▪ The heavy construction vehicles and deliveries will contribute an additional ±25 vehicle trips / day, typically occurring during the 'weekday midday' which will equate to 4 vehicle trips / hour. These additional vehicles will only contribute a small percentage to the existing road network. ▪ The abnormal loads on this development will be negligible and therefore will have no major impact. ▪ The cumulative impact of the area confirms that no significance rating change will be experienced during the construction period of the PV development. ▪ The existing road network can accommodate the proposed development; however, the recommendations below must be considered to mitigate any possible negative impacts. ▪ We recommend a Traffic Management Plan be completed prior to construction in order to form part of the Final Environmental Management Programme (EMPr). The plan must include inter alia the following; <ul style="list-style-type: none"> ○ The review of all intersections and routes prior to the project commencing in order to accommodate construction vehicles and staff commuting. ○ Further discussions with the SANRAL and the respective transport department on access points and route requirements. ○ The upgrades of intersections and the installation of road traffic signage as per the SARTSM (South African Road Traffic Sign Manual). ○ The implementation of pedestrian safety initiatives ○ The implementation of a road maintenance plan under the auspices of the respective transport department. ▪ We recommended that one (1) access point from the N10 freeway be used for the proposed facility to reduce the impact to the area. This access point is located at m19.92 on section N10-5 and the appropriate axillary lanes and speed reduction measures are to be implemented subsequent to discussions with SANRAL. This study and a revised study, with the all the renewable parties involved in the area at the time, must be submitted to SANRAL and more specifically Ms. Colene Runkel (021 957 4613) for review and comments.

	<ul style="list-style-type: none"> ▪ Development of access points to the PV facility is as per the recommendations in section 9 of the specialist Transportation report (Appendix 6I). ▪ The appropriate load permits be obtained from the Department of Transport prior to construction (if required). ▪ This assessment is limited to the impacts the development traffic will have on the network and not on the wider impacts known as background traffic. Background traffic includes the cumulative impacts other developments will have on the environment if their programs overlap. Such impacts can only be addressed in a detailed Traffic Impact Study which takes into account actual traffic counts undertaken during the peak periods. We therefore recommend that this study be completed prior to the construction process with all Renewable Energy parties involved in the immediate area.
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Figure 5 below illustrates the identified sensitivities within the Wonderheuvvel Solar PV Energy Facility project site, overlain with the preferred development footprint. Table 5: Summary of Impacts

Terrestrial Ecology Impacts

Impact	Overall Significance	
	Without Mitigation	With Mitigation
Construction Phase		
Loss and/or fragmentation of vegetation due to clearing for construction of infrastructure	Medium	Medium
Loss of individuals due to clearing for construction of infrastructure.	Medium	Low
Loss of habitat due to clearing for construction of infrastructure	Low	Low
Direct mortality due to machinery, construction and increased traffic	Low	Low
Displacement and disturbance due to increased activity and noise levels	Low	Low
Increased poaching and/or illegal collecting due to improved access to the area.	Low	Low
Loss of individuals due to clearing for construction of infrastructure.	Low	Low
Loss of habitat due to clearing for construction of infrastructure	Low	Low
Direct mortality due to machinery, construction and increased traffic	Low	Low
Displacement and disturbance due to increased activity and noise levels	Low	Low
Increased poaching and/or illegal collecting due to improved access to the area.	Low	Low
Operational Phase		
Direct mortality of fauna through traffic, illegal collecting, poaching and collisions and/or entanglement with infrastructure	Low	Low

Impact	Overall Significance	
	Without Mitigation	With Mitigation
Establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors	Medium	Low
Runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape	Medium	Low
Decommissioning Phase		
Loss and disturbance of natural vegetation due to the removal of infrastructure and need for working sites	Low	Low
Direct mortality of fauna due to machinery, construction and increased traffic	Low	Low
Displacement and/or disturbance of fauna due to increased activity and noise levels	Low	Low
Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors	Medium	Low
Continued runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape	Medium	Low

Avifaunal Impacts

Impact	Overall Significance	
	Without Mitigation	With Mitigation
Construction Phase		
Displacement of priority species due to disturbance associated with the construction of the PV plants and associated infrastructure	Medium	Medium
Operational Phase		
Displacement of priority avifauna due to habitat transformation associated with the PV plant and associated infrastructure	Medium	Medium
Entrapment in perimeter fences resulting in the mortality of priority species.	Low	Low
Collisions of priority avifauna with the solar panels resulting in the mortality of priority species.	Low	Low
Decommissioning Phase		
The de-commissioning of the PV plant and associated infrastructure will result in a significant amount of movement and noise, which will lead to displacement of priority avifauna from the site due to disturbance. It is highly likely that most priority species will temporarily vacate the site footprint.	Medium	Medium

Surface Water Impacts

Impact	Overall Significance	
	Without Mitigation	With Mitigation
Construction Phase		
Impacts associated with disturbance and edge effects to watercourses	Low	Low
Impacts associated with accelerated run-off and associated increased flood peaks to the watercourse	Low	Low
Potential impacts associated with the leakage / spillage of oils, fuels and other potentially hazardous substances from construction vehicles / machinery entering run-off and flowing into the watercourse. Pollution from workers using the watercourse for sanitation and cleaning purposes; as well as sedimentation via run-off polluting the watercourse.	Medium	Low
Operational Phase		
Increased run-off as well as associated erosion and sedimentation impacts	Medium	Low
Decommissioning Phase		
Impacts associated with disturbance and edge effects to watercourses	Low	Low
Impacts associated with accelerated run-off and associated increased flood peaks to the watercourse	Low	Low
Potential impacts associated with the leakage / spillage of oils, fuels and other potentially hazardous substances from construction vehicles / machinery entering run-off and flowing into the watercourse. Pollution from workers using the watercourse for sanitation and cleaning purposes; as well as sedimentation via run-off polluting the watercourse.	Medium	Low

Agricultural Impacts

Impact	Overall Significance	
	Without Mitigation	With Mitigation
Construction Phase		
Loss of agricultural land use due to direct occupation	Medium	Medium
Soil degradation and erosion	Low	Low
Operational Phase		
Loss of agricultural land use due to direct occupation	Medium	Medium
Soil degradation and erosion	Low	Low
Increased financial security through rental income	Low	Low
Decommissioning Phase		
Loss of agricultural land use due to direct occupation	Medium	Medium
Soil degradation and erosion	Low	Low

Visual Impacts

Impact	Overall Significance	
	Without Mitigation	With Mitigation
Construction Phase		
Potential alteration of the visual character and sense of place	Low	Low
Potential visual impact on receptors in the study area	Low	Low
Operational Phase		
Potential alteration of the visual character and sense of place.	Medium	Medium
Potential visual impact on receptors in the study area.	Medium	Medium
Potential visual impact on the night time visual environment.	Medium	Medium
Decommissioning Phase		
Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process;	Medium	Medium
Potential visual impacts of increased dust emissions from decommissioning activities and related traffic; and	Medium	Medium
Potential visual intrusion of any remaining infrastructure on the site.	Medium	Medium

Heritage Impacts

Impact	Overall Significance	
	Without Mitigation	With Mitigation
Construction Phase		
Impact on stone age resources during earth moving - including trenching, road making, foundation digging	Medium	Low
Impact on stone age resources during earth moving - including trenching, road making, foundation digging	High	Medium
Impact on palaeontological resources during earth moving - including trenching, road making, foundation digging	Medium	Medium
Operational Phase		
Impact on heritage resources during general maintenance	High	Low
Decommissioning Phase		
Impact on heritage resources during rehabilitation work associated with decommissioning - grading trench filling etc.	High	Low

Paleontology Impacts

Impact	Overall Significance	
	Without Mitigation	With Mitigation
Construction Phase		

Fossil Heritage	High	Medium
Operational Phase		
No impacts are expected		
Decommissioning Phase		
No impacts are expected		

Social Impacts

Impact	Overall Significance	
	Without Mitigation	With Mitigation
Construction Phase		
Annoyance dust and noise	Medium	Low
Increase in crime	Medium	Low
Increased risk of HIV infections	Medium	Low
Influx of construction workers	Medium	Low
Hard exposure	Medium	Low
Disruption of daily living patterns	Low	Low
Disruption to social and community infrastructure	Low	Low
Job creation and skills development	Low	Medium
Socio-economic development	Medium	Medium
Operational Phase		
Transformation of the sense of place	High	Medium
Job creation and skills development	Medium	Medium
Socio-economic stimulation	Medium	Medium
Decommissioning Phase		
No impacts are expected during Decommissioning		

Geotechnical Impacts

Impact	Overall Significance	
	Without Mitigation	With Mitigation
Construction Phase		
Soils	Low	Low
Operational Phase		
Soils	Low	Low
Decommissioning Phase		
Soils	Low	Low

Traffic Impacts

Impact	Overall Significance	
	Without Mitigation	With Mitigation
Construction Phase		
Increase in Traffic	Low	Low
Increase of Incidents with pedestrians and livestock	Medium	Low
Increase in Dust from gravel roads	Low	Low
Increase in Road Maintenance	Low	Low
Additional Abnormal Loads	Low	Low
Increase in Dust from gravel roads	Low	Low
New / Larger Access points	Low	Low
Operational Phase		
Increase in Traffic	Low	Low

Impact	Overall Significance	
	Without Mitigation	With Mitigation
Increase of Incidents with pedestrians and livestock	Low	Low
Increase in Dust from gravel roads	Low	Low
Increase in Road Maintenance	Low	Low
Additional Abnormal Loads	Low	Low
New / Larger Access points	Low	Low
Decommissioning Phase		
Increase in Traffic	Low	Low
Increase of Incidents with pedestrians and livestock	Low	Low
Increase in Dust from gravel roads	Low	Low
Increase in Road Maintenance	Low	Low
Additional Abnormal Loads	Low	Low
Increase in Dust from gravel roads	Low	Low
New / Larger Access points	Low	Low

The specialist sensitivities in conjunction with the proposed layout is mapped below:

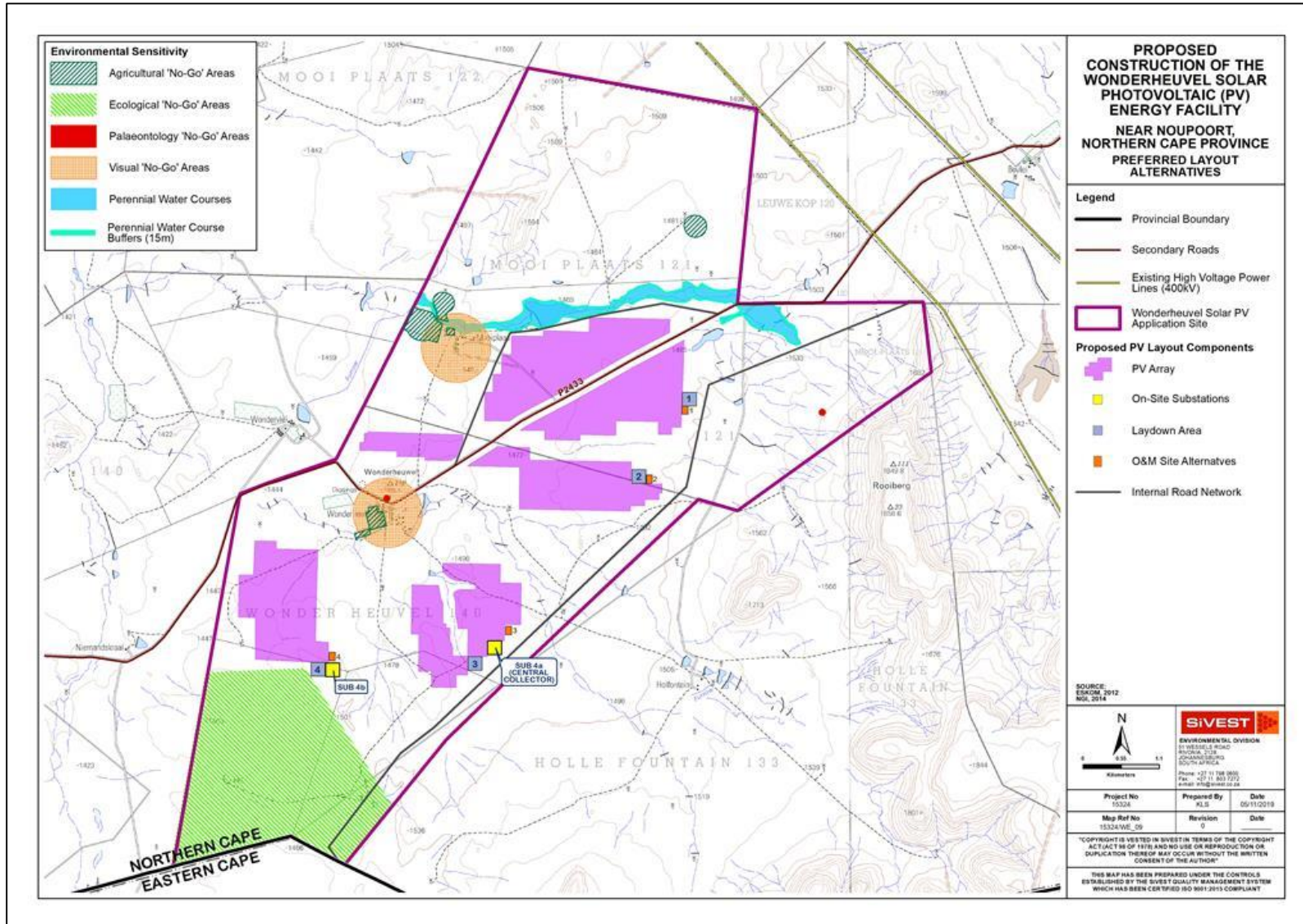


Figure 5: Map showing layout map with sensitivity data

3.3 Activities and Components associated with the Wonderheuvél Solar PV Energy Facility

Table 6: Activities associated with Planning, Construction, Operation and Decommissioning of the Wonderheuvél Solar PV Energy Facility

Planning Phase	
Requirements	Conduct technical surveys prior to initiating construction.
Activities to be undertaken	
Conduct surveys	Including, but not limited to: a geotechnical survey, site survey and confirmation of all other associated infrastructure, including the on-site and /or collector substation.
Construction Phase	
Requirements	Project requires Environmental Authorisation from DEA, preferred bidder allocation granted by Department of Energy, a generation license issued by NERSA, and a Power Purchase Agreement secured with Eskom.
	Duration dependent on the number of PV modules; expected to be up to 24 months for the Wonderheuvél Solar PV Energy Facility. Up to 370 jobs created
	No on-site labour camps. Employees to be accommodated in the nearby towns
	Overnight on-site worker presence would be limited to security staff.
	General waste will be collected and temporarily stockpiled in skips in a designated area on site and thereafter removed, emptied into trucks, and disposed at a registered waste disposal facility on a regular basis by an approved waste disposal Contractor (i.e. a suitable Contractor). Any hazardous waste (such as contaminated soil as a result of spillages) will be temporarily stockpiled (for less than 90 days) in a designated area on site (i.e. placed in leak-proof storage skips), and thereafter removed off site by a suitable service provider for safe disposal at a registered hazardous waste disposal facility. Waste disposal slips and waybills will be obtained for the collection and disposal of the general and hazardous waste. These disposal slips (i.e. safe disposal certificates) will be kept on file for auditing purposes as proof of disposal. The waste disposal facility selected will be suitable and able to receive the specified waste stream (i.e. hazardous waste will only be disposed of at a registered/licenced waste disposal facility). The details of the disposal facility will be finalised during the contracting process, prior to the commencement of construction. Where possible, recycling and re-use of material will be encouraged. Waste management is further discussed in the EMPr. During the operational phase of the proposed Wonderheuvél PV Energy Facility, waste generation will be minimal and will be disposed of a licenced landfill site.
	In terms of electricity supply for the construction phase has not be determined but it is likely that the developer will utilise a combination of generators and solar systems.
	During the construction phase a temporary water supply for construction will need to be installed that will make use of existing or new boreholes and will comprise of over-ground water pipelines and tanks to the construction camp. Approval for any additional water requirements will form part of a separate water use authorisation approvals process.

Activities to be undertaken	
Conduct surveys prior to construction	Including, but not limited to: a geotechnical survey and site survey.
Establishment of access roads to the Site	Access/haul roads and internal access roads within the site will be established at the commencement of construction.
	Existing access roads will be utilised where possible to minimise impact, and upgraded where required.
	Access roads to the site will have a width of up to 10m.
	Access roads to be established between the arrays for construction and/or maintenance activities within the development footprint.
	Internal service road alignment will be between 4-10m wide.
Undertake site preparation	Including the clearance of vegetation at the footprint of each array, establishment of the laydown areas, the establishment of internal access roads and excavations for foundations for substations.
	Stripping of topsoil to be stockpiled, backfilled, removed from site and/or spread on site.
	To be undertaken in a systematic manner to reduce the risk of exposed ground being subjected erosion.
	Include search and rescue of floral species of concern (where required) and the identification and excavation of any sites of cultural/heritage value (where required).
Establishment of laydown areas and batching plant on site	A laydown area for the storage of PV components, including civil engineering construction equipment.
	The laydown area will also accommodate building materials and equipment associated with the construction of buildings.
	A temporary concrete batching plant to facilitate the concrete requirements for foundations.
Transport of components and equipment to and within the site	Transportation will take place via appropriate National and Provincial roads, and the dedicated access/haul road to the site.
	Components considered as abnormal loads in terms of Road Traffic Act (Act No 29 of 1989) due to dimensional limitations and load limitations and will require a permit for the transportation of the abnormal loads on public roads.
	Civil engineering construction equipment to be brought to the site for the civil works (e.g. excavators, trucks, graders, compaction equipment, cement trucks, site offices etc.).
	Components for the establishment of the substation (including transformers) and the associated infrastructure to be transported to site.
Construction of PV fields (arrays) / multiple PV modules	Lifting cranes will be used and are required to move between the array sites.
Construction of substation	Two on-site substations to be constructed within the development footprint.
	Substation will be constructed with a total footprint of 8ha (4ha each)
Connection of PV fields (arrays) to the substation	Each PV field (array) to be connected to the on-site substation via underground electrical cables.
	Excavation of trenches are required for the installation of the cables. Trenches will be approximately 1.5m deep.

	Underground cables are planned to follow the internal access roads, as far as possible.
Establishment of ancillary infrastructure	A workshop, contractor's equipment camp, temporary storage areas and a construction compound will be required.
	Service buildings for site offices, storage and safe refueling areas are also required.
	Establishment will require the clearing of vegetation, levelling and the excavation of foundations prior to construction.
Connect substation to the power grid	On-site substation to connect the solar farm
	Connection via an overhead 132kV power line (located within a 32m servitude) in order to evacuate the generated electricity (to be undertaken as a separate Basic Assessment process).
Undertake site rehabilitation	Commence with rehabilitation efforts once construction is completed in an area, and all construction equipment is removed.
	On commissioning, access points to the site that will not be required for the operation phase will be closed and prepared for rehabilitation.
Operation Phase	
Requirements	Duration will be 20 years.
	Requirements for security and maintenance of the facility.
	Employment opportunities relating mainly to operation activities and maintenance. It is estimated that up to 42 full-time employment opportunities will be available.
	Current land-use activities, i.e. farming activities, being undertaken within the project site can continue during the operation of the solar farm.
Activities to be undertaken	
Operation and Maintenance	Full time security, maintenance and control room staff.
	All PV fields (arrays) comprising multiple PV modules will be operational except under circumstances of mechanical breakdown, inclement weather conditions, or maintenance activities.
	Modules to be subject to periodic maintenance and inspection.
	Disposal of waste products (e.g. oil) in accordance with relevant waste management legislation.
	Areas which were disturbed during the construction phase to be utilised should a laydown area be required during operation.
Decommissioning Phase	
Requirements	Decommissioning of the Wonderheuveld Solar PV Energy Facility infrastructure at the end of its economic life.
	Potential for repowering of the facility, depending on the condition of the facility at the time.
	Expected lifespan of approximately 20 years (with maintenance) before decommissioning is required.
	Decommissioning activities to comply with the legislation relevant at the time.
Activities to be undertaken	
Site preparation	Confirming the integrity of site access to accommodate the required equipment
	Preparation of the site (e.g. laydown areas and decommissioning platform).
	Mobilisation of decommissioning equipment.

Disassemble and remove PV fields (arrays) / multiple PV modules	Large crane required for the disassembling of the PV panels and associated infrastructure
	Components to be reused, recycled, or disposed of in accordance with regulatory requirements.
	Majority of components of the PV fields (arrays) / multiple PV modules would be considered reusable or recyclable.
	Any concrete will be removed to a depth as defined by an agricultural specialist and the area rehabilitated.
	Cables will be excavated and removed, as may be required.
Components to be disposed of or recycled.	Foundation
	PV Modules / panels
	Electrical components
	Rotor – remove. Think this is for wind farms only
	Generator
	Machine house – maybe take this out. Not sure what this is
	Reinforcing steel will go through cleansing and milling to re-melt the components

4 PURPOSE AND OBJECTIVES OF THE EMPR

An Environmental Management Programme (EMPr) is defined as “*an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented or mitigated, and that the positive benefits of the projects are enhanced*”. The objective of this EMPr is to provide information and guidance for implementing the management and monitoring methods established and to help ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the facility.

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 negative environmental impacts are mitigated or do not result.

The EMPr also defines monitoring requirements in order to ensure that the specified objectives are met.

This EMPr is applicable to all employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the Wonderheuvel Solar PV Energy Facility. The document will be adhered to and updated 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 the Wonderheuvel Solar PV Energy Facility and/or as the project develops. 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.

The EMPr has the following objectives:

- Outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction, rehabilitation and operation phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the Wonderheuvel Solar PV Energy Facility.
- 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 EIA process.

The mitigation measures identified within the EIA process are systematically addressed in the EMPr, ensuring the minimal adverse environmental impacts.

Wonderheuvél Solar PV Energy Facility must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits, and obligations arising from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr, and through its integration into the relevant contract documentation provided to parties responsible for construction and/or operation activities on the site. The adequacy and efficacy of implementation is to be monitored by an independent Environmental Control Officer (ECO). Since this EMPr is part of the EIA process for the Wonderheuvél Solar PV Energy Facility, it is important that this document be read in conjunction with the EIA report compiled for this project. This will contextualise the EMPr and enable understanding of its purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMPr and the Environmental Authorisation, the stipulations in the Environmental Authorisation shall prevail over those 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 required throughout the project life cycle

5 STRUCTURE OF THE EMPR

The first three chapters provide background to the EMPr and the Wonderheuvél Solar PV Energy Facility, while the subsequent chapters include the following:

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

These chapters set out the processes necessary for Wonderheuvél Solar PV Energy Facility as the Holder of the EA, to minimise environmental impacts and achieve environmental compliance. For each of the phases of implementation, environmental objectives are listed. The EMPr has been structured to show each phase and associated objectives, activities/risk sources, mitigation actions, monitoring requirements and performance indicators. A specific EMPr table has been established for each environmental objective.

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

- Planned activities change (i.e. in terms of the components of the solar farm).
- 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 in achieving an objective or target such that it should be re-examined to determine if it is still relevant or should be modified, etc.

5.1 Planning and Design Phase

- Makes sure that the design of the solar farm responds to the identified environmental constraints and opportunities.
- Makes sure that pre-construction activities are undertaken in accordance with all relevant legislative requirements.
- Makes sure that adequate regard has been taken of identified environmental sensitivities, as well as any landowner and community concerns and that these are appropriately addressed through design and planning (where applicable).
- Permits construction activities to be undertaken without significant disruption to other land uses and activities in the area.
- Makes sure that the best environmental options are selected for the solar farm.

5.2 Construction Phase

- Makes sure that construction activities are properly managed in respect of environmental aspects and impacts.
- Permits 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, protected tree species, and habitats of ecological value.
- Minimises impacts on fauna using the site.
- Minimises the impact on heritage sites should they be uncovered.

5.3 Operation Phase

- Makes sure that operation activities are properly managed in respect of environmental aspects and impacts.
- Permits solar farm operation activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to farming practices, traffic and road use, and effects on local residents.
- Minimises impacts on fauna.

5.4 Decommissioning Phase

Equipment associated with this solar farm would only be decommissioned once it has reached the end of its economic life. This would include the decommissioning of the medium voltage lines connecting the PV array areas to the substations as well as the overhead lines connecting the substations to the grid (i.e. the 132kV overhead power lines) which are associated with the proposed development. It must be noted that decommissioning activities will need to be undertaken in accordance with the legislation applicable at that time, which will require this section of the EMPr to be revisited and amended.

Please note that there are relevant mitigation measures contained under the construction section that should be applied during decommissioning and therefore are not repeated.

The general specifications of Construction and Rehabilitation are also relevant to the decommissioning of the Wonderheuvel Solar PV Energy Facility and must be adhered to.

- All structures not required for the post-decommissioning use of the site (may include the pv panels, substation, ancillary buildings, monitoring masts) are dismantled and/or demolished, removed and waste material disposed of at an appropriately licensed waste disposal site or as required by the relevant legislation.
- Rehabilitate access/service roads and servitudes not required for the post-decommissioning use of the site. If necessary, an ecologist should be consulted to give input into rehabilitation specifications.
- All disturbed areas are compacted, sloped and contoured to ensure drainage and runoff and to minimise the risk of erosion.
- Monitor rehabilitated areas quarterly for at least a year following decommissioning, and implement remedial action as and when required.
- Any fauna encountered during decommissioning activities should be removed to safety by a suitably qualified person.
- All vehicles to adhere to low speed limits (i.e.40km/h max) on the site, to reduce risk of faunal collisions as well as reduce dust.
- Retrenchments should comply with South African Labour legislation of the day.

5.5 Objectives of an EMPr

The objectives of this EMPr are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- To identify measures that could optimise beneficial impacts;
- To create management structures that address the concerns and complaints of I&APs with regards to the development;
- To establish a method of monitoring and auditing environmental management practices during all phases of development;
- Ensure that the construction and operational phases of the project continues within the principles of Integrated Environmental Management and Environmental Management System (EMS) ISO 14001 Principles;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Makes sure that the safety recommendations are complied with;
- Propose mechanisms for monitoring compliance with the EMPr and reporting thereon; and
- Specify time periods within which the measures contemplated in the EMPr are implemented, where appropriate.

The EMPr Seeks to highlight the following:

- Avoiding impacts by not performing certain actions;
- Minimising impacts by limiting aspects of an action;
- Rectifying impacts through rehabilitation, restoration, etc. of the affected environment;

- Compensating for impacts by providing substitute resources or environments;
- Minimising impacts by optimising processes, structural elements and other design features;
- Provide ongoing monitoring and management of environmental impacts of a development and documenting of any digressions /good performances; and
- The EMPr is a legally binding document that all parties involved in the project must be made aware of.

5.6 Environmental Monitoring

A monitoring programme will be implemented for the duration of the lifecycle of proposed development. This programme will include:

- Monthly Audits During the Construction Phase
- According to the EMPr, EA and permit conditions which will be conducted by the ECO. These audits can be conducted randomly and do not require prior arrangement with the project manager.
- Compilation of an audit report with a rating of the compliance with the EMPr. This report will be submitted to the relevant authorities.
- Audits conducted during the Operational Phase
- Undertaken by the ECO.

The ECO must keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage must be recorded in full to ensure the responsible party is held liable. All claims for compensation emanating from damage should be directed to the ECO for appraisal. A register must be kept of all complaints from the landowners and /or community. All complaints / claims must be handled immediately to ensure timeous rectification / payment by the responsible party.

The EMPr will be made binding on all contractors operating on the site and must be included within the Contractual Clauses. Those responsible for environmental damage must pay the repair costs both to the environment and human health and the preventative measures to reduce or prevent further pollution and/or environmental damage (the polluter pays principle).

5.7 Applicable Legislation, Development Strategies and Guidelines

The following legislation applies:

- Constitution of South Africa
- National Environmental Management Act No. 107 of 1998 – NEMA EIA Requirements
- NEMA EIA Regulations, 2014 (as amended)
- Environmental Impact Assessment Guideline for Renewable Energy Projects, DEA Notice 989 of 2015
- National Energy Act No. 34 of 2008
- Electricity Regulation Act No. 4 of 2006
- National Heritage Resources Act No. 25 of 1999
- National Water Act No. 36 of 1998, as amended
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004 as amended)
- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003 as amended)
- National Forests Act, 1998 (Act No. 84 of 1998)

- Conservation of Agricultural Resources Act No. 43 of 1983
- Subdivision of Agricultural Land Act No. 70 of 1970, as amended
- National Road Traffic Act No. 93 of 1996, as amended
- Civil Aviation Act No. 13 of 2009
- Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009)
- Astronomy Geographic Advantage Act No. 21 of 2007
- Renewable Energy Development ones
- Noise regulations
- Protected Areas Act, 2003 (Act No. 25 of 2003)
- Occupational Health and Safety Act No. 85 of 1993
- Road Safety Act (Act No. 93 of 1996)
- National Road Traffic Regulations Act (Act 22 of 2000)
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008 as amended)
- Development Facilitation (Act No. 67 of 1995)
- The Hazardous Substances Act (Act No. 15 of 1973)
- Water Services Act (Act No. 108 of 1998)
- Electricity Regulation Act (Act No. 4 of 2006 as amended)
- Municipal Systems Act (Act No. 32 of 2000)
- Mineral and Petroleum Resource Development Act (Act No. 28 of 2002 as amended)
- Northern Cape Planning and Development Act, 1998 (Act No. 7 of 1998)

Several regulations will be applicable to the construction phase of the project. These guidelines are mentioned in the EMPr tables. Also of significance in this EMPr are:

- World Bank International Finance Corporation (IFC);
- Environmental, Health and Safety (EHS) Guidelines; and
- Equator Principles.

5.7.1 *The Equator Principles*

The Equator Principles (2013) are a financial industry benchmark for determining, assessing and managing social and environmental risk in project financing. A number of banks, exchanges and organisations worldwide have adopted the Principles as requirements to be undertaken for project funding on application and approval. Furthermore, certain funding institutions have not formally adopted the Principles, but require clients to be compliant with them in order to qualify for loans.

Under Principle 3, the Equator Principles establish the International Finance Corporations (IFC) Performance Standards, 2012 and associated General and Sector Specific EHS Guidelines as the applicable social and environmental standards that a project should comply with if the project is located in a non-OECD country or OECD country that is not designated as high income.

The social and environmental assessment that is undertaken for a project establishes whether or not the project is in compliance with the IFC Performance Standards².

² NB A project does not seek compliance with the Equator Principles per se but the standards that the EP refers to. A financial institution that has adopted the EP must ensure that any projects it is financing meet the standards referred to and that it adopts an appropriate risk management system to ensure this.

According to these principles, the performance standards relevant to the proposed development are summarised in **Table 7**.

Table 7: IFC 2012 Performance Standards

Performance Standard	Intent and objective	Requirements	Project Specific Applicability
<p>Assessment and Management of Environmental and Social Risks and Impacts (1)</p>	<p>Underscores the importance of managing environmental and social performance throughout the life of a project. An effective Environmental and Social Management System (ESMS) is a dynamic and continuous process initiated and supported by management, and involves engagement between the client, its workers, local communities directly affected by the project (the Affected Communities) and, where appropriate, other stakeholders.</p> <p>Objectives:</p> <ul style="list-style-type: none"> ▪ To identify and evaluate environmental and social risks and impacts of the project. ▪ To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimise, and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment. ▪ To promote improved environmental and social performance of clients through the effective use of management systems. 	<ul style="list-style-type: none"> ▪ Policy ▪ Identification of Risks and Impacts Management Programmes ▪ Organisational Capacity and Competency ▪ Emergency Preparedness and Response ▪ Monitoring and Review ▪ Stakeholder Engagement ▪ External Communication and Grievance Mechanism ▪ Ongoing Reporting to Affected Communities 	<p>A formal Environmental and Social Management System will be compiled in the future.</p>

Performance Standard	Intent and objective	Requirements	Project Specific Applicability
	<ul style="list-style-type: none"> ▪ To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately. ▪ To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated. 		
Labour and Working Conditions (2)	<ul style="list-style-type: none"> ▪ Looks at the working conditions by following these principles; ▪ To establish and maintain the worker-management relationship (including specifically a human resources policy). ▪ To promote fair treatment, non-discrimination and equal opportunity of employees (and some contractors) and meet 	<ul style="list-style-type: none"> ▪ Working Conditions and Management of Worker Relationship ▪ Protecting the Work Force ▪ Occupational Health and Safety ▪ Workers Engaged by Third Parties ▪ Supply Chain 	A Formal human resource and labour policies will be compiled in the event that the project is developed in the future.

Performance Standard	Intent and objective	Requirements	Project Specific Applicability
	<p>national employment laws.</p> <ul style="list-style-type: none"> ▪ To protect the workforce by addressing child labour and forced labour. ▪ To promote healthy and safe working conditions. 		
Resource Efficiency and Pollution Prevention (3)	<ul style="list-style-type: none"> ▪ To avoid and minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities. ▪ To promote the reduction of emissions that contributes to climate change. 	<ul style="list-style-type: none"> ▪ Resource Efficiency ▪ Pollution Prevention 	<p>The requirements for PS 3 have been addressed in both the EIA process and EMPr. The project will have zero emissions and contributes to the reduction of greenhouse gases by offering an alternative to coal-based energy supply.</p> <p>Pollution prevention is discussed and assessed in the EIA Report and measures are provided in the EMPr.</p>
Community Health Safety and Security (4)	<ul style="list-style-type: none"> ▪ To avoid or minimize risks to and impacts on the health and safety of the local community during the project life cycle from both routine and non-routine circumstances. ▪ To ensure that the use of security personnel is carried out in a legitimate manner that avoids or minimizes 	Community Health and Safety Security Personnel	<p>The requirements included in PS 4 have been addressed in the EIA process and the development of the EMPr. The following generic plans have been included in the EMPr and Emergency Response Plan;</p> <p>All plans will be made site specific as part of the financial close process, in the event</p>

Performance Standard	Intent and objective	Requirements	Project Specific Applicability
	risks to the community's safety and security.		that the project is developed in the future. Furthermore a Health and Safety Plan will be implemented during construction.
Land Acquisition and Involuntary Resettlement (5)	<ul style="list-style-type: none"> ▪ To avoid or at least minimize involuntary resettlement wherever feasible by exploring alternative project designs. ▪ To mitigate adverse social and economic impacts from land acquisition or restrictions on affected persons' use of land by; (i) providing compensation for loss of assets at replacement cost, and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected. ▪ To improve or at least restore the livelihoods and standards of living of displaced persons. ▪ To improve living conditions among displaced persons through provision of adequate housing with security of tenure at resettlement sites. 	Displacement Private Sector Responsibilities Under Government-Managed Resettlement	No resettlement applicable

Performance Standard	Intent and objective	Requirements	Project Specific Applicability
Biodiversity Conservation and Sustainable Management of Living Natural Resources (6)	<ul style="list-style-type: none"> ▪ To promote and conserve biodiversity. ▪ To avoid the introduction of alien invasive species. ▪ To promote sustainable management and use of natural resources (NRM). 	<ul style="list-style-type: none"> ▪ Protection of Conservation of Biodiversity ▪ Management of Ecosystem Services ▪ Sustainable Management of Living Resources ▪ Supply Chain 	The requirements included in PS 6 have been addressed via numerous specialist studies and the findings and assessment associated with these aspects have been discussed in the EIA process. The EMPr incorporates mitigation measures from the specialist reports to ensure that aspects such as conservation of biodiversity and alien plants control are considered.
Indigenous People (7)	<ul style="list-style-type: none"> ▪ To foster full respect for the dignity, human rights, aspirations, cultures and natural resource-based livelihoods of Indigenous Peoples (IP). ▪ To avoid impacts or where avoidance is not feasible, minimize, mitigate and compensate in a culturally appropriate fashion and within the framework of successful good faith negotiation (a form of stakeholder engagement requiring approval of both parties). ▪ To establish and maintain effective 	<ul style="list-style-type: none"> ▪ Circumstances Requiring Free, Prior and Informed Consent ▪ Mitigation and Development Benefits ▪ Private Sector Responsibilities where Government is Responsible for Managing Indigenous Peoples Issues 	The requirements included in PS 7 have been addressed in the EIA process and the development of the EMPr. An extensive public participation process is undertaken as part of the EIA process which engages all stakeholders, authorities and interested and affected persons who may be affected. Furthermore a Social Study was undertaken and recommendations from this study incorporated into the EMPr.

Performance Standard	Intent and objective	Requirements	Project Specific Applicability
	relationships with IPs over the course of the project.		
Cultural Heritage (8)	<ul style="list-style-type: none"> ▪ To protect cultural heritage from adverse impacts of project activities and support its preservation. ▪ To promote the equitable sharing of benefits from the use of cultural heritage in business activities. 	<ul style="list-style-type: none"> ▪ Protection of Cultural Heritage in Project Design and Execution ▪ Project's Use of Cultural Heritage 	The requirements included in PS 8 have been addressed through a cultural heritage study that was undertaken as part of the EIA process. Recommendation and mitigation measures from this study are incorporated into the EMPr.

(Source; IFC Guidelines, 2012)

6 ENVIRONMENTAL DOCUMENTATION, REPORTING AND COMPLIANCE

6.1 Documentation

The Contractor must ensure the following documentation is kept on the project site for the full duration of the contract:

- Final Environmental Management Programme once approved by the DEA;
- EA issued by the DEA;
- Relevant permits;
- All Plans and reports in Chapter 9 of this EMPr;
- Environmental Policy of the Contractor;
- Environmental method statements compiled by the Contractor;
- Weekly environmental monitoring records;
- Minutes and record of attendance of all environmental meetings;
- Environmental incident book;
- Communications register;
- Register of audits;
- Non-conformance reports; and
- Waste manifests.

In addition, all Plans and reports in Chapter 9 of this EMPr must be made available to the Department and applicable competent authority on request.

6.1.1 Site Meetings

During the construction phase, weekly site meetings are undertaken which include environmental matters. This meeting must be chaired by a Senior Site Representative with the Holder of the EA, Contractor(s), the EO ('s), and CLO ('s) in attendance. Where practical or necessary, the ECO will need to attend if possible.

6.1.2 Method Statements

It is a statutory requirement to ensure the wellbeing of employees and of the environment. Therefore, the Contractor must submit a Method Statement to the Holder of the EA and the ECO for approval prior to the commencement of construction works.

A Method Statement is a document detailing how a particular process will be carried out. It should detail the possible dangers/risks associated with the particular part of the project and the methods of control to be established and to show how the work will be managed in a safe and environmentally responsible manner. The method statement must also include the following information, where applicable:

- The type of construction activity;
- Timing and location of the activity;
- Construction procedures;
- Materials and equipment to be used;
- Transportation of the equipment to and from site;
- How the equipment/material will be moved while on site;
- Location and extent of construction site office and storage areas;
- Identification of impacts that might result from the construction activity;

- Population impacts;
- Community/institutional arrangements;
- Conflicts between local residents and newcomers;
- Individual and family level impacts;
- Community infrastructure needs;
- Intrusion impacts;
- Methodology and/or specifications for impact prevention or containment and for environmental monitoring;
- Emergency/disaster incident and reaction procedures (required to be demonstrated); and
- Rehabilitation procedures and continued maintenance of the impacted environment.

The Contractor will be accountable for all actions taken in non-compliance of the approved method statements. The Contractor must keep all the method statements and subsequent revisions on file, copies of which must be distributed to all relevant personnel for implementation.

The Contractor will be required to submit, as a minimum, the relevant method statements as requested by the ECO which are to be compliant with the conditions of the EMPr, EA and permits for review prior to the start of that specific activity.

6.1.3 *Communications Register*

All complaints or communications that are received from I&APs or any other stakeholder must be recorded in a communications register. These complaints and communications will be brought to the attention of the Holder of the EA, whereupon it will be investigated and a response to the Complainant, I&APs or stakeholder will be given within 10 days. The communications register must include the following information:

- Record the time and date of the complaint/communication;
- A detailed description of the complaint/communication;
- Action and resources used to correct the complaint;
- Photographic evidence of the complaint (where possible);
- A written response to the complainant indicating rectification of the complaint; and
- Information regarding the relevant authority that was contacted or notified in writing where applicable (person, time and date).

The relevant authorities include:

- Department of Water and Sanitation (DWS) (e.g. for any incidents involving the contamination of water resources).
- South African Heritage Resources Agency (SAHRA).
- Northern Cape Department of Environment & Nature Conservation (DENC)
- Department of Environmental Affairs (DEA) (e.g. for any significant incident of pollution of the soil and air).
- Department of Agriculture, Forestry and Fisheries (DAFF) (e.g. uses of appropriate herbicides for eradication of alien invasive species, and permits for trees of special concern).
- Department of Health (e.g. for incidents such as contamination of water resources, accidental spill of hazardous substances).
- Department of Transport (e.g. for the diversion of traffic due to construction activities).
- Department of Labour (e.g. for labour disputes).

6.1.4 *Photographic Record*

The EO and CLO will be required to compile a photographic record (dated) of all activities on site prior to the start of construction related activities, during the construction process and on completion of construction related works. This photographic record will include:

- A pre-construction site record
- Monthly environmental audit reports;
- Weekly environmental monitoring reports;
- Corrective action;
- Progress of environmental works; and
- Incidences of non-conformance.

6.1.5 *Waste Manifests*

The Contractor must ensure that all solid (including any hazardous) waste removed from site is disposed of at a registered landfill site or nearby waste transfer station with capacity to accept the project generated waste. The waste manifest must be kept on record for auditing purposes.

6.1.6 *Good Housekeeping*

The Contractor is to practice good housekeeping throughout the construction phase. This should eliminate disputes about responsibility, facilitate efficient and timeous running of the project. Over and above practicing accepted construction methods in accordance with SANS 10120, this should include measures to preserve the environment inside the work area. Records of such actions taken to ensure the maintenance and management of housekeeping must be recorded.

The Contractor must record and report upon environmental management measures undertaken to mitigate assessed impacts upon the environment.

6.1.7 *Management and Control*

The Contractor is to implement environmental management in a reasonable manner and should such management not prove effective, must implement measures to the satisfaction of the Holder of the EA.

6.1.8 *Appropriate measures must include:*

- Appointment of necessary resources to monitor and manage environmental requirements;
- Implement aspect-specific method statements to deal with emergency situations;
- Provision of adequate emergency response equipment to mitigate and manage an incident or emergency; and
- Provision of specific training related to implementation of environmental management requirements.

6.1.9 Recording and Reporting

The Contractor must maintain detailed records of parameters monitored. These detailed records must demonstrate the effectiveness of the management actions implemented to mitigate potential impacts. The Contractor must submit a monthly database/report of management works implemented to the Holder of the EA, as part of the Contractors monthly report.

6.1.10 Monitoring

The Contractor must submit an Environmental Monitoring Method Statement which details the scope, nature, process, schedule and templates for environmental monitoring. The monitoring results must be used to determine the effectiveness of the management programme. All complaints, compliments or other comments relating to environmental management parameters are to be recorded in the site issues register of the Contractor for inclusion in the project issues register held by the Holder of the EA.

Monitoring results and the associated required management and mitigation actions for the coming monitoring period are to be presented in the monitoring section of the Contractors monthly report. The daily and weekly reports are to detail observations and information relating to requested management actions and their effectiveness.

The Contractor must monitor and maintain the following on an ongoing basis:

- Re-growth of alien invasive vegetation;
- Validity of the pest control officer certificate;
- Fire break requirements associated to construction related activities;
- Stormwater systems;
- Topsoil and backfill volumes;
- Access road condition;
- Dust generated from stockpiles;
- Noise;
- Water quality;
- Erosion prevention; and
- Landscaping requirements for rehabilitation.

The Contractor must submit a monthly database of inter alia the following works to the Holder of the EA. This data base is to include as a minimum:

- Extent of alien invasive clearing operations;
- Volumes of herbicide used on the project;
- Stockpile volumes of chipped material, topsoil, fertile soil and subsoil;
- Volume of recyclable waste removed from site;
- Water volumes recycled and used for dust suppression; and
- Maintenance of chemical toilets.

All complaints, compliments or other comments relating to construction related works are to be recorded by the Contractor in the communications register of the receiving party for inclusion in the project issues register. Site clearance monitoring results and the associated required management and mitigation actions for the coming monitoring period are to be presented in the monitoring section of the Contractors monthly

report. The weekly reports are to detail observations and information relating to requested management actions and their effectiveness.

The EO will be required to provide the Main Contractor with a brief weekly environmental monitoring report covering the onsite events which occurred during the past week. This will highlight key performance areas and provide feedback on corrective and preventive actions taken. The EO will have the weekly reports submitted by the Contractor's Manager prior to submission to The Holder of the EA for monthly reporting.

6.2 Compliance with the EMPr

The Contractor/s is/are deemed not to have complied with the EMPr if:

- Within the boundaries of the site, site extensions and access roads there is evidence of contravention of clauses;
- If environmental damage ensues due to negligence;
- The contractor fails to comply with corrective or other instructions issued by the ECO or Authorities within a specified time; and
- The Contractor fails to respond adequately to complaints from the public.
- Contravention of or deviation from any condition stipulated in the EA.

The Holder of the EA is deemed not to have complied with the EMPr if:

- Within the boundaries of the site there is evidence of contravention of clauses;
- If environmental damage ensues due to negligence;
- They fail to respond adequately to complaints from the public; and
- Contravention of or deviation from any condition stipulated in the EA.

6.2.1 Non-Conformance Report (NCR)

A NCR will be issued to the Contractor as a final step towards rectifying a failure in complying with a requirement of the EMPr. This will be issued to the Contractor in writing. Preceding the issuing of the NCR, the Contractor will be presented with an opportunity to rectify the outstanding issue in a timely manner.

Preceding requirements to the submitting of the NCR will entail an issue that has been highlighted to the Contractor in the audits for corrective action. Should this issue not be corrected or completed to the satisfaction of the Holder of the EA and ECO, the issue is escalated to an NCR.

Should the ECO assess an incident / issue and find it to be significant (e.g. non-repairable damage upon the environment), it will be reported to the DEA and immediately escalated to the level of an NCR. This will be done in consultation with the Holder of the EA. The following information should be recorded in the NCR:

- Details of non-conformance;
- Any plant or equipment involved;
- Any chemicals or hazardous substances involved;
- Work procedures not followed;
- Any other physical aspects;
- Nature of the risk;

- Actions agreed to by all parties following consultation that should adequately address the identified non-conformance. This may take the form of specific control measures and should take the hierarchy of controls into account. This must accompany the NCR for filing purposes;
- The agreed timeframe by which the Contractor should have implemented the actions documented in the NCR; and
- The ECO should verify that the agreed actions have taken place on or soon after the agreed completion date. Where the actions are complete, the ECO and Contractor should sign the Close Out portion of the Non-Conformance Form and file it with the contract documentation.

6.2.2 *Environmental Emergency Response*

The Contractor's environmental emergency procedures must ensure that there will be an appropriate response to unexpected or accidental actions or incidents that could cause environmental impacts. Such incidents may include but are not limited to:

- Accidental discharges to water (i.e. into a water resource) and land;
- Accidental spillage of hazardous substances (typically oil, petrol, and diesel);
- Accidental toxic emissions into the air;
- Specific environmental and ecosystem effects from accidental releases or incidents;

The Environmental Emergency Response Plan is separate to the Health and Safety Plan as it is aimed at responding to environmental incidents and must ensure and include the following:

- Construction employees must be adequately trained in terms of incidents and emergency situations;
- Details of the organisation (manpower) and responsibilities, accountability and liability of personnel;
- A list of key personnel and contact numbers;
- Details of emergency services (e.g. the fire department, spill cleanup services) must be listed;
- Internal and external communication plans, including prescribed reporting procedures;
- Actions to be taken in the event of different types of emergencies;
- Incident recording, progress reporting and remediation measures to be implemented; and
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.

The Contractor(s) will comply with the environmental emergency preparedness and incident and accident-reporting requirements, as required by the Occupational Health and Safety Act (Act No. 85 of 1993), the National Environmental Management Act (Act No. 107 of 1998), the National Water Act (Act No. 36 of 1998), and/or any other relevant legislation.

6.2.3 *Non-compliance*

Non-conformance will be issued to the Contractor for incidents of non-compliance. The Contractor (through the Environmental Officer) must also take the necessary steps (e.g. training) to prevent a recurrence of the infringement. The Contractor is also advised that the imposition of non-conformance does not replace any legal proceedings the authorities, landowners and/or members of the public may institute against the Contractor. The Contractor must be required to make good any damage caused as a result of the infringement at his own expense. A preliminary list of infringements for which non-conformance will be imposed is as follows:

- Using areas outside the working areas without permission/accessing “no-go areas”;
- Clearing and/or leveling area outside of the working areas;
- Littering on the site and surrounds;
- Burying/burning waste on site and surrounds;
- The undertaking of informal ablutions
- Making fires on site;
- Spillage onto the ground or water bodies of oil, diesel, or any other potential pollutants;
- Picking/damaging plant material, especially that from the residual areas of natural bush on the site;
- Damaging/killing wild or domestic animals/birds;
- Discharging effluent and/or storm water onto the ground or into surface water;
- Repeated contravention of the specification or failure to comply with instruction;
- Mixing cement directly on soil or bare ground outside designated batching plant; and
- Keeping animals as pets on site.

The Senior Site Supervisor, on recommendation from the ECO, may also order the Contractor to suspend part or all the works if the Contractor repeatedly causes damage to the environment by not adhering to the EMPr (i.e. more than 3 cases of infringements). The suspension will be enforced until such time as the offending actions, procedure or equipment is corrected. No extension of time will be granted for such delays and all costs will be borne by the Contractor.

Penalty Fines

Where environmental damage is caused or a pollution incident, and/or failure to comply with any of the environmental specifications contained in the EMPr, the Contractor shall be liable to pay a penalty fine. The following transgressions should be penalised:

- Hazardous chemical/oil spill;
- Damage to sensitive environments;
- Damage to cultural and historical sites;
- Unauthorised removal/damage to indigenous trees and other vegetation, particularly in identified sensitive areas;
- Uncontrolled/unmanaged erosion;
- Unauthorised blasting activities; and
- Violation of environmental authorisation conditions.

Spot Fines

These activities, along with the appropriate guidelines to determining fines, shall be agreed to by Wonderhevel Solar PV Energy Facility, the Project Manager and Contractor, and will be included within the final EMPr. In addition to penalties, the Project Manager has the power to remove from site any person who is in contravention of the EMPr, and if necessary, the engineer can suspend part of or all of the works, as required.

The ESO and ECO shall be authorised to impose spot fines for any of the transgressions detailed below:

- Littering on site;
- Lighting of illegal fires on site;

- Any persons, vehicles or equipment related to the contractor's operations found within the designated 'no-go' areas (especially for significant cultural resources such as nearby graves etc.);
- Creating dust or noise;
- Possession or use of intoxicating substances or weapons on site;
- Trapping, hunting or trading of fauna and / or plants on site;
- Any vehicles being driven in excess of designated speed limits;
- Unauthorised removal and/or damage to fauna, flora or cultural or heritage objects on site; and
- Urination and defecation anywhere other than using the toilet facilities that have been provided.

These activities, along with the appropriate guidelines to determining the fines, shall be agreed to by Wonderheuvél Solar PV Energy Facility, the Project Manager and the Contractor. Such fines will be issued in addition to any remedial costs incurred as a result of non-compliance with the environmental specifications and or legal obligations. Wonderheuvél Solar PV Energy Facility will inform the contractor of the contravention and the amount of the fine.

6.2.4 *Training and Awareness*

The Main Contractor is to take responsibility for the management of their staff and subcontractors on the project site during the construction and decommissioning phase and supervise them closely at all times. The onus is on the Contractor to make sure that all their staff and subcontractors fully comprehend the contents of the EMPr. The Contractor must organise environmental awareness training programmes, which should, be targeted at the two levels of employment: management and labour.

6.2.5 *Training of Construction Workers*

The construction workers must receive basic training in environmental awareness, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must be informed of how to recognise historical / archaeological artefacts that may be uncovered. They must also be appraised of the EMPr's requirements. Environmental awareness training programmes need to be formulated for these levels and must comprise:

- A record of all names, positions and duties of staff to be trained;
- A framework for the training programmes;
- A summarised version of the training course(s); and
- An agenda for the delivery of the training courses.

Such programmes will set out the training requirements, which need to be conducted prior to any construction works occurring and will include:

- Acceptable behaviour with regard to flora and fauna;
- Management and minimising of waste, including waste separation;
- Maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, lubricants, cement, mortar and other chemicals;
- Responsible handling of chemicals and spills;
- Environmental emergency procedures and incident reporting; and
- General code of conduct towards I&APs.

The ECO may be requested to provide additional training (in a first language) on-site regarding environmental aspects that are unclear to the construction personnel. A translator may be required and requested to assist in this additional training. The cost for the translator will be borne by the Contractor.

6.2.6 Contractor Performance

The Main Contractor must ensure that the conditions of the EMPr are adhered to. Should the Main Contractor require clarity on any aspect of the EMPr, the Main Contractor must contact the ECO for advice.

6.3 Layout of Environmental Management Programme

This EMPr seeks to manage and keep to a minimum the negative impacts of a development and at the same time, enhance the positive and beneficial impacts.

The EMPr specifies mitigation measures for the following environmental aspects:

6.3.1 Planning and Design Phase (Site establishment)

- Site Preparation
- Consultation
- Site clearing

6.3.2 Construction Phase

- Construction Camp
- Environmental Education and Training
- Erosion Control
- Water Use and Quality
- Waste Management
- Noise
- Flora
- Fauna
- Avifauna
- Aquatic Ecology
- Soils and Geology
- Visual Impact
- Heritage
- Social Environment
- Construction Traffic and Access
- Energy Use
- Employment
- Occupational Health and Safety
- Security

6.3.3 Operation Phase

- Construction Site Decommissioning
- Rehabilitation and Maintenance

- Operation and Maintenance
- Biodiversity
- Avifauna
- Air quality
- Aquatic Ecology
- Agriculture
- Visual Impact
- Heritage
- Social Environment
- Health and Safety

6.3.4 *Decommissioning Phase*

- Ongoing Stakeholder involvement
- Community health and safety
- Waste Management
- Biodiversity
- Aquatic Ecology
- Agriculture
- Visual Impact
- Air quality

7 PROJECT RESPONSIBILITIES

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Holder of the EA; Project Manager (PM); Contractor Project Manager (CPM), Main Contractor (MC), Safety, Health and Environment Quality Representative (SHEQ); Environmental Control Officer (ECO) and Community Liaison Officer (CLO) for the construction phase of this solar farm are as detailed below. Figure 4 provides an organogram indicating the organisational structure for the implementation of the EMPr.

Basic Organogram:

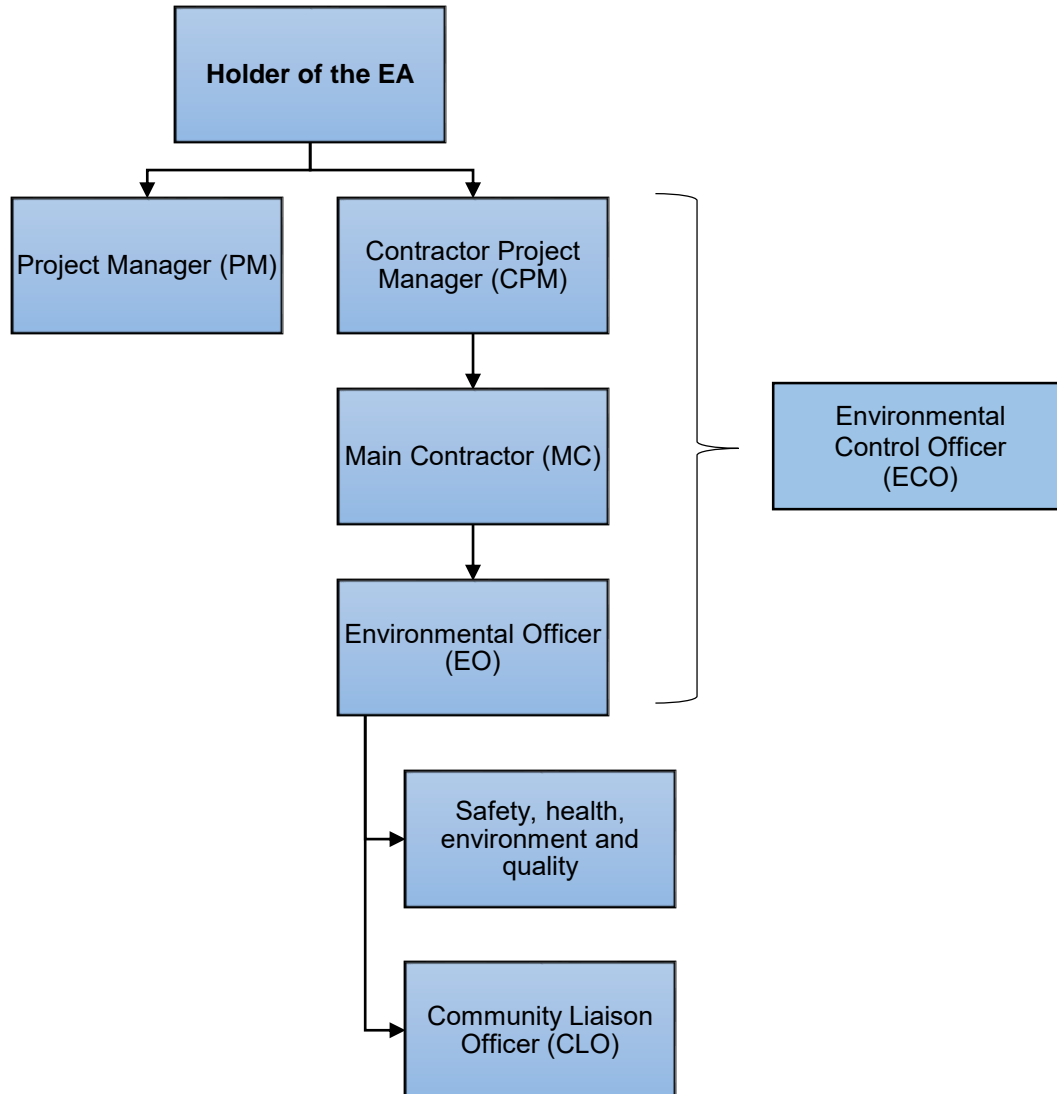


Figure 6: Organogram indicating the organisational structure

Holder of the EA 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 Wonderheuvel Solar PV Energy Facility (Pty) Ltd 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 must be documented as part of the site meeting minutes;
- Be fully conversant with the BA for the project, the EMPr, the conditions of the Environmental Authorisation (once issued), and all relevant environmental legislation; and
- Be fully knowledgeable with the contents of all relevant licences and permits.

Project Manager (PM) will:

- Be fully knowledgeable with the contents of the EIA and risk management;
- Be fully knowledgeable with the contents and conditions of the Environmental Authorisation (once issued);
- Be fully knowledgeable with the contents of the EMPr;
- Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with these;
- Have the overall responsibility of the EMPr and its implementation;
- Conduct audits to ensure compliance to the EMPr;
- Ensure there is communication with the Technical Director, the ECO, and relevant discipline engineers on matters concerning the environment;
- Be fully knowledgeable with the contents of all relevant licences and permits;
- Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site; and
- Confine activities to the demarcated construction site.

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

- Be fully knowledgeable with the contents with the EIA;
- Be fully knowledgeable with the contents and the conditions of the Environmental Authorisation (once issued);
- Be fully knowledgeable with the contents of the EMPr;
- Be fully knowledgeable of all the licences and permits issued to the site;
- Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with them;
- Ensure that the contents of this document are communicated to the Contractor site staff and that the Site Manager and Contractor are constantly made aware of the contents through discussion;
- Ensure that the compliance of the EMPr, EA and the legislation is monitored through regular and comprehensive inspection of the site and surrounding areas;
- Ensure that 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);
- Monitoring and verification must be implemented to ensure that environmental impacts are kept to a minimum, as far as possible;
- Ensure that the Site Manager has input into the review and acceptance of construction methods and method statements;
- Ensure that activities on site comply with all relevant environmental legislation;

- Ensure that a removal is ordered of any person(s) and/or equipment responsible for any contravention of the specifications of the EMPr;
- Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO;
- Ensure that the compilation of progress reports for submission to the Technical Director, with input from the Site Manager, takes place on a regular basis, including a final post-construction audit;
- Ensure that there is communication with the Site Manager regarding the monitoring of the site;
- Ensure that any non-compliance or remedial measures that need to be applied are reported; and
- Submit independent reports to the DEA and other regulating authorities regarding compliance with the requirements of the EMPr, EA and other environmental permits.

The ECO must be present for the site preparation and initial clearing activities to ensure the correct demarcation of no-go areas, to facilitate environmental induction with construction staff and 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). The developer should appoint a designated Environmental Officer (EO) to be present on-site to deal with any environmental issues as they arise. 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.

Contractors and Service Providers: It is important that contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The 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 farm;
- 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; and
- 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 adherence to the environmental management specifications;
- Ensuring that Method Statements are submitted to the Site Manager (and ECO) for approval before any work is undertaken;
- Any lack of adherence to the above will be considered as non-compliance to the specifications of the EMPr;
- Ensuring that any instructions issued by the Site Manager on the advice of the ECO are adhered to;
- Ensuring that a report is tabled at each site meeting, which will document all incidents that have occurred during the period before the site meeting;
- Ensuring that a register is kept in the site office, which lists all transgressions issued by the ECO;

- Ensuring that a register of all public complaints is maintained; and
- Ensuring that all employees, including those of sub-contractors receive training before the commencement of construction in order 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)

The EO must be appointed by the Main Contractor and is responsible for managing the daily onsite implementation of the EMPr, and for the compilation of weekly environmental monitoring reports. In addition, the EO must act as liaison and advisor on all environmental and related issues, seek advice from the ECO when necessary, and ensure that any complaints received from I&APs are duly processed and addressed and that conflicts are resolved in an acceptable manner and timely manner. The EO must be a full time dedicated member of the Main Contractor's team and must be approved by the Holder of the EA.

The following qualifications, qualities and experience are recommended for the individual appointed as the EO:

- A relevant environmental diploma or degree in natural sciences, as well as a minimum of three years' experience in construction site monitoring, excluding health and safety;
- A level-headed and firm person with above-average communication and negotiating skills. The ability to handle and address conflict management situations will be an advantage; and
- Relevant experience in environmental site management and EMPr compliance monitoring.

The EO's responsibilities include:

- Monitoring, on a daily basis, environmental specifications on site and compliance with the conditions of the EA, environmental legislation and EMPr;
- Keeping a register of compliance / non-compliance with the environmental specifications;
- Identifying and assessing previously unforeseen, actual or potential impacts on the environment;
- Ensuring that a brief weekly environmental monitoring report is submitted to the ECO;
- Conducting site inspections during the defects liability period, and bringing any environmental concerns to the attention of the ECO and Contractor;
- Advising the Contractor on the rectification of any pollution, contamination or damage to the construction site, rights of way and adjacent land;
- Attending site meetings (scheduled and *ad hoc*);
- Presenting the environmental awareness training course to all staff, Contractors and Sub contractors, and monitoring the environmental awareness training for all new personnel on-site, as undertaken by the Contractor;
- Ensuring that a copy of the EA and the latest version of the EMPr are available on site at all times;
- Ensuring that the Contractor is made aware of all applicable changes to the EMPr that are approved by the DEA;
- Assisting the Contractor in drafting environmental method statements and/or the Environmental Policy where such knowledge/expertise is lacking;
- Undertaking daily environmental monitoring to ensure the Contractor's activities do not impact upon the receiving environment. Such monitoring must include dust, noise and water monitoring; and
- Maintaining the following on site:
 - A weekly site diary.
 - A non-conformance register.
 - An I&AP communications register, and
 - A register of audits.

The EO will remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site is handed over to the Operator.

Contractor's Safety, Health and Environment Representative: The Contractor's Safety, Health and Environment and Quality (SHEQ) Representative, employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMP, and for the compilation of regular (usually weekly) Monitoring Reports. In addition, the SHE must act as liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor. A separate Environmental Officer (EO) may be appointed to support this function.

The Contractor's Safety, Health and Environment Representative and/or Environmental Officer 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 EMP-related activities on site.

7.1 Responsible Parties and Auditing Process

Table 8: Responsible Parties and Auditing Process

TITLE	PARTY	ROLE DURING CONSTRUCTION	ROLE DURING OPERATION	ROLE DURING DECOMMISSIONING
Holder of the EA	Wonderheuveld Solar farm (Pty) Ltd (Holder of EA)	Assume ultimate responsibility	Assume ultimate responsibility	Assume ultimate responsibility
Project Manager	To be appointed by Holder of the EA	Construction management	N/A	Decommissioning management
Contractor's Project Manager	To be appointed by Holder of the EA	Project management	N/A	Project management of decommissioning
Main Contractor/s	There will be multiple contracts placed and managed by the Contractor's Project Manager for the construction phase. These will cover civil earthworks and concrete, structural mechanical and electrical / instrumentation. Then there could also be the construction camp management contract.	Main Contractor will undertake day to day construction activities covering aspects such as civil earthworks and concrete, structural mechanical and electrical / instrumentation.	N/A	Main Contractor will undertake day to day decommissioning activities.

TITLE	PARTY	ROLE DURING CONSTRUCTION	ROLE DURING OPERATION	ROLE DURING DECOMMISSIONING
Environmental Officer	To be appointed by Main Contractors	Day to day environmental responsibility, point of contact for ECO	N/A	Day to day environmental responsibility, point of contact for ECO
Environmental Control Officer	To be appointed by Holder of the EA	Monthly audits	Annual audits	Day to day environmental responsibility, point of contact for ECO

Unless otherwise stated, the EMPr will be adhered to as follows:

- The EO will be the responsible party for all daily compliance of this EMPr during the construction phase;
- The monitoring party will be the ECO;
- Method of record keeping will be monthly audits undertaken by the ECO;
- Audit Technique will be the review of records and documentation (including EMPr/EA/permits) that will be kept on site by the EO and/ or site inspections; and

The Holder of the EA will bear ultimate responsibility during the construction, operational and decommissioning phase.

8 MANAGEMENT PROGRAMME

8.1 Planning and Design Phase

- Makes sure that the design of the solar farm responds to the identified environmental constraints and opportunities.
- Makes sure that pre-construction activities are undertaken in accordance with all relevant legislative requirements.
- Makes sure that adequate regard has been taken of identified environmental sensitivities, as well as any landowner and community concerns and that these are appropriately addressed through design and planning (where applicable).
- Permits construction activities to be undertaken without significant disruption to other land uses and activities in the area.
- Makes sure that the best environmental options are selected for the solar farm.

8.1.1 Site Preparation

This section deals with the preparation of the site and actions that need to be implemented before construction commences.

Table 9: Site preparation

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Site preparation: Appoint construction team and suitable manager	1. Carefully plan to minimise the construction period and avoid construction delays. 2. Appoint an Environmental Control Officer and Environmental Liaison Officer. The ELO is appointed on the contractor's behalf while the ECO is appointed on the Holder of the EA's behalf. 3. The Contractor must draw up method statements for relevant construction activities. The ECO must approve all of the method statements before they become operational.	Holder of the EA	Avoid construction delays. Ensure the EMPr is adhered to.
Site preparation:	4. All Construction Camp(s) are to be fenced off in such a manner that unlawful entry is prevented and access is controlled.	Holder of the EA	Ensure safety of the public and prevent loss/ damage equipment.

<p>Site demarcation and compliance</p>	<p>Signage must be erected at all access points in compliance with all applicable occupational health and safety requirements. All access points to the Construction Camp must be controlled by a guard or otherwise monitored, to prevent unlawful access.</p> <p>5. The contractor and ECO must ensure compliance with conditions described in the EA.</p> <p>6. Records of compliance / non-compliance with the conditions of the authorisation must be kept and be available on request.</p> <p>7. Records of all environmental incidents must be maintained and a copy of these records be made available to provincial department on request throughout the project execution.</p> <p>8. A suitable licensed landfill site must be identified, which will accept the type of waste material to be generated.</p> <p>9. Where water course crossings are required, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion (erosion protection) as well minimise the loss of riparian vegetation (reduce footprint as much as possible).</p>		<p>Ensure the conditions of the EA are adhered to.</p> <p>Compliance to all legislative requirements.</p> <p>Erosion plan implemented and hydrological measures in place</p> <p>Appropriate stormwater structures incorporated in final design.</p>
<p>Site preparation: Labour</p>	<p>10. All unskilled labourers must be drawn from the local market and where possible use must be made of local semi-skilled and skilled personnel where possible.</p> <p>11. A procurement policy promoting the use of local business should, where possible, be put in place to be applied throughout the construction phase</p> <p>12. Women should be given equal employment opportunities and encouraged to apply for positions.</p> <p>13. A skills transfer plan should be put in place at an early stage and workers should be given the opportunity to develop skills</p>	<p>Holder of the EA</p>	<p>Fair employment practices in place</p> <p>Maintain a locals first recruitment policy as far as possible, reduced social impact from development</p>

	which they can use to secure jobs elsewhere post-construction.		
Site preparation: Training of site staff	<p>14. Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts.</p> <p>15. Project Manager must ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks.</p> <p>16. Staff operating equipment (such as loaders, etc.) must be adequately trained and sensitised to any potential hazards associated with their tasks.</p> <p>17. No operator must be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager.</p> <p>18. Staff must be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training.</p> <p>19. Staff must be trained in the hazards and required precautionary measures for dealing with these substances</p> <p>20. Spillage packs must be available at construction areas.</p>	Holder of the EA	<p>All staff members are aware of the EMP requirements relevant to them</p> <p>All waste managed according to approved Method Statement</p>
Site preparation: Specialist Assessments	<p>21. It is recommended to undertake a "dry-run" with the largest abnormal load vehicle, prior to the transportation of any PV panel components, to ensure that the delivery of the PV panels will occur without disruptions.</p> <p>22. A detailed pre-construction walk-through survey must be undertaken by the Terrestrial Ecologist during a favourable</p>	Holder of the EA	<p>The design fully responds to the recommendations of the specialists.</p> <p>Pre-construction walk through conducted, sensitive areas demarcated</p>

	<p>season to locate any additional individuals of protected plants. This survey must cover the footprint of all approved infrastructure, including internal access roads.</p> <p>23. A heritage walk down of the final approved layout must be undertaken before construction commences. Micro siting will be required if significant sites will be affected.</p> <ul style="list-style-type: none"> a. Any heritage features of significance identified during this walk down will require formal mitigation or where possible a slight change in design to accommodate such resources. b. A 30m buffer should be applied to all Stone Age find spots and sites. 		<p>Erosion plan implemented and hydrological measures in place</p> <p>Impacts to heritage features avoided or managed as per specialist recommendations. Input obtained from heritage authorities</p>
<p>Site preparation: General</p>	<p>24. Plants lost to the development must be rescued and planted in appropriate places in rehabilitation areas.</p> <p>25. Ensure that lay-down and other temporary infrastructure is within low- sensitivity areas, preferably previously transformed areas if possible</p> <p>26. Wherever possible, locate infrastructure within areas that have been previously disturbed or in areas with lower sensitivity scores.</p> <p>27. Access and service roads must be kept to a minimum and routes must also be adjusted to avoid areas of high sensitivity as far as possible, as informed by a pre-construction walk-through surveys.</p> <p>28. Cross streams and other linear features at right angles, where possible, and also near their end-points or where there are natural breaks in the feature.</p> <p>29. Ensure that the design of the PV Energy Facility takes the sensitivity mapping of the specialists into account to avoid</p>	<p>Holder of the EA</p>	<p>Plant Rehabilitation Implemented</p> <p>Plant Rescue Plan Implemented</p> <p>Ecological Management Plan</p> <p>Appropriate stormwater structures incorporated in design</p>

	<p>and/or reduce the impacts on Species and habitats of Conservation Concern.</p> <p>30. Where possible, the operation and maintenance buildings must be consolidated to reduce visual clutter.</p> <p>31. The operation and maintenance buildings must be painted with natural tones that fit with the surrounding environment. Non-reflective surfaces should be utilised where possible.</p> <p>32. Personnel must be educated about protection status of terrestrial species, including distinguishing features to be able to identify protected species.</p> <p>33. Ensure that the detailed design avoids all sensitive water resources</p>		
SPECIFIC MITIGATION MEASURES			
	<p>34. A procurement policy promoting the use of local business should, where possible, be put in place to be applied throughout the construction phase</p> <p>35. Women should be given equal employment opportunities and encouraged to apply for positions.</p> <p>36. A skills transfer plan should be put in place at an early stage and workers should be given the opportunity to develop skills which they can use to secure jobs elsewhere post-construction.</p> <p>37. A single perimeter fence should be used. Alternatively, the two (2) fences should be at least 4m apart to allow medium to large birds enough space to take off.</p>	Holder of the EA	<p>Fair employment practices in place</p> <p>Maintain a locals first recruitment policy as far as possible, reduced social impact from development</p> <p>The design fully responds to the recommendations of the specialists.</p>

8.1.2 Consultation

This section deals with the public consultation of the site and actions that need to be implemented before construction commences

Table 10: Consultation

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Consultation	<ol style="list-style-type: none"> 1. Provide a mechanism through which information could be exchanged between the Holder of the EA and stakeholders. 2. Identify relevant stakeholders and engage them at applicable stages of the construction process. 3. Inform the public about the proposed construction process. 4. Surrounding communities must be kept informed, through the identified and agreed consultation channels, of the commencement of construction. 5. Solicit views and concerns from the public and allow them to suggest mitigations and enhancement measures. 	Holder of the EA	Clear communication channels established

8.1.3 Site Clearing

This section deals with site clearing and actions that need to be implemented before construction commences

Table 11: Site Clearing

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Site Clearing	<ol style="list-style-type: none"> 1. Site clearing must take place in a phased manner, as and when required. 2. Areas which are not to be constructed on within two (2) months must not be cleared to reduce erosion risks. 3. The area to be cleared must be clearly demarcated and this footprint strictly maintained. 4. Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site. 5. The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. 	Holder of the EA	Site establishment undertaken in line with the requirement of the EMPr

			<p>Pre-construction walk through conducted, sensitive areas identified.</p> <p>Erosion plan implemented and hydrological measures in place.</p> <p>Appropriate stormwater structures incorporated in final design.</p> <p>Plant Rehabilitation Implemented</p> <p>Plant Rescue Plan Implemented</p> <p>Ecological Management Plan</p> <p>ey sensitive areas avoided</p>
SPECIFIC MITIGATION MEASURES			

	<p>6. If electric fences are to be constructed, these should be erected according to the standards of Nature Conservation authorities.</p> <p>7. Avoid construction of infrastructure within sensitive habitats.</p> <p>8. Restrict impact to development footprint only and limit disturbance spreading into surrounding areas.</p> <p>9. Implement traffic control measures, including speed limits and no-go ones</p> <p>10. Stockpile topsoil for re-use in rehabilitation phase. Maintain stockpile shape and protect from erosion. All stockpiles must be positioned at least 50m away from watercourses. Limit the height of stockpiles as far as possible in order to reduce compaction.</p> <p>11. Disturbance of vegetation and topsoil must be kept to a practical minimum.</p>	Holder of the EA	<p>Impacts avoided or managed as per specialist recommendations.</p> <p>Pre-construction walk through conducted, sensitive areas identified.</p> <p>Erosion plan implemented and hydrological measures in place.</p> <p>Appropriate stormwater structures incorporated in final design.</p> <p>Plant Rehabilitation Implemented</p> <p>Plant Rescue Plan Implemented</p> <p>Ecological Management Plan</p> <p>ey sensitive areas avoided</p>
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8.2 Construction Phase

- Makes sure that construction activities are properly managed in respect of environmental aspects and impacts.
- Makes sure 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, protected tree species, and habitats of ecological value.
- Minimises impacts on fauna using the site.
- Minimises the impact on heritage sites should they be uncovered.

8.2.1 Construction Camp

This section deals with construction camp and actions that need to be implemented during construction

Table 12: Construction Camp

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
<p>Construction Camp: Site of construction camp</p>	<ol style="list-style-type: none"> 1. The Contractor's camp must take into account location of local residents and / or ecologically sensitive areas (such as wetlands and drainage lines), including flood zones. The Construction camp position will be determined by the Environmental Authorisation. 2. The site of the construction camp must be where technically feasible minimised 3. Adequate parking must be provided for site staff and visitors. The Contractor must attend to drainage of the camp site to avoid standing water and / or sheet erosion. 4. Suitable control measures over the Contractor's yard (Clean and tidy yard area) plant (not causing smoke, and or, noise pollution unnecessarily) and material storage (organised, and neat) to mitigate any visual impact of the construction activity must be implemented. 	<p>Holder of the EA</p>	<p>Ensure the conditions of the EA are adhered to.</p> <p>Compliance to all legislative requirements.</p> <p>Impacts avoided or managed as per specialist recommendations.</p>

<p>Construction Camp: Construction camp</p>	<ol style="list-style-type: none"> 5. The ECO and Contractor must inspect the Construction Camp site to confirm and note any environmental sensitivity. 6. The construction camp layout plan must be provided to the ECO for approval prior to the construction of the camp. 7. The construction camp must be fenced off and on-site security must be put in place prior to commencing with the construction activities. 8. The Contractor must supply a wastewater management system that will comply with legal requirements and be acceptable to the Holder of the EA if this does not already exist on the site. 9. Site establishment must take place in an orderly manner and all required amenities must be installed at camp sites before the main workforce move onto site. 10. All construction equipment must be stored within the construction camp unless temporarily stored at immediate area where work is undertaken. 11. All oil changes must take place on a sealed surface such as a concrete slab that is bunded, or a similar appropriate surface. 12. The Construction Camp must be provided with portable fire extinguishing equipment, in accordance with all relevant legislation and must be readily accessible. 13. The Contractor must provide sufficient ablution facilities (1 toilet per every 15 workers), in the form of portable / VIP toilets, at the Construction Camps, and must conform to all relevant health and safety standards and codes. No pit latrines, French drain systems or soak away systems must be allowed and toilets must not be situated within 100 meters of any surface water body or 1:100 year flood line. 	<p>Holder of the EA</p>	<p>Ensure the conditions of the EA are adhered to.</p> <p>Compliance to all legislative requirements.</p> <p>Impacts avoided or managed as per specialist recommendations.</p> <p>Ensure safety of the public and prevent loss/ damage equipment.</p> <p>All hazardous substances managed according to approved Method Statement.</p> <p>No unauthorised open fires on site.</p>
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	<p>14. The Contractor must inform all site staff to make use of supplied ablution facilities and under no circumstances must indiscriminate sanitary activities be allowed.</p> <p>15. No fires will be allowed and the Contractor must make alternative arrangements for heating. LP Gas must be used, provided that all required safety measures are in place. The Contractor must take specific measures to prevent the spread of veld fires, caused by activities at the campsites. These measures must include appropriate instruction of employees about fire risks and the construction of firebreaks around the site perimeter.</p> <p>16. Should an area for cooking be required, it must be inspected and approved by the ECO prior to use.</p>		
<p>Construction Camp: Storage of materials (including hazardous materials)</p>	<p>17. An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and that provides for spillage prevention and containment.</p> <p>18. Choice of location for storage areas must take into account prevailing winds, distances to water bodies, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary.</p> <p>19. Storage areas must be designated, demarcated and fenced if necessary.</p> <p>20. Storage areas must be secure so as to minimize the risk of crime. They must also be safe from access by unauthorised persons i.e. children / animals etc.</p> <p>21. Fire prevention facilities must be present at all storage facilities.</p> <p>22. Proper storage facilities for the storage of oils, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground</p>	Holder of the EA	All hazardous substances managed according to approved Method Statement.

	<p>and groundwater regime around the temporary storage area(s). These pollution prevention measures for storage must include a bund wall high enough to contain at least 110 of any stored volume, and this must be sited away from drainage lines on a site with the approval of the ECO.</p> <p>23. All fuel storage areas must be roofed to avoid creation of dirty storm water</p> <p>24. Material Safety Data Sheets (MSDSs) must be readily available on site for all chemicals and hazardous substances to be used on site. Where possible the available, MSDSs must additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.</p> <p>25. Storage areas containing hazardous substances / materials must be clearly signposted.</p> <p>26. Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.</p> <p>27. All excess cement and concrete mixes are to be contained within a bunded area on the construction site prior to disposal off site.</p> <p>28. All major spills as specified in the contractor emergency response procedure of any materials, chemicals, fuels or other potentially hazardous or pollutant substances must be cleaned immediately, and the cause of the spill investigated. Preventative measures must be identified and submitted to the MC and ECO for information. Emergency response procedures to be followed and implemented.</p>		
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<p>Construction Camp: Drainage of construction camp</p>	<p>29. Surface drainage measures must be established in the Construction Camps so as to prevent</p> <ul style="list-style-type: none"> • Ponding of water; • Erosion as a result of accelerated runoff; and, • Uncontrolled discharge of polluted runoff. 	<p>Holder of the EA</p>	<p>Storm Water Management Plan provided and accepted prior to construction commencing</p> <p>Storm Water Management Plan implemented</p> <p>Appropriate stormwater structures incorporated in final design.</p> <p>Erosion plan implemented and hydrological measures in place.</p>
<p>Construction Camp: Reporting on suspicious activities</p>	<p>30. Encourage local people to report any suspicious activity associated with the construction sites through the establishment of a community liaison forum;</p> <p>31. Prevent loitering within the vicinity of the construction camp as well as construction sites.</p>	<p>Holder of the EA</p>	<p>Clear communication channels established</p>
SPECIFIC MITIGATION MEASURES			
	<p>32. All oils, fuels and hazardous substances or liquids must not be stored within 100m from the full extent of the watercourse and the associated buffer zone, unless such storage is unavoidable and is approved by the ECO.</p> <p>33. Where these items are stored, the storage area must be adequately bunded to contain any spillage from containers.</p> <p>34. Emergency spill kits must be available to clean up and remove spills.</p> <p>35. The ECO must also monitor increased run-off and associated erosion impacts. Where additional mitigation measures are</p>	<p>Holder of the EA</p>	<p>All hazardous substances managed according to approved Method Statement.</p>

	stipulated by the ECO in order to control increased run-off and erosion, this is to be undertaken accordingly.		
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8.2.2 Environmental Education and Training

This section deals with the environmental training of construction employees.

Table 13: Environmental Education and Training

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Environmental education and training: Environmental training	<ol style="list-style-type: none"> 1. The Holder of the EA must appoint an ECO prior to construction 2. Ensure that all site personnel have a basic level of environmental awareness training. The ECO will be responsible for the training and topics covered must include: <ul style="list-style-type: none"> • What is meant by “Environment”; • Why the environment needs to be protected and conserved; • How construction activities can impact on the environment; • What can be done to mitigate against such impacts; • Awareness of emergency and spills response provisions; • Social responsibility during construction e.g. being considerate to local residents; and • Specific mitigation measures stipulated in the EMPr and EA. 3. Environmental awareness training for all construction staff must be undertaken by the ECO prior to construction starting. Translators are to be used where necessary. The topics covered must include, but not be limited to the following: <ul style="list-style-type: none"> • Use of the appropriate fire-fighting equipment; 	Holder of the EA	All staff members are aware of the EMPr requirements relevant to them.

	<ul style="list-style-type: none"> • The need for a “clean site” policy; • The prevention of accidental spillage of hazardous chemicals and oil; • Pollution of water resources (both surface and groundwater); • Air pollution and litter control; • The need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources; and • General safety. <p>4. Training of new staff that did not receive the initial training is the responsibility of the ECO.</p> <p>5. Staff operating equipment (such as cranes, etc.) must be adequately trained and sensitised to any potential hazards associated with their tasks.</p> <p>6. No operator must be permitted to operate critical mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager.</p>		
Environmental education and training: Monitoring of environmental training	<p>7. The Contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction have been properly understood and are being followed. If necessary, the ECO and / or a translator must be called to the site to further explain aspects of environmental or social behaviour that are unclear. Toolbox talks are required</p>	Holder of the EA	Thorough induction to site.
SPECIFIC MITIGATION MEASURES			
	<p>8. Personnel on site should undergo environmental induction training, including the need to abide by speed limits, the increased risk of collisions with wild animals on roads in rural areas.</p> <p>9. Make staff aware of the dangers of fire during regular toolbox talks</p>	Holder of the EA	Impacts avoided or managed as per specialist recommendations.

8.2.3 Erosion Control

This section deals with erosion issues and actions that need to be implemented during construction

Table 14: Erosion Control

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Erosion Control	<ol style="list-style-type: none"> 1. Wind screening and storm water control must be undertaken to prevent soil loss from the site. 2. The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion, if any. 3. All erosion control mechanisms need to be regularly maintained. 4. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces. 5. Retention of vegetation where possible to avoid soil erosion 6. Vegetation clearance must be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. 7. Re-vegetation of disturbed surfaces must occur immediately after construction activities are completed. 8. No impediment to the natural water flow other than approved erosion control works is permitted. 9. Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion. 	Holder of the EA	<p>Erosion plan implemented and hydrological measures in place.</p> <p>Erosion minimised and due care illustrated throughout project life cycle</p> <p>Appropriate stormwater structures incorporated in final design.</p>
SPECIFIC MITIGATION MEASURES			
	10. Compile and implement a stormwater management plan, which highlights control priorities and areas and provides a programme for long-term control.	Holder of the EA	Storm Water Management Plan provided and accepted prior to construction commencing

	<ol style="list-style-type: none"> 11. Undertake regular monitoring to detect erosion features early so that they can be controlled. 12. Avoid building on or near steep or unstable slopes. 13. Erosion must be controlled where necessary on top-soiled areas. 14. Construct proper culverts, bridges and/or crossings at drainage-line crossings, and other attenuation devices to limit overland flow. 15. Use of berms and drainage channels to direct water away from the construction areas where necessary 16. Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. 17. Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there. This system must be in place and maintained during all phases of the development. 18. All stockpiles must be positioned at least 50m away from watercourses. 19. Limit the height of stockpiles as far as possible in order to reduce compaction. 20. Control run-off; maintain vegetation cover; strip, stockpile and re-spread topsoil 21. The substation, access road, and maintenance and operation buildings must have energy dissipating structures where required to prevent increased run-off and sediments contained in the run-off entering adjacent areas or surface water resources. 		<p>Storm Water Management Plan .implemented</p> <p>Appropriate stormwater structures incorporated in final design</p> <p>Erosion plan implemented and hydrological measures in place.</p>
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	22. Minimise earthworks and levelling 23. Use existing access roads wherever possible 24. Rehabilitate disturbed areas as soon as possible		
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8.2.4 Water Use and Quality and Aquatic Ecology

This section deals with water use and quality issues and actions that need to be implemented during construction

Table 15: Water Use and Quality and aquatic ecology

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Water Use and Quality: Water Use	1. Develop a sustainable water supply management plan to minimise the impact to natural systems by managing water use, avoiding depletion of aquifers and minimising impacts to water users. 2. Water must be reused, recycled or treated where possible. 3. Consultation with key stakeholders to understand any conflicting water use demands and the community's dependency on water resources and conservation requirements within the area.	Holder of the EA	Compliance to all legislative requirements. Water Management Plan
Water Use and Quality: Water quality	4. The quality and quantity of effluent streams discharged into the environment including storm water must be managed and treated to meet applicable effluent discharge guidelines. 5. Efficient oil and grease traps or sumps must be installed and maintained at refuelling facilities, workshops, fuel storage depots, and containment areas and spill kits must be available with emergency response plans.	Holder of the EA	Storm Water Management Plan implemented. Waste Management Plan Implemented
Water Use and Quality: Storm Water	6. The site must be managed in order to prevent pollution of drains, downstream watercourses or groundwater, due to suspended solids and silt or chemical pollutants. 7. Temporary cut off drains and berms must be required to capture storm water and promote infiltration.	Holder of the EA	Storm Water Management Plan implemented.

	<p>8. Promote a water saving mind set with construction workers in order to reduce water wastage.</p> <p>9. New storm water systems must be developed strictly in accordance with engineers' specifications in order to ensure efficiency.</p> <p>10. Hazardous substances (fuel) must be stored at least 20m from any water bodies on site to avoid pollution.</p> <p>11. The installation of the storm water system must take place as soon as possible to attenuate storm water from the construction phase as well as the operation phase.</p> <p>12. Earth, stone and rubble is to be properly disposed of, or utilized on site so as not to obstruct natural water pathways over the site. i.e. these materials must not be placed in storm water channels, drainage lines or rivers.</p> <p>13. There must be periodic checking of the site's drainage system to ensure that the water flow is unobstructed.</p> <p>14. If a batching plant is necessary, run-off must be managed effectively to avoid contamination of other areas of the site. Untreated runoff from the batch plant must not be allowed to get into the storm water system or nearby streams, rivers or erosion channels or dongas.</p>		
Water Use and Quality: Concrete Mixing	15. Concrete contaminated water must not enter soil or any natural drainage system as this disturbs the natural acidity of the soil and affects plant growth.	Holder of the EA	Batching plant managed according to approved Method Statement
Water Use and Quality: Public areas	<p>16. Food preparation areas must be provided with adequate washing facilities and food refuse must be stored in sealed refuse bins which must be removed from site on a regular basis.</p> <p>17. The contractor must take steps to ensure that littering by construction workers does not occur and persons must be</p>	Holder of the EA	All staff members are aware of the EMPr requirements relevant to them.

	<p>employed on site to collect litter from the site and immediate surroundings, including litter accumulating at fence lines.</p> <p>18. No washing or servicing of vehicles on site unless in abounded area and agreed to by the ECO.</p>		<p>Storm Water Management Plan .implemented.</p> <p>Compliance to all legislative requirements.</p> <p>All waste managed according to approved Method Statement</p> <p>Vehicles repaired as per the approved Method Statement for vehicles management</p>
Water Use and Quality: General	19. Ensure that the Department Water and Sanitation and the respective Local Municipalities are continuously engaged with.	Holder of the EA	Clear communication channels established
Aquatic Ecology: Sanitation	20. The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution.	Holder of the EA	All waste managed according to approved Method Statement
Aquatic Ecology: Ha arduous materials	<p>21. Use and / or storage of materials, fuel and chemicals which could potentially leak into the ground must be controlled.</p> <p>22. The Contractor (monitored by the ECO or EO) must be responsible for ensuring that potentially harmful materials are properly stored in a dry, secure, ventilated environment, with concrete or sealed flooring and a means of preventing unauthorised entry.</p> <p>23. All storage tanks containing ha arduous materials must be placed in banded containment areas with sealed surfaces. The</p>	Holder of the EA	<p>All ha arduous substances managed according to approved Method Statement.</p> <p>Compliance to all legislative requirements.</p>

	<p>bund walls must be high enough to contain 110 of the total volume of the stored hazardous material.</p> <p>24. Any hazardous substances must be stored at least 100m from any of the water bodies on site.</p> <p>25. Contaminated wastewater must be managed by the Contractor to ensure that existing water resources on the site are not contaminated. All wastewater from general activities in the camp must be collected and removed from the site for appropriate disposal at a licensed commercial facility</p>		
<p>Aquatic Ecology: Water resources</p>	<p>26. Site staff must not be permitted to use any open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction or related activities.</p> <p>27. Municipal water (or another source approved by the ECO) must instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting, etc.</p> <p>28. Relevant departments and other emergency services must be contacted in order to deal with spillages and contamination of aquatic environments.</p>	Holder of the EA	<p>Ensure the EMPr is adhered to.</p> <p>Ensure the conditions of the EA are adhered to.</p> <p>Compliance to all legislative requirements.</p> <p>All staff members are aware of the EMPr requirements relevant to them</p>
SITE SPECIFIC MITIGATION MEASURES			
	<p>29. An Alien Eradication and Removal Programme must be compiled prior to construction and implemented for the duration of the proposed development.</p> <p>Impacts to watercourses</p>	Holder of the EA	<p>Implementation of Alien Invasive Species Management</p> <p>Impacts avoided or managed as per specialist recommendations.</p> <p>Erosion plan implemented and hydrological measures in place</p>

	<p>30. No vegetation trimming and / or pruning must take place along the existing access roads running through the extent of the watercourse.</p> <p>31. However, where nearby vegetation trimming and / or pruning is required outside the extent of the watercourse, this must take place accordance with vegetation clearance requirements and standards.</p> <p>32. Vegetation clearing must take place in a phased manner, only clearing areas where construction will take place and not in areas where construction will only take place in the future.</p> <p>33. Provide sufficient facilities for litter disposal. Regular clean ups are required to keep the construction area and adjacent watercourses clean.</p> <p>Impacts to Hydrology</p> <p>34. Adequate structures, where necessary, must be put into place (temporary or permanent where necessary in extreme cases) to deal with increased/accelerated run-off and potential erosion. The use of silt fencing and potentially sandbags or hessian “sausage” nets or other appropriate measures along the boundaries of the structure foundations and maintenance and operation buildings can be used where required to slow run-off entering the watercourses and the associated buffer ones, thereby preventing increase in flood peaks, run-off volumes and also the likelihood of erosion.</p> <p>Impacts to Water Quality</p> <p>35. All oils, fuels and hazardous substances or liquids must not be stored within 100m from the full extent of the watercourse and the associated buffer one, unless such storage is unavoidable</p>		<p>Storm Water Management Plan implemented</p> <p>All waste managed according to approved Method Statement</p>
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	<p>and is approved by the ECO. Where these items are stored, the storage area must be adequately bunded to contain any spillage from containers. Emergency spill kits must be available to clean up and remove spills.</p> <p>36. All vehicles and machinery operating on the study site are to be checked for oil, fuel or any other fluid leaks before entering the construction areas. All vehicles and machinery must be regularly serviced and maintained before being allowed to enter the construction areas. No fuelling, re-fuelling, vehicle and machinery servicing or maintenance is to take place within 100m of the watercourse and the associated buffer one.</p> <p>37. The study site is to contain sufficient safety measures throughout the construction process. Safety measures include (but are not limited) oil spill kits and the availability of fire extinguishers. Additionally, fuel, oil or hazardous substances storage areas must be bunded to 110 capacity to prevent oil or fuel contamination of the ground and / or nearby watercourses and the associated buffer ones.</p> <p>38. No cement mixing is to take place in the watercourse or the associated buffer one. In general, any cement mixing should take place over a bin lined (impermeable) surface or alternatively in the load bin of a vehicle to prevent the mixing of cement with the ground. Cement / concrete can also be trucked in readymix vehicles. Importantly, no mixing of cement or concrete directly within the watercourse and associated buffer one.</p> <p>39. No “long drop” toilets are allowed on the study site. Suitable temporary chemical sanitation facilities are to be provided. Temporary chemical sanitation facilities must be placed at least 100 meters from the watercourse and the associated buffer</p>		
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	<p>one where required. Temporary chemical sanitation facilities must be checked regularly for maintenance purposes and cleaned often to prevent spills.</p> <p>40. Adequate structures, where required, must be put into place (temporary or permanent where necessary in extreme cases) to deal with sedimentation. The use of silt fencing and potentially sandbags or hessian “sausage” nets or other appropriate measures along the boundaries of the structure foundations, and maintenance and operation buildings can be used where required to prevent and / or reduce sediments entering the watercourse and the associated buffer one.</p>		
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8.2.5 Waste Management

This section deals with waste management issues and actions that need to be implemented during construction

Table 16: Waste Management

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
<p>Waste Management: Litter Management</p>	<ol style="list-style-type: none"> 1. Refuse bins must be placed at strategic locations to ensure that litter does not accumulate within the construction site. 2. The Contractor must supply waste collection bins where such are not available and all solid waste collected must be disposed of at registered/licensed landfill. 3. A housekeeping team must be appointed to regularly maintain the litter and rubble situation on the construction site. 4. If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling. 	<p>Holder of the EA</p>	<p>All waste managed according to approved Method Statement</p>

	<p>5. Littering by the employees of the Contractor must not be permitted under any circumstances. The ECO must monitor the neatness of the work sites as well as the Contractor campsite.</p> <p>6. Skip waste containers must be maintained on site. These must be kept covered and arrangements made for them to be collected regularly.</p> <p>7. All waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours.</p> <p>8. Where a registered waste site is not available close to the construction site, the Contractor must provide a method statement with regard to waste management.</p> <p>9. A certificate of disposal must be obtained by the Contractor and kept on file, if relevant.</p> <p>10. Under no circumstances will solid waste be burnt on site.</p> <p>11. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.</p> <p>12. An approved waste disposal contractor must be employed to remove and recycle waste oil, if practical. The contractor must ensure that its personnel are made aware of the health risks associated with any hazardous substances used, have been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training.</p>		
<p>Waste Management: Hazardous Waste</p>	<p>13. All hazardous waste materials, if present, must be carefully stored as advised by the ECO, and then disposed of off-site at a licensed landfill site, where practical.</p> <p>14. Contaminants to be stored safely to avoid spillage.</p> <p>15. Machinery must be properly maintained to keep oil leaks in check</p>	<p>Holder of the EA</p>	<p>All waste managed according to approved Method Statement</p>

	16. All necessary precaution measures must be taken to prevent soil or surface water pollution from hazardous materials used during construction and any spills must immediately be cleaned up and all affected areas rehabilitated		
Waste Management: Remedial Actions	<p>17. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site.</p> <p>18. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site.</p> <p>19. The ECO must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil.</p> <p>20. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material.</p> <p>21. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure.</p> <p>22. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use.</p> <p>23. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal.</p>	Holder of the EA	All waste managed according to approved Method Statement
SPECIFIC MITIGATION MEASURES			

<p>Water Use and Quality: Public areas</p>	<p>24. Storage areas must be located more than 50 m away from the watercourse.</p> <p>25. The storage of flammable and combustible liquids such as oils must be in designated areas which are appropriately bunded, and stored in compliance with MSDS files, as defined by the SHE Representative / ECO.</p> <p>26. Any spills must receive the necessary clean-up action. If required, bioremediation kits are to be kept on-site and used to remediate any spills that will occur. Appropriate arrangements to be made for appropriate collection and disposal of all cleaning materials, absorbents and contaminated soils (in accordance with a waste management plan).</p> <p>27. Any storage and disposal permits/approvals which will be required must be obtained, and the conditions attached to such permits and approvals must be complied with.</p> <p>28. Routine servicing and maintenance of vehicles must not take place on-site (except for emergency situations or large cranes which cannot be moved off-site). If repairs of vehicles must take place on site, an appropriate drip tray must be used to contain any fuel or oils.</p> <p>29. Transport of all hazardous substances must be in accordance with the relevant legislation and regulations.</p> <p>30. Waste disposal records must be available for review at any time.</p> <p>31. Construction contractors must provide specific detailed waste management plans to deal with all waste streams.</p> <p>32. 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. Location of such areas must seek to minimise the</p>	<p>Holder of the EA</p>	<p>All waste managed according to approved Method Statement</p> <p>Impacts avoided or managed as per specialist recommendations.</p>
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	<p>potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage and vermin control.</p> <p>33. Where 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).</p> <p>34. Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.</p> <p>35. Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area.</p> <p>36. Waste and surplus dangerous goods must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal.</p> <p>37. Documentation (waste manifest) must be maintained detailing the quantity, nature and fate of any hazardous waste.</p> <p>38. An incident/complaints register must be established and maintained on-site.</p> <p>39. Hazardous and non-hazardous waste must be separated at source. Separate waste collection bins must be provided for this purpose. These bins must be clearly marked and appropriately covered.</p> <p>40. All solid waste collected must be disposed of at a registered waste disposal site. A certificate of disposal must be obtained and kept on file. The disposal of waste must be in accordance with all relevant legislation. Under no circumstances will solid waste be burnt or buried on site.</p> <p>41. Supply waste collection bins at construction equipment and construction crew camps.</p>		
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	<p>42. Construction equipment must be refuelled within designated refuelling locations, or where remote refuelling is required, appropriate drip trays must be utilised.</p> <p>43. All stored fuels to be maintained within a bund and on a sealed surface.</p> <p>44. Fuel storage areas must be inspected regularly to ensure bund stability, integrity and function.</p> <p>45. Construction machinery must be stored in an appropriately sealed area.</p> <p>46. Oily water from bunds at the substation must be removed from site by licensed contractors.</p> <p>47. Spilled cement or concrete must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.</p> <p>48. Corrective action must be undertaken immediately if a complaint is received, 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.</p> <p>49. 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> <p>50. Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.</p> <p>51. Upon the completion of construction, the area must be cleared of potentially polluting materials.</p> <p>52. Identify and demarcate construction areas for general construction work and restrict construction activity to these areas. Prevent unnecessary destructive activity within</p>		
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	<p>construction areas (prevent over-excavations and double handling)</p> <p>53. Stockpile topsoil for re-use in rehabilitation phase. Maintain stockpile shape and protect from erosion. All stockpiles must be positioned at least 50 m away from watercourses. Limit the height of stockpiles as far as possible in order to reduce compaction.</p> <p>54. Any excavation, including those for cables, must be supervised by the ECO/ESO within the proposed watercourses. Disturbance of vegetation and topsoil must be kept to a practical minimum.</p> <p>55. Rehabilitate disturbance areas as soon as construction in an area is completed.</p>		
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8.2.6 Flora

This section deals with floral issues and actions that need to be implemented during construction

Table 17: Flora

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Flora: Existing Vegetation	<ol style="list-style-type: none"> 1. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step. 2. Materials must not be delivered to the site prematurely which could result in additional areas being cleared or affected. 	Holder of the EA	<p>Ensure the EMPr is adhered to.</p> <p>Ensure the conditions of the EA are adhered to.</p> <p>All staff members are aware of the EMPr requirements relevant to them</p>
Flora: Rehabilitation	<ol style="list-style-type: none"> 3. All natural areas impacted during construction must be rehabilitated with locally indigenous species typical of the representative botanical unit. Seeds from surrounding seed banks can be used for re-seeding. 	Holder of the EA	<p>Plant Rehabilitation Implemented</p> <p>Impacts avoided or managed as per specialist recommendations.</p>

	<p>4. Rehabilitation must take place in a phased approach as soon as possible.</p> <p>5. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.</p>		
Flora: Demarcation of construction and laydown areas	<p>6. All plants not interfering with the construction must be left undisturbed. Species of special concern must be clearly marked.</p> <p>7. The construction area must be well demarcated and no construction activities must be allowed outside of this demarcated footprint</p> <p>8. Vegetation removal must be phased in order to reduce impact of construction.</p> <p>9. Strict and regular auditing of the construction process to ensure containment of the construction and laydown areas.</p> <p>10. Soils must be kept free of petrochemical solutions that must be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.</p>	Holder of the EA	<p>Plant Rescue Plan Implemented</p> <p>Ecological Management Plan</p> <p>Impacts avoided or managed as per specialist recommendations.</p>
Flora: Utilisation of resources	<p>11. Gathering of firewood, fruit, muti plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO.</p>	Holder of the EA	Impacts avoided or managed as per specialist recommendations.
Flora: Exotic Vegetation	<p>12. Alien vegetation on the site will need to be controlled.</p> <p>13. The contractor must be responsible for implementing a programme of weed and exotic species control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion.</p>	Holder of the EA	Alien Plant Management Plan Implemented
SPECIFIC MITIGATION MEASURES			
	<p>14. Compile a Rehabilitation Plan for all areas affected by construction, that fall outside the permanent infrastructure footprint.</p>		<p>Impacts avoided or managed as per specialist recommendations.</p> <p>Plant Rescue Plan Implemented</p>

	<p>15. Compile an Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas and provides a programme for long-term control. Undertake monitoring to evaluate whether further measures would be required to manage impacts.</p> <p>16. Relevant permits must be obtained for specimens that will be lost.</p> <p>17. A Plant Rescue Plan must be compiled to be approved by the appropriate authorities.</p>		<p>Ensure the conditions of the EA are adhered to.</p> <p>Compliance to all legislative requirements.</p>
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8.2.7 Fauna

This section deals with faunal issues and actions that need to be implemented during construction

Table 18: Fauna

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Fauna	<ol style="list-style-type: none"> 1. No trapping or snaring of fauna on the construction site. 2. No faunal species are to be harmed by maintenance staff during any routine maintenance at the development. 3. No animals are to be kept as pets except those owned by the landowners. 4. Any trenches that are required for cabling etc., must not be left open for extended periods as fauna such as tortoises will fall in and become trapped. Any open trenches must be checked regularly for trapped fauna. 5. Access to sensitive areas outside of development footprint must not be permitted during construction. 6. Speed limits should be set for all roads on site, as well as access roads to the site. Strict enforcement of speed limits should occur – install speed control measures, such as speed humps, if necessary. 	Holder of the EA	<p>Impacts avoided or managed as per specialist recommendations.</p> <p>Ensure the conditions of the EA are adhered to.</p> <p>Compliance to all legislative requirements</p> <p>Impacts avoided or managed as per specialist recommendations.</p> <p>Ensure the conditions of the EA are adhered to.</p> <p>Compliance to all legislative requirements</p>

	<ol style="list-style-type: none"> 7. Personnel on site must undergo environmental induction training, including the need to abide by speed limits, the increased risk of collisions with wild animals on roads in rural areas. 8. The illegal collection, hunting or harvesting of any animals at the site must be strictly forbidden. 9. If any parts of site such as construction camps must be lit at night, this must be done with low-UV type lights (such as most LEDs) as far as practically possible, which do not attract insects and which must be directed downwards. 10. Personnel to be educated about protection status of species, including distinguishing features to be able to identify protected species. 		<p>Noise and lighting managed according to approved Method Statement</p> <p>All staff members are aware of the EMPr requirements relevant to them</p>
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8.2.8 Avifauna

This section deals with avifaunal issues and actions that need to be implemented during construction

Table 19: Avifauna

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Avifauna	<ol style="list-style-type: none"> 1. Ensure that key areas of conservation importance and sensitivity are avoided. 2. Implement appropriate working practices to protect sensitive habitats. 3. Provide adequate briefing for site personnel and, in particularly sensitive locations, employing an on-site ecologist during construction if necessary. 4. Where possible, install low voltage collector cables between the arrays underground (subject to habitat sensitivities and in accordance with existing best practice guidelines for underground cable installation). 	Holder of the EA	<p>Impacts avoided or managed as per specialist recommendations.</p> <p>Ensure the conditions of the EA are adhered to.</p> <p>Compliance to all legislative requirements</p> <p>Noise and lighting managed according to approved Method Statement</p>

	<ol style="list-style-type: none"> 5. Time construction to avoid sensitive periods, where possible. 6. Clearance and removal of natural vegetation must be kept to a minimum. 7. Clearance and removal of natural vegetation must be kept to a minimum. 8. The ECO should monitor the removal of natural vegetation. If significant portions of natural vegetation are removed in very high sensitive areas, then an appropriate rehabilitation specialist should be consulted for further actions. 9. The ECO must monitor and prevent any erosion and pollution (chemical spills etc.) within the PV Energy Facility boundaries, particularly when associated with water features such as drainage lines, riparian vegetation and water bodies / wetlands. 10. Driving should, at all times, remain on existing or newly constructed roads. This should be strictly monitored so that habitat destruction does not occur. 11. Provide sufficient drainage along access roads to prevent erosion and pollution of adjacent watercourses or wetlands. No chemical spills or any other material dumps should be allowed within the PV Energy Facility implementation area, with special focus on areas nearby riparian vegetation or drainage lines. 12. No off-road driving is permitted. 13. Fit bird flight diverters to overhead powerlines and weather mast guyed wires. The spacing of devices should be not more than 5-10 m apart. 14. Powerlines should cross very high sensitive areas as little as possible, but should mainly aim to not be orientated perpendicularly to known bird flight paths. 		<p>Avifaunal Monitoring Plan implemented during construction.</p> <p>Plant Rescue Plan Implemented</p> <p>Storm Water Management Plan implemented</p> <p>Adhere to Eskom Requirements for Work in or near Eskom Servitudes</p>
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	15. Powerlines should never run perpendicularly to known flight paths. They should only be orientated parallel to these flight paths – to avoid an increased risk of collision.		
SPECIFIC MITIGATION MEASURES			
	<p>16. Activity should be restricted to the immediate footprint of the infrastructure.</p> <p>17. -Measures to control noise and dust should be applied according to current best practice in the industry.</p> <p>18. -Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum as far as practical.</p> <p>19. -The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the footprint and rehabilitation of disturbed areas is concerned.</p>	Holder of the EA	<p>Impacts avoided or managed as per specialist recommendations.</p> <p>Ensure the conditions of the EA are adhered to.</p> <p>Compliance to all legislative requirements</p> <p>Plant Rescue Plan Implemented</p> <p>Storm Water Management Plan implemented</p> <p>Adhere to Eskom Requirements for Work in or near Eskom Servitudes</p>

8.2.9 Air Quality

This table deals with mitigation measures to prevent air pollution

Table 20: Air Quality

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Air Quality: Dust Control	<p>1. Wheel washing and damping down of un-surfaced and un-vegetated areas must be undertaken if required.</p> <p>2. Retention of vegetation where possible will reduce dust travel.</p> <p>3. Excavations and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas.</p>	Holder of the EA	<p>Impacts avoided or managed as per specialist recommendations.</p> <p>Ensure the conditions of the EA are adhered to.</p> <p>Compliance to all legislative requirements</p>

	<p>4. Damping down of all exposed soil surfaces with a water bowser or sprinklers when necessary to reduce dust.</p> <p>5. In cases where severe water restrictions are imposed, other measures like the use of wetting agents such as chemical stabilisation or hydromulch, must be considered. In situations where the use of water is necessitated, non-potable water sources are to be utilised.</p> <p>6. The Contractor must be responsible for dust control on site to ensure no nuisance is caused to the neighbouring communities.</p> <p>7. A speed limit of 40km/h for cars and 30km/h for trucks must not be exceeded on site.</p> <p>8. Any complaints or claims emanating from the lack of dust control must be attended to immediately by the Contractor.</p> <p>9. Any dirt roads that are utilised by the workers must be regularly maintained to ensure that dust levels are controlled.</p>		
Air Quality: Odour control	<p>10. Regular servicing of vehicles in order to limit gaseous emissions.</p> <p>11. Regular servicing of on-site toilets to avoid potential odours.</p>	Holder of the EA	Ensure the conditions of the EA are adhered to.

8.2.10 Soils and Geology

General guidelines for management of soils are provided in **Annexure B**.

This section deals with soils and geology issues and actions that need to be implemented during construction.

Table 21: Soils and Geology

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Soils and Geology: Topsoil	1. The contractor must, prior to the commencement of earthworks determine the average depth of topsoil (if any), and agree on this with the ECO. The full depth of topsoil must be stripped from areas affected by construction and related activities prior to the commencement of foundations. This must include the building	Holder of the EA	<p>Erosion plan implemented and hydrological measures in place</p> <p>All waste managed according to approved Method Statement</p> <p>Ensure the EMPr is adhered to.</p>

	<p>footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed surface areas.</p> <ol style="list-style-type: none"> 2. Care must be taken not to mix topsoil and subsoil during stripping. 3. Must any topsoil become polluted the contractor must remove the polluted soil to the full depth of pollution and replace it at his own expense with clean topsoil. 4. Removed polluted topsoil must be transported to a licensed landfill site. 5. The topsoil must be conserved on site in and around the pit area 		
Soils and Geology: Soil Stripping	<ol style="list-style-type: none"> 6. No soil stripping must take place on areas within the site that the contractor does not require for construction works or areas of retained vegetation. 7. Construction vehicles must only be allowed to utilize existing tracks or pre-planned access routes. 	Holder of the EA	Ensure the EMPr is adhered to.
Soils and Geology: Soil Stockpiles	<ol style="list-style-type: none"> 8. Stockpiles must not be situated such that they obstruct natural water pathways. 9. Stockpiles must not exceed 2m in height unless otherwise permitted by the Engineer. 10. If stockpiles are exposed to windy conditions or heavy rain, they must be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles must further be protected by the construction of berms or low brick walls around their bases. 11. Stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding. 12. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where 		Erosion plan implemented and hydrological measures in place

	contaminated soils are dumped if and when a spillage / leakage occurs must be attained and given to the project manager.		
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8.2.11 Noise and Vibrations

This section deals with noise issues and actions that need to be implemented during construction.

Table 22: Noise and vibrations

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Noise and Vibrations	<ol style="list-style-type: none"> 1. The construction phase must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development. 2. The construction crew must abide by the local by-laws regarding noise. 3. Ensure that noise as a component is included in the induction of employees and contractors, and how their activities and actions can impact on residents in the area (reverse alarms and reversing close to dwellings, driving fast past residential dwellings at night, maintenance of equipment). All contractors and employees must receive this induction. 4. Truck traffic must be routed away from noise sensitive areas, where possible. 5. Noisy operations must be combined so that they occur where possible at the same time. 6. Construction activities are to be confined to reasonable hours during the day and early evening. Night-time activities near noise sensitive areas must not be permitted. 7. Construction workers to wear necessary ear protection gear. 8. Noise from labourers must be controlled. 	Holder of the EA	<p>Noise and lighting managed according to approved Method Statement</p> <p>Ensure the EMPr is adhered to.</p>

	<p>9. The contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour must be transported to and from the site by the contractor or his Sub-Contractors by the contractors own transport.</p> <p>10. Implementation of enclosure and cladding of processing plants.</p> <p>11. When working in very close proximity to potentially sensitive receptors, coordinate the working time with periods when the receptors are not at home where possible. An example would be to work within the 08:00 to 17:00 time-slot to minimize the significance of the impact because:</p> <p>12. Where possible construction work must be undertaken during normal working hours (07H00 – 17H00), from Monday to Saturday; If agreements can be reached (in writing) with all the surrounding (within a 2,000m distance) potentially sensitive receptors, these working hours can be extended.</p> <p>13. The developer must investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000m from location where construction activities are taking place.</p> <p>14. When any noise complaints are received, noise monitoring must be conducted at the complainant, followed by feedback regarding noise levels measured.</p> <p>15. Reduce the noise impact during the construction phase by:</p> <p>16. Using the smallest/quietest equipment for the particular purpose. For modelling purposes the noise emission characteristics of large earth-moving equipment (typically of mining operations) were used, that would most likely over-estimate the noise levels. The use of smaller equipment therefore would have a significantly lower noise impact;</p>		
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	17. Ensuring that equipment is well-maintained and fitted with the correct and appropriate noise abatement measures.		
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8.2.12 Visual Impact

This section deals with visual issues and actions that need to be implemented during construction

Table 23: Visual Impact

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Visual Impact: General	<ol style="list-style-type: none"> 1. Construction activities must not occur at night and lighting must only be erected where absolutely necessary. 2. Construction traffic must stick to designated routes or access roads. 3. Construction areas are to be kept clean and tidy. 4. Measures must be taken to suppress dust arising from construction activities. 5. Labour being transported to the site must take cognisance of litter and waste concerns. 6. Equipment being transported to the site must be covered with tarps. 7. Topsoil stockpiles must be well managed and seeded when possible if not utilised within three months. 8. It is recommended that equipment be stored discreetly so as not to increase visual impacts. 9. Construction must be conducted in the shortest possible time in order to reduce visual impacts. 	Holder of the EA	<p>Noise and lighting managed according to approved Method Statement</p> <p>Ensure the EMPr is adhered to. Impacts avoided or managed as per specialist recommendations.</p> <p>Implementation of Alien Invasive Species Management</p> <p>Implementation of Plant Rehabilitation Plan</p>
SPECIFIC MITIGATION MEASURES			
	<ol style="list-style-type: none"> 10. Carefully plan to minimise the construction period and avoid construction delays. 11. Inform receptors of the construction programme and schedules. 	Holder of the EA	Impacts avoided or managed as per specialist recommendations

	<ol style="list-style-type: none"> 12. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. 13. Vegetation clearing should take place in a phased manner. 14. Maintain a neat construction site by removing rubble and waste materials regularly. 15. Make use of existing gravel access roads where possible. 16. Limit the number of vehicles and trucks travelling to and from the construction site, where possible. 17. Unless there are water shortages, ensure that dust suppression techniques are implemented on all access roads; in all areas where vegetation clearing has taken place and on all soil stockpiles. 18. Ensure that the PV arrays are not located within 500m of any farmhouses or the N10 national route in order to minimise visual impacts on these dwellings and on the receptor road. 19. Locally occurring indigenous woody vegetation (trees and shrubs) should be planted along the northern boundary of the site to screen views from the N10. 20. Retain a buffer (approximately 100m wide) of intact natural vegetation along the perimeter of the development area (i.e. the CPV panel blocks) and along the site boundary. 21. Maintain a neat construction site by removing rubble and waste materials regularly. 22. Temporarily fence-off the construction site (for the duration of the construction period). 23. Where possible, the operation and maintenance buildings and laydown areas should be consolidated to reduce visual clutter. 24. Buildings and similar structures must be in keeping with relevant regional planning policy documents. 25. Where possible, underground cabling should be utilised. 26. Make use of existing gravel access roads where possible. 		
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	<p>27. Limit the number of vehicles and trucks travelling to and from the construction site, where possible.</p> <p>28. Unless there are water shortages, ensure that dust suppression techniques are implemented:</p> <ul style="list-style-type: none"> • on all access roads; • in all areas where vegetation clearing has taken place; • on all soil stockpiles. 		
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8.2.13 Heritage

This section deals with the impact that the new development has on potential archaeological artefacts on the site

Table 24: Heritage

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Heritage	<ol style="list-style-type: none"> 1. Any finds must be reported to the nearest National Monuments office to comply with the National Heritage Resources Act (Act No 25 of 1999) and to DEA. 2. Local museums as well as the South African Heritage Resource Agency (SAHRA) must be informed if any artefacts are uncovered in the affected area. 3. The contractor must ensure that his workforce is aware of the necessity of reporting any possible historical or archaeological finds to the ECO so that appropriate action can be taken. 4. Any discovered artefacts must not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits must be obtained from the South African Heritage Resources Association (SAHRA) must the proposed site affect any world heritage sites or if any heritage sites are to be destroyed or altered. 	Holder of the EA	<p>Impacts to heritage resources managed and avoided as far as possible</p> <p>Chance Find Procedure Implemented</p> <p>Heritage Management Plan Implemented</p>

	5. Should any archaeological sites / graves be uncovered during construction, their existence must be reported to the Holder of the EA and MC immediately.		
SPECIFIC MITIGATION MEASURES			
	<ol style="list-style-type: none"> 1. Monitor major excavations for fossil material by the ECO on an on-going basis during construction phase. 2. Significant fossil finds must be reported to SAHRA for recording and sampling by a professional palaeontologist. 3. Chance find procedure must be followed: <ul style="list-style-type: none"> • When a chance find is made the person must instantly stop all work near the find. • The site must be secured to protect it from any additional damage • The finder of the fossil heritage must immediately report the find to his/her direct supervisor, according to the reporting protocols instituted by the Mine/development management. The supervisor must in turn report the find to his/her manager and the ECO. The ECO must report the find to the relevant Authorities and a relevant palaeontologist. • The ECO must appoint a relevant palaeontologist to investigate and access the chance find and site. • Both ECO and palaeontologist must ensure that accurate records and documentation are kept. The documentation must start with the initial chance find report, including records of all actions taken, persons involved and contacted, comments received and findings. • These documents will be necessary to request authorisations and permits from the relevant Authorities to continue with the work on site 	Holder of the EA	<p>Chance Find Procedure Implemented</p> <p>Heritage Management Plan Implemented</p>

	<ul style="list-style-type: none"> • The reports and all other documents will be submitted to SAHRA by the palaeontologist. • The report will include recommendations for additional specialist work if necessary, or request approval to continue with the development. • Once the required approvals have been issued, the development may carry on with the development. • The ECO will close off the chance find procedure and would be required to implement any requirements issued by the Authority and to add it to the operational management plan. • Demarcate heritage sites / find spots / colonial structures / grave sites identified during this study as no-go areas; • Demarcate and fence during construction, if construction activities area to happen within 100 meters from heritage sites / find spots / colonial structures / grave sites; • Monitor heritage sites / find spots / colonial structures / grave sites areas if construction is going to take place through them. • A management plan for the heritage resources must be compiled and approved for implementation during construction. 		
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8.2.14 Social Environment

This section deals with social environment and actions that need to be implemented during construction

Table 25: Social Environment

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Social Environment	1. All contact with the affected parties must be courteous at all times. The rights of the affected parties must be respected at all times.	Holder of the EA	Clear communication channels maintained

	<ol style="list-style-type: none"> 2. A complaints register must be kept on site. Details of complaints must be incorporated into the audits as part of the monitoring process. This must be in carbon copy format, with numbered pages. Any missing pages must be accounted for by the Contractor. 3. Damage to infrastructure must not be tolerated and any damage must be rectified immediately by the Contractor. A record of all damage and remedial actions must be kept on site. 4. Care must be taken not to damage irrigation equipment, lines, channels and crops. 		<p>Compliance to all legislative requirements.</p> <p>Ensure the EMPr is adhered to.</p>
SPECIFIC MITIGATION MEASURES			
	<ol style="list-style-type: none"> 5. Ensure that an onsite HIV infections policy is in place and that construction workers have easy access to condoms; 6. Expose workers to a health and HIV/AIDS awareness educational program; 7. Extend the HIV/AIDS program into the community with specific focus on schools and youth clubs. 8. Communicate the limitation of opportunities created by the project through Community leaders and Ward Councillors; 9. Draw up a recruitment policy in conjunction with the Community Leaders and Ward Councillors of the area and ensure compliance with this policy. 10. Ensure that, at all times, people have access to their properties as well as to social facilities 11. Wherever feasible, local residents should be recruited to fill semi and unskilled jobs; 12. Women should be given equal employment opportunities and encouraged to apply for positions; 13. A skills transfer plan should be put in place at an early stage and workers should be given the opportunity to develop skills 		<p>HIV/AIDS awareness educational program implemented</p> <p>Clear communication channels maintained</p> <p>Compliance to all legislative requirements.</p>

	<p>which they can use to secure jobs elsewhere post-construction;</p> <p>14. A procurement policy promoting the use of local business should, where possible, be put in place to be applied throughout the construction phase.</p> <p>15. All workers should carry identification cards and wear identifiable clothing.</p> <p>16. Fence off the construction site and control access to the site.</p> <p>17. Appoint an independent security company to monitor the site.</p> <p>18. Appoint a community liaison officer.</p> <p>19. Encourage local people to report any suspicious activity associated with the construction site to the community liaison officer.</p> <p>20. A grievance mechanism must be prepared and communicated to surrounding landowners and local communities, to ensure that the project proponent, EPC contractor and sub-contractors remain responsible and accountable. This will also facilitate the identification and implementation of additional mitigation measures if required.</p> <p>21. Where necessary training should be provided on the implementation of the grievance mechanism to ensure that those who are most likely to be affected by the project are suitably equipped in the mechanism of raising concerns and having these addressed.</p> <p>22. Prevent loitering within the vicinity of the construction camp as well as construction sites by recruiting off-site via an offsite recruiting office/agent, whatever is most appropriate.</p> <p>23. Communicate, through Community Leaders and Ward Councillors, the limitation of opportunities created by the project to prevent an influx of job seekers.</p>		
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	<p>24. -Develop and implement a local procurement policy which prioritises “locals first” to reduce the movement of people into the area in search of work.</p> <p>25. -Draw up a recruitment policy in conjunction with Community Leaders and Ward Councillors and ensure compliance with this policy.</p> <p>26.</p>		
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8.2.15 Construction Traffic and Access

This section deals with construction traffic and access and actions that need to be implemented during construction

Table 26: Construction Traffic and Access

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
<p>Construction Traffic and Access: Construction traffic</p>	<ol style="list-style-type: none"> 1. Construction routes and required access roads must be clearly defined. 2. A route study is to be undertaken as part of the final traffic transportation plan to confirm the most appropriate route to site. 3. Recommendations of the Stormwater Management Plan must be implemented. 4. All equipment moved onto site or off site during a project is subject to the legal requirements. 5. The Contractor must ensure that all the necessary precautions against damage to the environment and injury to persons are taken in the event of an accident. 6. Access of all construction and material delivery vehicles must be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure. 7. Damping down of the un-surfaced roads must be implemented to reduce dust and nuisance. 	<p>Holder of the EA</p>	<p>A traffic management Strategy developed and Implemented throughout the construction and operation phases.</p> <p>Storm Water Management Plan .implemented</p> <p>Ensure the EMPr is adhered to.</p>

	8. In cases where severe water restrictions are imposed, other measures like the use of wetting agents such as chemical stabilisation or hydromulch, must be considered. In situations where the use of water is necessitated, non-potable water sources are to be utilised.		
Construction Traffic and Access: Access	9. The main routes on the site must be clearly signposted and printed delivery maps must be issued to all suppliers and Sub-Contractors. 10. Planning of access routes to the site for construction purposes must be done in conjunction with the Contractor and the Landowner. All agreements reached must be documented and no verbal agreements must be made. The Contractor must clearly mark all access roads. Roads not to be used must be marked with a "NO ENTRY for construction vehicles" sign.	Holder of the EA	A traffic management Strategy developed and Implemented throughout the construction and operation phases.
Construction Traffic and Access: Road Maintenance	11. Where necessary suitable measures must be taken to rehabilitate damaged areas. 12. Contractors must ensure that access roads are maintained in good condition by attending to potholes, corrugations and storm water damages as soon as these develop. 13. If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have spilt. 14. Recommendations of the Surface Water report must be taken into consideration in terms of erosion, storm water management, alignment of roads and upgrading of existing river crossings.	Holder of the EA	A traffic management Strategy developed and Implemented throughout the construction and operation phases.
Construction Traffic and Access: General	15. The contractor must meet safety requirements under all circumstances. All equipment transported must be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used must be in place.	Holder of the EA	A traffic management Strategy developed and Implemented throughout the construction and operation phases. Adhere to Health and Safety Regulations

	<p>16. Care for the safety and security of community members crossing access roads must receive priority at all times.</p> <p>17. Ensure that roadworthy and safety standards are implemented at all times for all construction vehicles.</p> <p>18. Trips must be planned to avoid peak hours as far as possible (i.e. 06:00 - 07:00 and 16:00 – 17:00)</p> <p>19. Management strategies for dust suppression to be implemented and dust generating activities to be suspended during periods of strong winds.</p> <p>20. Road kill monitoring programme must be established and fences erected where necessary to direct animals to safe road crossings on access roads.</p> <p>21. Limit the number of vehicles and trucks travelling to and from the construction site, where possible.</p> <p>22. Unless there are water shortages, ensure that dust suppression techniques are implemented</p> <ul style="list-style-type: none"> • on all access roads; • in all areas where vegetation clearing has taken place; • on all soil stockpiles. 		
	<p>23. All on-site construction vehicles must adhere to a low speed limit (40km/h for cars and 30km/h for trucks) to avoid collisions with susceptible species such as snakes and tortoises and rabbits or hare.</p> <p>24. Access to sensitive areas outside of development footprint must not be permitted during construction.</p> <p>25. Personnel and vehicles must avoid sensitive habitats.</p> <p>26. Personnel on site must undergo environmental induction training, including the need to abide by speed limits, the increased risk of collisions with wild animals on roads in rural areas.</p>		<p>Ensure the EMPr is adhered to.</p> <p>All staff members are aware of the EMPr requirements relevant to them</p> <p>A traffic management Strategy developed and Implemented throughout the construction and operation phases.</p>

	<p>27. Night driving must be strictly limited and, where absolutely required, lower speed limits should apply for night driving.</p> <p>28. Use existing access roads wherever possible.</p> <p>29. Construct an on-site batching plant to reduce trips.</p> <p>30. Install road traffic signage as per the South African Road Traffic Sign Manual (SARTSM).</p> <p>31. A detailed Traffic Management Plan must be completed prior to construction in order to form part of the Final EMPr.</p> <p>32. No driving of vehicles off-road.</p> <p>33. Stagger PV panel component delivery to site</p> <p>34. The use of mobile batch plants and quarries near the site would decrease the impact on the surrounding road network</p> <p>35. Dust suppression</p> <p>36. Reduce the construction period</p> <p>37. Maintenance of gravel roads</p> <p>38. Apply for abnormal load permits prior to commencement of delivery via abnormal loads</p> <p>39. Assess the preferred route and undertake a 'dry run' to test</p> <p>40. Staff and general trips should occur outside of peak traffic periods as far as possible.</p> <p>41. Any low hanging overhead lines (lower than 5.1m) e.g. Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles.</p>		
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8.2.16 Energy Use

This section deals with energy use and actions that need to be implemented during construction

Table 27: Energy Use

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
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Energy Use:	<ol style="list-style-type: none"> 1. Energy saving lighting must be implemented across the board. 2. Minimal lighting, while maintaining health and safety regulations, must be kept on during the night operations. 3. Equipment not in use must be switched off and unplugged to save on unnecessary energy costs and carbon footprint. 	Holder of the EA	<p>Adhere to Health and Safety Regulations</p> <p>Noise and lighting managed according to approved Method Statement</p>
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8.2.17 Employment

This section deals with employment issues and actions that need to be implemented during construction

Table 28: Employment

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Employment: Labour	<ol style="list-style-type: none"> 1. The use of labour intensive construction measures must be used where appropriate. 2. Training of labour to benefit individuals. 	Holder of the EA	Fair employment practises in place
Employment: Recruitment Plan	<ol style="list-style-type: none"> 3. The majority of unskilled labourers must be drawn from the local market and where possible use must be made of local semiskilled and skilled personnel. 4. Local suppliers to be used where possible. 5. The Project Manager must ensure that all staff working on the proposed project are in possession of a South African Identity Document or a relevant work permit. 6. Ensure adequate advertising in the project community areas, local papers for labour. Adverts are to be placed in each area where the public meetings were conducted namely, Sutherland. 7. Local community key stakeholders must be utilised to source labour where possible. 8. The recruitment process must be equitable and transparent. A concerted effort will be made to guard against nepotism and/or any form of favouritism during the process 9. A record of official complaints by employees is to be maintained 	Holder of the EA	<p>Maintain a locals first recruitment policy as far as possible, reduced social impact from development</p> <p>HIV/AIDS awareness educational program implemented</p>

	<p>10. Where possible, subcontract to local construction companies</p> <p>11. Consultation with local authorities is essential so as to manage job creation expectations and ensure that all eligible workers in the primary study area are informed of the opportunities.</p> <p>12. To ensure that skills are adequately acquired, additional training programmes need to be held during the construction phase to prepare the identified community members to be employed at the next phase, i.e. operational.</p> <p>13. Initiating the education campaign among the local community (in partnership with the community members already active in the area) focusing on alcohol abuse, drug abuse, HIV/AIDS, STDs, etc. prior to the start of construction and maintaining this campaign throughout the project's duration.</p>		
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8.2.18 Occupational Health and Safety

This section deals with health and safety and actions that need to be implemented during construction

Table 29: Occupational Health and Safety

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
<p>Occupational Health</p> <p>Safety:</p> <p>Worker Safety</p>	<ol style="list-style-type: none"> 1. Implementation of safety measures, work procedures and first aid must be implemented on site. This must include the provision of first aid facilities, and the training of a number of employees to carry out first aid procedures. 2. Workers must be thoroughly trained in using potentially dangerous equipment. 3. Contractors must ensure that all equipment is maintained in a safe operating condition. 4. A safety officer must be appointed. 5. A record of health and safety incidents must be kept on site. 	<p>Holder of the EA</p>	<p>Adhere to Health and safety Regulations</p> <p>Ensure the EMPr is adhered to.</p>

	<p>6. Any health and safety incidents must be reported to the Project Manager immediately.</p> <p>7. Workers have the right to refuse work in unsafe conditions.</p> <p>8. A record must be kept of drugs administered or precautions taken and the time and dates when this was done. This can then be used as evidence in court must any claims be instituted against the Holder of the EA or the Contractor.</p> <p>9. Material stockpiles or stacks must be stable and well secured to avoid collapse and possible injury to site workers / local residents.</p>		
<p>Occupational Health Safety: Hazardous Substances</p>	<p>10. Working areas must be provided with adequate ventilation and dust/fume extraction systems to ensure that inhalation exposure levels for potentially corrosive, oxidizing, reactive or siliceous substances are maintained and managed at safe levels.</p>	Holder of the EA	All waste managed according to approved Method Statement
<p>Occupational Health Safety: Electrical Safety and Isolation</p>	<p>11. All sources of hazardous energy or hazardous substances must have written procedures for isolation, identifying how the system, plant or equipment can be made and kept safe.</p>	Holder of the EA	Adhere to Health and Safety Regulations
<p>Occupational Health Safety: Physical Hazards</p>	<p>12. Geotechnical safety - All structures must be planned, designed and operated such that the geotechnical risks are appropriately managed.</p>	Holder of the EA	Adhere to Health and Safety Regulations
<p>Occupational Health Safety:</p>	<p>13. Use must be made of reflective markings on structures, traffic junctions, and other areas with a potential for accidents.</p> <p>14. Safety barriers must be installed in high risk locations.</p>	Holder of the EA	Adhere to Health and Safety Regulations

Machine and Equipment			
Occupational Health Safety: Fitness for work	15. Shift management systems must minimize risk of fatigue. Establish alcohol and other drug policy for the operation.	Holder of the EA	Adhere to Health and Safety Regulations
Occupational Health Safety: Travel and remote site health	16. Develop programs to prevent both chronic and acute illnesses through appropriate sanitation and vector control systems.	Holder of the EA	Adhere to Health and Safety Regulations
Occupational Health Safety: Protective Gear	17. Personal Protective Equipment (PPE) must be made available to all construction staff and must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn where necessary i.e. dust masks, ear plugs etc. 18. No person is to enter the site without the necessary PPE.	Holder of the EA	Adhere to Health and Safety Regulations
Occupational Health Safety: Construction equipment safety	19. All equipment used for construction must be in good working order with up to date maintenance records	Holder of the EA	Adhere to Health and Safety Regulations
Occupational Health Safety: Procedure in the event of a	20. A spill kit needs to be kept on site to address any unforeseen spillages. 21. The individual responsible for or who discovers the petrochemical spill must report the incident to the Project Manager, Contractor or ECO.	Holder of the EA	All waste managed according to approved Method Statement

petrochemical spill	<p>22. The problem must be assessed and the necessary actions required will be undertaken.</p> <p>23. The immediate response must be to contain the spill.</p> <p>24. The source of the spill must be identified, controlled, treated or removed wherever possible.</p>		
Occupational Health Safety: Safety of surrounding residents	<p>25. All I & AP's must be notified in advance of any known potential risks associated with the construction site and the activities on it. Examples of these are:</p> <ul style="list-style-type: none"> • Blasting • Earthworks / earthmoving machinery on steep slopes above houses / infrastructure • Risk to residence along haulage roads / access routes. 	Holder of the EA	Clear communication channels
Occupational Health Safety: Emergency evacuation plan	<p>26. 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.</p>	Holder of the EA	Adhere to Emergency Evacuation Plan
Occupational Health Safety: Maintenance	<p>27. The solar PV energy facility and surrounding areas are to be regularly maintained. A maintenance schedule must be drawn up and records of all maintenance kept.</p>	Holder of the EA	

8.2.19 Security

This section deals with security and actions that need to be implemented during construction.

Table 30: Security

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
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Security	<ol style="list-style-type: none"> 1. A security company must be employed to guard the construction site and monitor access. 2. Labour must be transported to and from the site to discourage loitering in adjacent areas and a possible increase in crime or disturbance. 3. Unsocial activities such as consumption or illegal selling of alcohol, drug utilisation or selling and prostitution on site must be prohibited. Disciplinary or criminal action must be taken against any persons found to be engaged in such activities. 4. Only pre-approved staff must be permitted to stay in the staff accommodation where staff accommodation is provided. 5. The construction camp site must be fenced, where necessary to prevent any loss or injury to persons during the construction phase. 6. No alcohol / drugs to be present on site. 7. No firearms allowed on site or in vehicles transporting staff to / from site (unless used by security personnel or landowners). 8. Construction staff is to make use of the facilities provided for them, as opposed to ad-hoc alternatives (e.g. fires for cooking, the use of surrounding bush as a toilet facility are forbidden). 9. Trespassing on private / commercial properties adjoining the site is forbidden. 	Holder of the EA	All staff members are aware of the EMPr requirements relevant to them Ensure the EMPr is adhered to.
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8.3 Operation Phase

- 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.
- Develop and implement an Environmental Management System (EMS) for the solar farm and associated infrastructure.
- Manage and report on the solar farm's environmental performance.
- Maintain a register of all known environmental impacts and manage the monitoring thereof.

- Conduct internal environmental audits and co-ordinate external environmental audits.
- Liaise with statutory bodies such as the National and Provincial departments of Environmental Affairs (DEA and DENC) on environmental performance and other issues.
- Conduct environmental training and awareness for the employees who operate and maintain the solar farm.
- Compile environmental policies and procedures.
- Liaise with interested and affected parties on environmental issues of common concern.
- Track and control the lodging of any complaints regarding environmental matters.

8.3.1 Rehabilitation and Maintenance and Biodiversity

This section deals with the issues relating to rehabilitation after construction as well and therefore must be applied during rehabilitation.

Table 31: Rehabilitation and maintenance and Biodiversity

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Rehabilitation: Rehabilitation	<ol style="list-style-type: none"> 1. A mixture of vegetation seed can be used provided the mixture is carefully selected to ensure the following: <ul style="list-style-type: none"> • Annual and perennial species are chosen. • Pioneer species are included. • All the species must not be edible. • Species chosen will grow in the area under natural conditions. • Root systems must have a binding effect on the soil. • The final product must not cause an ecological imbalance in the area. 2. All natural areas impacted during construction must be rehabilitated with locally indigenous species that were present on the site prior to construction. 3. Rehabilitation must take place in a phased approach as soon as possible. 	Holder of the EA	<p>Ensure the EMPr is adhered to. Ensure the conditions of the EA are adhered to.</p> <p>All staff members are aware of the EMPr requirements relevant to them Plant Rescue Plan Implemented</p> <p>Ecological Management Plan</p> <p>Impacts avoided or managed as per specialist recommendations.</p>

	4. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.		
Rehabilitation: Maintenance	5. The site need to be monitored every three (3) months for the first year to identify the emergence of alien species and any erosion concerns.	Holder of the EA	Alien Plant Management Plan Implemented
Biodiversity: Flora	6. Indigenous vegetation must be maintained and all exotics removed as they appear and disposed of appropriately. 7. Vegetative re-establishment must, as far as possible, make use of indigenous or locally occurring plant varieties within the servitude. 8. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas during and following rehabilitation. 9. Regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the new development as there are also likely to be prone to invasion problems. 10. Regular alien clearing must be conducted using the best-practice methods for the species concerned. The use of herbicides must be avoided as far as possible.		Alien Plant Management Plan Implemented Plant Rehabilitation Implemented
Biodiversity: Fauna	11. No faunal species must be harmed by maintenance staff during any routine maintenance. 12. Management of the site must take place within the context of an Open Space Management Plan. 13. The collection, hunting or harvesting of any plants or animals at the site must be strictly forbidden by anyone except landowners or other individuals with the appropriate permits and permissions where required. 14. If any parts of the site need to be lit at night for security purposes, this must be done with downward-directed low-UV		Ensure the EMPr is adhered to. Ensure the conditions of the EA are adhered to. All staff members are aware of the EMPr requirements relevant to them Noise and lighting managed according to approved Method Statement A traffic management Strategy developed and Implemented

WONDERHEUVEL SOLAR POWER (PTY) LTD

Proposed Development of the Wonderheuvel Solar PV Energy Facility – Draft Environmental Management Plan (EMPr)

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22 November 2019

SIVEST Environmental

	<p>type lights (such as most LEDs) as far as possible, which do not attract insects.</p> <p>15. All hazardous materials must be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site must be cleaned up in the appropriate manner as related to the nature of the spill.</p> <p>16. All vehicles accessing the substation sites and servitude must adhere to a low speed limit (30-40km/h max) to avoid collisions with susceptible species such as snakes and tortoises.</p> <p>17. If parts of the facility are to be fenced, no electrified strands must be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution as they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified strands must be placed on the inside of the fence and not the outside.</p> <p>18. A single perimeter fence should be used. Alternatively, the two (2) fences should be at least 4m apart to allow medium to large birds enough space to take off.</p> <p>19. Erosion management at the site must take place according to the Erosion Management Plan and Rehabilitation Plan.</p> <p>20. All roads and other hardened surfaces must have runoff control features which redirect water flow and dissipate any energy in the water which will pose an erosion risk.</p> <p>21. All erosion problems observed must be rectified as soon as possible, using the appropriate erosion control structures and re-vegetation techniques. Any roads that will not be rehabilitated must have runoff control features which redirect</p>		<p>throughout the construction and operation phases.</p> <p>Erosion plan implemented and hydrological measures in place</p> <p>Storm Water Management Plan implemented.</p> <p>Ecological Management Plan Implemented</p>
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	<p>water flow and dissipate any energy in the water which will pose an erosion risk.</p> <p>22. All cleared areas must be re-vegetated with indigenous perennial shrubs and grasses from the local area. These can be cut when dry and placed on the cleared areas if natural recovery is slow.</p> <p>23. There must be an integrated management plan for the development area during operation, which is beneficial to fauna and flora.</p>		
SPECIFIC MITIGATION MEASURES			
	<p>24. All hardened surfaces must have runoff control features which redirect water flow and dissipate any energy in the water which will pose an erosion risk.</p> <p>25. Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project.</p> <p>26. All erosion problems observed must be rectified as soon as possible, using the appropriate erosion control structures and re-vegetation techniques.</p> <p>27. All cleared areas must be re-vegetated with indigenous perennial shrubs and grasses from the local area. These can be cut when dry and placed on the cleared areas if natural recovery is slow.</p> <p>28. Wherever excavation is necessary, topsoil must be set aside and replaced after construction to encourage natural regeneration of the local indigenous species.</p> <p>29. Regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from access roads or the substation as these areas are also likely to be prone to invasion problems.</p>		<p>Ensure the EMPr is adhered to.</p> <p>Ensure the conditions of the EA are adhered to.</p> <p>All staff members are aware of the EMPr requirements relevant to them</p> <p>Erosion plan implemented and hydrological measures in place</p> <p>All waste managed according to approved Method Statement</p> <p>Plant Rescue Plan Implemented</p> <p>Ecological Management Plan</p> <p>Alien Plant Management Plan Implemented</p>

	<p>30. Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.</p> <p>31. Personnel and vehicles to avoid sensitive habitats.</p> <p>32. No speeding on access roads is permitted – install speed control measures, such as speed humps, if necessary</p> <p>33. No illegal collecting of any individuals.</p> <p>34. No hunting of protected species or hunting of any other species is permitted without a valid permit.</p> <p>35. Personnel to be educated about protection status of species, including distinguishing features to be able to identify protected species.</p> <p>36. Report any sightings of priority species to conservation authorities.</p> <p>37. Prevent unauthorised access to the site – project roads provide access to remote areas that were not previously easily accessible for illegal collecting or hunting.</p>		
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8.3.2 Operation and Maintenance

This section deals with the potential impacts that could result from the operation and maintenance of the line and substation.

Table 32: Operation and maintenance

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
<p>Operation and Maintenance: Maintenance</p>	<p>1. All applicable standards, legislation, policies and procedures must be adhered to during operation.</p> <p>2. Regular ground inspection of the energy facilities must take place to monitor their status</p>	<p>Holder of the EA</p>	<p>Ensure the conditions of the EA are adhered to.</p> <p>Compliance to all legislative requirements</p>
<p>Rehabilitation: Public awareness</p>	<p>3. The emergency preparedness plan must be ready for implementation at all times should an emergency situation arise.</p>	<p>Holder of the EA</p>	<p>Adhere to Emergency Evacuation Plan</p>

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8.3.3 Avifauna

This section deals with avifaunal issues and actions that need to be implemented during operation

Table 33: Avifauna

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Avifauna	<ol style="list-style-type: none"> 1. Reduce noise levels as far as possible. 2. Driving should, at all times, remain on existing roads. 3. Speed limits should be implemented for driving, and should not exceed 40km/h. 	Holder of the EA	<p>Noise and lighting managed according to approved Method Statement</p> <p>A traffic management Strategy developed and Implemented throughout the construction and operation phases.</p> <p>Plant Rescue Plan Implemented</p> <p>Ecological Management Plan</p> <p>Alien Plant Management Plan Implemented</p> <p>Plant Rehabilitation Implemented</p>
SPECIFIC MITIGATION MEASURES			
	<ol style="list-style-type: none"> 4. A single perimeter fence should be used. Alternatively, the two (2) fences should be at least 4m apart to allow medium to large birds enough space to take off. 5. The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint and rehabilitation of transformed areas is concerned. 	Holder of the EA	<p>A traffic management Strategy developed and Implemented throughout the construction and operation phases.</p> <p>Plant Rescue Plan Implemented</p> <p>Ecological Management Plan</p>

			Alien Plant Management Plan Implemented Plant Rehabilitation Implemented
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8.3.4 Air Quality

This section deals with the issues relating to air pollution during operation

Table 34: Air Pollution

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Air Quality: Dust Management	1. Any dirt roads utilised to access the sites must be regularly maintained and dust mitigation measures to be enforced to ensure that dust levels are controlled.	Holder of the EA	Ensure the conditions of the EA are adhered to.
Air Quality: Litter management	2. Remove unwanted materials and litter on a regular basis to avoid potential odours.	Holder of the EA	All waste managed according to approved Method Statement

8.3.5 Aquatic Ecology

This section deals with the issues relating to surface water during operation

Table 35: Aquatic Ecology

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Aquatic Ecology	1. All stipulated mitigation measures are to be adhered to in order to minimise potential impacts to surface water resources.	Holder of the EA	ey sensitive areas avoided Impacts avoided or managed as per specialist recommendations.
SPECIFIC MITIGATION MEASURES			
	2. The access roads, and maintenance and operation buildings must have energy dissipating structures where required to		Storm Water Management Plan

	<p>prevent increased run-off and sediments contained in the run-off entering adjacent areas or surface water resources. This will assist in erosion prevention as well. Structures can be in the form of hard concrete structures or soft engineering structures (such as grass blocks for example). It is also recommended that the area beneath the PV panels be maintained as grass (vegetation of some sort) if possible. A buffer strip of vegetation and rock reinforcement should be maintained downslope of the PV cells, as this will allow a reduction in erosion and sedimentation from increased overland flows from the hardened surfaces.</p> <p>3. Alternatively, a suitable operational stormwater management design or plan can be compiled and implemented that accounts for the use of appropriate alternative structures or devices that will prevent increased run-off and sediment entering the watercourses thereby, also preventing erosion.</p> <p>4. ECO monitoring is to take place during the post-construction rehabilitation phase. Monitoring is to take place for erosion as well as re-establishment of vegetation where trenching has taken place. An incident/complaints register must be established and maintained on-site.</p>		<p>Ensure the EMPr is adhered to. Erosion plan implemented and hydrological measures in place</p>
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8.3.6 Agriculture

This section deals with issues relating to agricultural potential and resources and actions that need to be implemented during operation

Table 36: Agriculture

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
<p>Agriculture: Erosion</p>	<p>1. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize the soil against erosion.</p>	<p>Holder of the EA</p>	<p>Plant Rehabilitation Implemented</p> <p>Erosion plan implemented</p>

8.3.7 Visual Impact

This section deals with issues relating to agricultural potential and resources and actions that need to be implemented during operation

Table 37: Visual Impact

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Visual Impact: Maintenance and lighting	<ol style="list-style-type: none"> 1. The site must be kept clean, tidy and well maintained to reduce negative visual impacts. 2. Rehabilitation of surrounding areas must take place with indigenous species that were present on the site prior to construction. 3. Regular maintenance of the associated infrastructure must be undertaken. 	Holder of the EA	<p>Noise and lighting managed according to approved Method Statement</p> <p>All waste managed according to approved Method Statement</p> <p>Plant Rehabilitation Implemented</p>
SPECIFIC MITIGATION MEASURES			
	<ol style="list-style-type: none"> 4. Ensure that dust suppression techniques are implemented on all gravel access roads. 5. As far as possible, limit the amount of security and operational lighting present on site. 6. Light fittings for security at night should reflect the light toward the ground and prevent light spill. 7. Lighting fixtures should make use of minimum lumen or wattage. 8. Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used. 9. If possible, make use of motion detectors on security lighting. 10. The operations and maintenance (O&M) buildings should not be illuminated at night. 11. The O&M buildings should be painted in natural tones that fit with the surrounding environment. 12. Buildings and similar structures must be in keeping with relevant regional planning policy documents. 		Noise and lighting managed according to approved Method Statement

8.3.8 Heritage

This section deals with the impact that the new development has on potential archaeological artefacts on the site

Table 38: Heritage

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Heritage	1. No Mitigation measure	Holder of the EA	N/A

8.3.9 Social Environment

This section deals with social environment and actions that need to be implemented during operation

Table 39: Social Environment

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Social Environment	<ol style="list-style-type: none"> 1. All contact with the affected parties must be courteous at all times. The rights of the affected parties must be respected at all times. 2. Ensure that the expectations (rules) of the farmers regarding access to farms are understood and effectively adhered to. 3. Establish a local skills desk to identify the skills set of the local residents available for the operation phase of the PV Energy Facility. 4. Up-skill construction workers with aptitude to maintain the PV Energy Facility. 5. Communicate the benefits associated with renewable energy to the broader communities. 6. Ensure that all affected land owners and tourist associations are regularly consulted. 7. Ensure that any trusts or funds are strictly managed in respect of outcomes and funds 	Holder of the EA	Clear communication channels maintained
SPECIFIC MITIGATION MEASURES			

	8. Work closely with the appropriate municipal structures in regard to establishing a social responsibility programme; 9. Establish a social responsibility programme either in line with the REIPPP BID guidelines or equivalent; 10. Apply the mitigation measures suggested in the Visual Impact Assessment Report. 11. Ensure that all affected landowners and tourist associations are regularly consulted. 12. A Grievance Mechanism should be put in place and all grievances should be dealt with in a transparent manner. 13. The mitigation measures recommended in the Heritage Impact Assessment should be followed. 14. Ensure that the procurement policy supports local enterprises.	Holder of the EA	Clear communication channels maintained Social Responsibility Programme implemented
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8.3.10 Health and Safety

This section deals with the issues relating to health and safety during operation

Table 40: Health and Safety

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Health and Safety: Emergency evacuation plan	1. 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. 2. Develop and implement an occupational health and safety plan. 3. Train all onsite personnel handling chemical or hazardous substances in the use of such substances and the environmental, health and safety consequences of incidents.	Holder of the EA	Emergency Evacuation Plan implemented Occupational Health And Safety Plan implemented
Health and Safety: Maintenance	4. A maintenance schedule must be drawn up and records of all maintenance kept.	Holder of the EA	Maintenance Schedule Implemented

Health and Safety: Fire safety	5. Firefighting equipment in the form of fire hydrants or fire extinguishers must be available on the site. These must be regularly maintained by an appropriate company.	Holder of the EA	Adhere to Health and safety Regulations Ensure the EMPr is adhered to.
Health and Safety: Storage and handling of hazardous waste	6. A spill kit needs to be kept on site to address any unforeseen spillages. 7. Transport of all hazardous substances must be in accordance with the relevant legislation.	Holder of the EA	All waste managed according to approved Method Statement Compliance to all legislative requirements.

8.4 Decommissioning Phase

Mitigation measures implemented during construction with regards to the construction camp and equipment will remain the same for the decommissioning phase when a construction camp will need to be established again

8.4.1 Ongoing Stakeholder involvement

This is the process that is recommended if the substations sites are decommissioned.

This section relates to the stakeholder involvement that needs occur during decommissioning

Table 41: Ongoing stakeholder involvement

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Ongoing stakeholder involvement	<ol style="list-style-type: none"> 1. Community to be notified, as culturally appropriate, timeously of the planned decommissioning, e.g.: Proposed decommissioning start date; and Process to be followed. 2. Recommend that a meeting with community leader(s) be held before decommissioning commence to inform them: <ul style="list-style-type: none"> • What activities will take place during the decommissioning phase. • How these activities will impact upon the communities and/or their properties. • Regarding the timeframes of scheduled activities 	Holder of the EA	Clear communication channels maintained

	<ol style="list-style-type: none"> 3. Regular interaction between Holder of the EA and community leader(s) during the decommissioning phase 4. A reporting office / channel to be established must community members experience problems with contractors / sub-contractors during the decommissioning phase. 5. A register to be kept of problems reported by community members and the steps taken to address / resolve it. 		
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8.4.2 Construction Site Decommissioning

This section deals with the demolishing of the construction camp and the actions that need to be implemented

Table 42: Construction Site Decommissioning

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Construction Site Decommissioning: Removal of equipment	<ol style="list-style-type: none"> 1. All structures comprising the construction camp are to be removed from site apart from what may be required for the operation of the facility. 2. The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint etc., and these must be cleaned up. 3. All hardened surfaces within the construction camp area must be ripped, all imported materials removed, and the area must be top soiled and regressed using the guidelines set out in the re-vegetation plan that forms part of this document. 	Holder of the EA	Compliance to all legislative requirements. Ensure the EMPr is adhered to. Alien Plant Management Plan Implemented Plant Rehabilitation Implemented
Construction Site Decommissioning: Temporary services	<ol style="list-style-type: none"> 4. The Contractor must arrange the cancellation of all temporary services. 5. Temporary roads must be closed and access across these, blocked. 6. All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO. 	Holder of the EA	Clear communication channels maintained A traffic management Strategy Implemented

			Alien Plant Management Plan Implemented Plant Rehabilitation Implemented
Construction Site Decommissioning: Associated Infrastructure	<p>7. Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the Engineer.</p> <p>8. All surfaces hardened due to construction activities are to be ripped and imported material thereon removed.</p> <p>9. All rubble is to be removed from the site to an approved disposal site as approved by the ECO. Burying of rubble on site is prohibited.</p> <p>10. The site is to be cleared of all litter.</p> <p>11. The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials.</p> <p>12. Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer.</p> <p>13. All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer.</p> <p>14. The Contractor must repair any damage that the construction works has caused to neighbouring properties, specifically, but not limited to, damage caused by poor storm water management.</p>	Holder of the EA	All waste managed according to approved Method Statement
Construction Site Decommissioning: Rehabilitation plan	<p>15. Rehabilitate and re-vegetate cleared areas with indigenous plant species that were present on the site prior to construction.</p> <p>16. All roads utilized during the construction phase must be rehabilitated to an acceptable standard after construction is complete.</p>	Holder of the EA	Alien Plant Management Plan Implemented Plant Rehabilitation Implemented

8.4.3 Community Health and Safety

This section deals with the issues relating to health and safety during decommissioning

Table 43: Community Health and Safety

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Ongoing stakeholder involvement	<ol style="list-style-type: none"> 1. Demarcated routes to be established for construction vehicles to ensure the safety of communities, especially in terms of road safety and communities to be informed of these demarcated routes. 2. Excavated areas to be fenced off and regularly inspected to ensure that humans and animals do not have access to the site. 3. Where dust is generated by trucks passing on gravel roads, dust mitigation measures to be enforced. 4. Any infrastructure that would not be decommissioned must be appropriately locked and/or fenced off to ensure that it does not pose any danger to the community 	Holder of the EA	<p>A traffic management Strategy Implemented</p> <p>Ensure the EMPr is adhered to.</p>

8.4.4 Waste Management

This section deals with the issues relating to waste management during decommissioning

Table 44: Waste Management

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Waste Management	<ol style="list-style-type: none"> 1. All decommissioned equipment must be removed from site and disposed of at a registered land fill. Records of disposal must be kept. 2. Modules must be returned to the manufacturer or relevant recycling agent to be recycled. 	Holder of the EA	All waste managed according to approved Method Statement

8.4.5 Biodiversity

This section deals with the issues relating to biodiversity during decommissioning

Table 45: Biodiversity

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
<p>Biodiversity: Fauna</p>	<ol style="list-style-type: none"> 1. All hazardous materials must be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site must be cleaned up in the appropriate manner as related to the nature of the spill. 2. All vehicles accessing the site must adhere to a low speed limit (30-40km/h max) to avoid collisions with susceptible species such as snakes and tortoises. 3. No excavated holes or trenches must be left open for extended periods as fauna must fall in and become trapped. 4. All above-ground infrastructure must be removed from the site. Below-ground infrastructure such as cabling can be left in place if it does not pose a risk, as removal of such cables must generate additional disturbance and impact, however, this must be in accordance with the decommissioning and recycling plan, and as per the agreements with the land owners concerned. 	<p>Holder of the EA</p>	<p>All waste managed according to approved Method Statement</p> <p>A traffic management Strategy Implemented</p> <p>Ensure the EMPr is adhered to.</p>
<p>Biodiversity: Erosion control</p>	<ol style="list-style-type: none"> 5. There must be regular monitoring for erosion for at least 2 years after decommissioning by the Holder of the EA to ensure that no erosion problems develop as a result of the disturbance, and if they do, to immediately implement erosion control measures. 6. All erosion problems observed must be rectified as soon as possible, using the appropriate erosion control structures and re-vegetation techniques. 		<p>Erosion plan implemented and hydrological measures in place</p> <p>Alien Plant Management Plan Implemented</p> <p>Plant Rehabilitation Implemented</p>

	7. All disturbed and cleared areas must be re-vegetated with indigenous perennial shrubs and grasses from the local area.		
Biodiversity: Alien invasive plant control	8. Wherever excavation is necessary for decommissioning, topsoil must be set aside and replaced after construction to encourage natural regeneration of the local indigenous species. 9. Due to the disturbance at the site alien plant species are likely to be a long-term problem at the site following decommissioning and regular control will need to be implemented until a cover of indigenous species has returned. 10. Regular monitoring for alien plants within the disturbed areas for at least two years after decommissioning or until alien invasives are no longer a problem at the site. 11. Regular alien clearing must be conducted using the best-practice methods for the species concerned. The use of herbicides must be avoided as far as possible		Alien Plant Management Plan Implemented Plant Rehabilitation Implemented
SPECIFIC MITIGATION MEASURES			
	12. Access to sensitive areas outside of development footprint must not be permitted during deconstruction. 13. Minimise the presence of people and vehicles in very high sensitive areas, and reduce noise levels as far as possible. 14. No illegal collecting of any individuals is permitted. 15. Personnel to be educated about environmental sensitivities and issues on site.		Ensure the conditions of the EA are adhered to. Ensure the EMPr is adhered to. Noise and lighting managed according to approved Method Statement

	<p>16. Report any priority species sightings to conservation authorities.</p> <p>17. Appropriate lighting must be installed to minimise impacts on nocturnal animals.</p> <p>18. Construction activities must not be undertaken at night.</p> <p>19. No driving of vehicles off-road.</p> <p>20. Implement speed limits (max 40km/h).</p> <p>21. Implement Alien Plant Management Plan</p> <p>22. Surface runoff and erosion must be properly controlled and any issues addressed as quickly as possible</p> <p>23. Do NOT use any alien plants during any rehabilitation that may be required.</p> <p>24. Personnel to be educated about environmental sensitivities and issues on site.</p> <p>25. Appropriate lighting should be installed to minimise impacts on nocturnal animals.</p> <p>26. Project decommissioning activities should not be undertaken at night.</p>		<p>Alien Plant Management Plan Implemented</p> <p>Plant Rehabilitation Implemented</p> <p>A traffic management Strategy Implemented</p>
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8.4.6 Aquatic Ecology

This section deals with the issues relating to Aquatic Ecology during decommissioning

Table 46: Aquatic ecology

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Aquatic Ecology	<p>1. Removal of any historically contaminated soil as hazardous waste must be undertaken.</p> <p>2. Removal of hydrocarbons and other hazardous substances by a suitable contractor to reduce contamination risks must be undertaken.</p>	Holder of the EA	<p>All waste managed according to approved Method Statement</p> <p>Ensure the EMPr is adhered to</p> <p>Alien Plant Management Plan Implemented</p>

	<ol style="list-style-type: none"> 3. Removal of all substances which can result in groundwater (or surface water) contamination must be undertaken. 4. Re-vegetation of exposed soil surfaces to ensure no erosion in these areas is to be undertaken. 		Plant Rehabilitation Implemented
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8.4.7 Agriculture

This section deals with issues relating to agricultural potential and resources and actions that need to be implemented during decommissioning

Table 47: Agriculture

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Agriculture: Soil erosion	<ol style="list-style-type: none"> 1. Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there. 2. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize the soil against erosion. 	Holder of the EA	<p>Erosion Plan implemented</p> <p>Alien Plant Management Plan Implemented</p> <p>Plant Rehabilitation Implemented</p>

8.4.8 Visual Impact

This section deals with visual issues and actions that need to be implemented during decommissioning

Table 48: Visual Impact

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
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Visual Impact: General	<ol style="list-style-type: none"> 1. Decommissioning activities must not occur at night and lighting must only be erected where absolutely necessary. 2. Decommissioning traffic must stick to designated routes or access roads. 3. Decommissioning areas are to be kept clean and tidy. 4. Measures must be taken to suppress dust arising from decommissioning activities. 5. Labour being transported to the site must take cognisance of litter and waste concerns. 6. Equipment being transported to and from the site must be covered with tarps. 7. Topsoil stockpiles must be well managed and seeded when possible if not utilised within three months. 8. It is recommended that equipment be stored discreetly so as not to increase visual impacts. 9. Decommissioning must be conducted in the shortest possible time in order to reduce visual impacts. 	Holder of the EA	Noise and lighting managed according to approved Method Statement A traffic management Strategy Implemented All staff members are aware of the EMPr requirements relevant to them Erosion Plan implemented Alien Plant Management Plan Implemented Plant Rehabilitation Implemented
SPECIFIC MITIGATION MEASURES			
	<ol style="list-style-type: none"> 10. Carefully plan to avoid any delays or extensions to the decommissioning period. 11. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. 12. Vegetation clearing must take place in a phased manner. 13. Limit the number of vehicles and trucks travelling to and from the proposed site, where possible. 		

	<p>14. If dust plumes become an issue, dust suppression techniques must be implemented on gravel access roads utilised during decommissioning, where possible.</p> <p>15. Ensure that all soil stockpiles are covered in order to reduce dust.</p> <p>16. Establish erosion control measures on areas which will be exposed for long periods of time. This is to reduce the potential impact heavy rains must have on the bare soil.</p>		
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8.4.9 Air Quality

This section deals with the issues relating to air quality during decommissioning

Table 49: Air Pollution

Impact	Impact Management Actions	Responsibility	Impact Management Outcome
Air quality	1. Regular maintenance of equipment to ensure reduced exhaust emissions	Holder of the EA	Ensure the EMPr is adhered to.

9 ADDITIONAL MANAGEMENT PLANS

9.1 High-level Alien Invasive Management Plan

Table 50: Alien Invasive Management Plan

ALIEN INVASIVE MANAGEMENT PROGRAMME	
MITIGATION MEASURES	<p>1. Stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding.</p> <p>2. Alien vegetation and the spread of exotic species on the site will need to be controlled.</p> <p>3. The contractor must be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion.</p>

ALIEN INVASIVE MANAGEMENT PROGRAMME	
	<ol style="list-style-type: none"> 4. Herbicide use must only be allowed according to contract specifications. The application must be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment must be properly investigated and only environmentally friendly herbicides must be used. 5. The use of pesticides and herbicides must be discouraged as these can impact on important pollinator species of indigenous vegetation. 6. Six monthly checks of the area must take place for the emergence of invader species. 7. Mitigation measures mentioned for the construction phase above must be implemented for any maintenance of the development that must be undertaken during the operation phase. 8. Correct rehabilitation with locally indigenous species. 9. Monitoring programme to ensure that rehabilitation efforts are successful to ensure that risks such as erosion, spread of exotic species and the edge effect are avoided. 10. Constant maintenance of the area to ensure re-colonisation of floral species. 11. Regular removal of alien species which will jeopardise the proliferation of indigenous species.

The above High Level Alien invasive management plan will be updated by a vegetation specialist once the detailed design stages of the proposed development are complete and the floral walk-through study has been undertaken.

9.2 Plant Rescue and Protection Plan

Table 51: Plant Rescue and Protection Plan

PLANT RESCUE PROTECTION PLAN	
MITIGATION MEASURES	<ol style="list-style-type: none"> 1. The removal of protected plant species from the proposed development areas must take place prior to construction commencing. These plant species should be grown ex-situ and then relocated after construction has been completed. 2. Where possible, preference be given to conservation organisations to remove seeds, cuttings and plants prior to construction commencing for conservation purposes.

PLANT RESCUE PROTECTION PLAN

3. A large proportion of the impact of the development stems from the access roads and the number of roads must be reduced to the minimum possible and routes must also be adjusted to avoid areas of high sensitivity as far as possible, as informed by a preconstruction walk-through survey.
4. Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.
5. A pre-construction walk-through survey by the biodiversity specialist will be required during a favourable season to locate any protected plants / trees and/or sensitive species and/or ecological feature. This survey must cover the footprint of all proposed infrastructure, including internal access roads. If necessary, shift infrastructure to avoid impacts on species or specific features.
6. Vegetation clearing must only commence after the walk-through has been conducted and necessary permits obtained. The Northern Cape Nature Conservation Act permit conditions must also be complied with.
7. Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared.
8. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step.
9. Materials must not be delivered to the site prematurely which could result in additional areas being cleared or affected.
10. No vegetation to be used for firewood.
11. Gathering of firewood, fruit, “muti” plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO.
12. Only vegetation within the footprint must be removed.
13. Vegetation removal must be phased in order to reduce impact of construction.
14. Construction site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas.
15. All natural areas impacted during construction must be rehabilitated with locally indigenous plant species.
16. A buffer zone must be established in areas where construction will not take place to ensure that construction activities do not extend into these areas.
17. Construction areas must be well demarcated and these areas strictly adhered to.

PLANT RESCUE PROTECTION PLAN	
	<p>18. The use of pesticides and herbicides in the study area must be discouraged as these impacts on important pollinator species of indigenous vegetation.</p> <p>19. Soils must be kept free of petrochemical solutions that must be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.</p> <p>20. Soil stockpiles must not become contaminated with oil, diesel, petrol, garbage or any other material, which must inhibit the later growth of vegetation in the soil.</p>

The above Plant Recue and Protection Plan will be updated by a vegetation specialist once the detailed design stages of the proposed development are complete and the floral walk-through study has been undertaken.

9.3 Re-Vegetation and Habitat Rehabilitation Plan

Table 52: Re-Vegetation and Habitat Rehabilitation Plan

RE-VEGETATION AND HABITAT REHABILITATION PLAN	
MITIGATION MEASURES	<ol style="list-style-type: none"> 1. Re-vegetation must aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment. 2. Re-vegetation of disturbed surfaces must occur immediately after construction activities are completed. This must be done through seeding with indigenous grasses. 3. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction. 4. All natural areas impacted during construction must be rehabilitated with locally indigenous species typical of the representative botanical unit. 5. Rehabilitation must take place in a phased approach as soon as possible. 6. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding. 7. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas. 8. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged.

RE-VEGETATION AND HABITAT REHABILITATION PLAN	
	<p>9. Habitat destruction must be limited to what is absolutely necessary for the construction of the infrastructure, including the construction of new roads. In this respect, the recommendations from the Ecological Specialist Study must be applied strictly. Personnel must be adequately briefed on the need to restrict habitat destruction, and must be restricted to the actual construction area.</p> <p>10. Monitoring programme to ensure that rehabilitation efforts are successful to ensure that risks such as erosion, spread of exotic species and the edge effect are avoided.</p>

The above Re-Vegetation and Habitat Rehabilitation Plan will be updated by a vegetation specialist once the detailed design stages of the proposed development are complete and the floral walk-through study has been undertaken.

9.4 Erosion Management Plan

Table 53: Erosion Management Plan

EROSION MANAGEMENT PLAN	
MITIGATION MEASURES	<ol style="list-style-type: none"> 1. Contractor to provide method statement on erosion control, showing how storm water will be managed. 2. To prevent erosion, material stockpiled for long periods (2 weeks) must be retained in a bermed area. 3. Areas which are not to be constructed on within two months must not be cleared to reduce erosion risks. 4. The area to be cleared must be clearly demarcated and this footprint strictly maintained. 5. Wind screening and stormwater control must be undertaken to prevent soil loss from the site. 6. Other erosion control measures that can be implemented are as follows: <ul style="list-style-type: none"> • Brush packing with cleared vegetation • Mulch or chip packing • Planting of vegetation • Hydroseeding / hand sowing 7. Sensitive areas need to be identified prior to construction so that the necessary precautions can be implemented. 8. All erosion control mechanisms need to be regularly maintained.

EROSION MANAGEMENT PLAN	
	<ol style="list-style-type: none"> 9. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces. 10. Retention of vegetation where possible to avoid soil erosion. 11. Vegetation clearance must be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. 12. Re-vegetation of disturbed surfaces must occur immediately after construction activities are completed. This must be done through seeding with indigenous grasses that were present on site prior to construction. 13. No impediment to the natural water flow other than approved erosion control works is permitted. 14. To prevent storm water damage, the increase in storm water run-off resulting from construction activities must be estimated and the drainage system assessed accordingly. 15. Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion.

9.5 Stormwater Management Plan

A Stormwater Management Plan cannot be compiled until the detailed design stages of the proposed development are complete, which will only take place if the proposed Wonderheuvél PV Energy Facility development is authorised by the DEA. It is however stipulated in this EMP that a Stormwater Management Plan must be compiled before any construction commences and be implemented during the construction phase. Refer to **Section 3.4.4**

9.6 Open Space Management Plan

Table 54: Open Space Management Plan

OPEN SPACE MANAGEMENT PLAN	
MITIGATION MEASURES	<ol style="list-style-type: none"> 1. A buffer zone must be established in areas where construction will not take place, to ensure that construction activities do not extend into these areas. 2. Vehicle movement must be restricted to authorised access roads.

OPEN SPACE MANAGEMENT PLAN

3. Before construction begins, all areas to be developed must be clearly demarcated with fencing or orange construction barrier where applicable.
4. All Construction Camp are to be fenced off in such a manner that unlawful entry is prevented and access is controlled. Signage must be erected at all access points in compliance with all applicable occupational health and safety requirements. All access points to the Construction Camp must be controlled by a guard or otherwise monitored, to prevent unlawful access.
5. The contractor and ECO must ensure compliance with conditions described in the EA.
6. Records of compliance/ non-compliance with the conditions of the authorisation must be kept and be available on request.
7. Records of all environmental incidents must be maintained and a copy of these records be made available to the national and provincial departments on request throughout the project execution.
8. Site establishment must take place in an orderly manner and all required amenities must be installed at camp sites before the main workforce move onto site.
9. All construction equipment must be stored within this construction camp.
10. An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and that provides for spillage prevention and containment.
11. The Contractor must provide sufficient ablution facilities, in the form of portable / VIP toilets, at the Construction Camps, and must conform to all relevant health and safety standards and codes. No pit latrines, French drain systems or soak away systems must be allowed and toilets must not be situated within 100 meters of any surface water body or 1:100 year flood line. A sufficient number of toilets must be provided to accommodate the number of personnel working in the area.
12. The Contractor must inform all site staff to make use of supplied ablution facilities and under no circumstances must indiscriminate sanitary activities be allowed.
13. No fires will be allowed and the Contractor must make alternative arrangements for heating. LP Gas must be used, provided that all required safety measures are in place. The Contractor must take specific measures to prevent the spread of veld fires, caused by activities at the campsites. These measures must include appropriate instruction of employees about fire.

OPEN SPACE MANAGEMENT PLAN	
	<p>14. Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts.</p> <p>15. Project manager must ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks.</p> <p>16. Staff must be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training.</p> <p>17. Staff must be trained in the hazards and required precautionary measures for dealing with these substances</p>

9.7 Monitoring System

Table 55: Monitoring System

MONITORING SYSTEM	
MITIGATION MEASURES	<ol style="list-style-type: none"> 1. Monitoring must be undertaken to evaluate the success of mitigation measures. Monitoring methods must be in accordance with features that need to be monitored. 2. An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and provides for spillage prevention and containment. 3. Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control. 4. Spillage packs must be available at construction areas. 5. Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage area(s). These pollution prevention measures for storage must include a bund wall high enough to contain at least 110% of any stored volume, and this must be sited away from drainage lines in a site with the

MONITORING SYSTEM

approval of the Project Manager. The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material with an additional allocation for potential storm water events.

6. These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.
7. An approved waste disposal contractor must be employed to remove and recycle waste oil, if practical. The contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training.
8. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage / leakage occur must be attained and given to the project manager.
9. Topsoil and subsoil to be protected from contamination. This must be monitored on a monthly basis by a visual inspection of diesel/oil spillage and pollution prevention facilities.
10. Concrete and chemicals must be mixed on an impervious surface and provisions must be made to contain spillages or overflows into the soil.
11. Relevant departments and other emergency services must be contacted in order to deal with spillages and contamination of aquatic environments.
12. Soils must be kept free of petrochemical solutions that must be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.

9.8 Traffic Management Plan

Table 56: Traffic Management Plan

TRAFFIC MANAGEMENT PLAN	
MITIGATION MEASURES	<ol style="list-style-type: none"> 1. A designated transport coordination manager must be appointed to oversee and manage the traffic safety officers. Additionally, the designated transport coordination manager must inform and keep up-to-date the interested and affected parties of all the activities taking place that will have a direct impact on them. 2. A traffic safety officer must be nominated to make all the necessary arrangements to maintain the required traffic measures for the duration of the project. The safety officer must liaise daily with the transportation coordination manager to keep them apprised of the state of all the traffic arrangements. 3. All construction traffic must comply with the legal load requirements as outlined in the National Road Traffic Act and National Road Traffic Regulations. 4. During periods of high construction traffic entering and exiting the site, it is recommended that flagmen help direct the traffic. This will enable the safe movement of construction and public traffic at the entrance and reduce the number of potential conflicts. 5. The South African Road Traffic Signs Manual (SARTSM), Volume 2, June 1999 is to be used for all traffic during the construction activities of the proposed project. 6. Any damage caused by the construction vehicles to the existing road infrastructure must be repaired in kind, prior to the completion of the project. 7. A dust suppression system for the gravel roads must be in place to prevent excessive dust from the traffic polluting the air. 8. All abnormal loads must be transported under a permit. 9. A route study be undertaken to confirm the most appropriate route to site. 10. The appropriate load permits be obtained from the Western Cape Department of Transport prior to construction.

9.9 Transportation Management Plan

Table 57: Transportation Management Plan

TRANSPORTATION MANAGEMENT PLAN	
MITIGATION MEASURES	<ol style="list-style-type: none"> 1. For each convoy of abnormal vehicles/loads a designated safety officer must be nominated.

TRANSPORTATION MANAGEMENT PLAN

2. All vehicles used during the transport of materials and in the construction activities are required to be roadworthy per the National Road Traffic Act (NRTA) and display all pertinent certificates as required.
3. For any vehicles that operate under an exemption permit, a roadworthy certificate will not be required; however the exemption permit will require that the vehicle is fit for operation on public roadways.
4. All vehicles travelling to and from the site must adhere to all laws imposed by the law enforcement agencies, and must comply with any requests made by the law enforcement officials.
5. All construction vehicles that are entering the site must also be available via radio or telephone communication to the transport coordination manager. So that in the event of an emergency, all vehicles can be accounted for.
6. During the delivery of the PV panel components and associated infrastructure, the person in charge must be in communication with transport coordination manager, so that he/she will keep track and document the progress of the vehicles to facilitate any issues that may arise during the transportation phase.
7. All vehicles must comply with the posted speed limits on public roads as well as the speed limits within the development.
8. All abnormal vehicles and loads to be transported are required to have a valid permit before any trip is begun.
9. SANRAL Western & Southern Region will need to be contacted in order to obtain consent for the abnormal load transport on their roadways.
10. An escort is required to accompany the abnormal vehicle to warn the normal travelling public and to promote the safe flow of traffic if the normal flow of traffic is disrupted by the abnormal vehicle.
11. Construction vehicles delivering raw materials to the site must be covered to prevent any debris along the roads.
12. Ensure a large portion of vehicles traveling to and from the proposed development site travel in the 'off peak' periods.
13. Implement pedestrian safety initiatives.
14. Trucks must stop at regular intervals to allow queuing vehicles to pass.

A consolidated Traffic and Transport Management Plan, taking into account the final route selection must be prepared once the Project advances to the preliminary phase. This plan must ensure that vehicles arrive in a dispersed manner throughout the day to reduce the impact to other road users. Methods to improve driver safety must also be outlined, e.g. the use of speed cameras or Average Speed Over Distance (ASOD). Furthermore, this plan must include measures to minimise the impact on local commuters so as not to disturb existing retail and commercial operations.

9.10 Heritage Management Plan

Table 58: Heritage Management Plan

THE HERITAGE MANAGEMENT PLAN	
MITIGATION MEASURES	<ol style="list-style-type: none"> 1. In the event that an area previously not included in an archaeological or cultural resources survey is to be disturbed, the SAHRA needs to be contacted. An enquiry must be lodged with them into the necessity for a Heritage Impact Assessment. 2. In the event that a further heritage assessment is required it is advisable to utilise a qualified heritage practitioner, preferably registered with the Cultural Resources Management Section (CRM) of the Association of Southern African Professional Archaeologists (ASAPA). <ol style="list-style-type: none"> (a) This survey and evaluation must include: (b) The identification and mapping of all heritage resources in the area affected; (c) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7 of the National Heritage Resources Act; (d) An assessment of the impact of the development on such heritage resources; (e) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development; (f) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources; (g) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and (h) Plans for mitigation of any adverse effects during and after the completion of the proposed development. 3. It is advisable that an information section on cultural resources be included in the SHE training given to contractors involved in surface earthmoving activities. These sections must include basic information on: <ol style="list-style-type: none"> (a) Heritage; (b) Graves; (c) Archaeological finds; and (d) Historical Structures.

THE HERITAGE MANAGEMENT PLAN

4. This module must be tailor made to include all possible finds that could be expected in that area of construction.
Possible finds include:
 - (a) Open air Stone Age scatters, disturbed during vegetation clearing. This will include stone tools.
 - (b) Palaeontological deposits such as bone, and teeth in fluvial riverbank deposits.
5. In the event that a possible find is discovered during construction, all activities must be halted in the area of the discovery and a qualified archaeologist contacted.
6. The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures.
7. If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA.
8. After mitigation, an application must be lodged with SAHRA for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued will such a site be destroyed.
9. If during the initial survey sites of cultural significance are discovered, it will be necessary to develop a management plan for the preservation, documentation or destruction of such a site. Such a program must include an archaeological/palaeontological monitoring programme, timeframe and agreed upon schedule of actions between the company and the archaeologist.
10. In the event that human remains are uncovered, or previously unknown graves are discovered, a qualified archaeologist needs to be contacted and an evaluation of the finds made.
11. If the remains are to be exhumed and relocated, the relocation procedures as accepted by SAHRA need to be followed. This includes an extensive social consultation process.

The above Heritage Plan will be updated by a heritage specialist once the detailed design stages of the proposed development are complete and the walk-through study has been undertaken.

9.11 Fire Management Plan

The intent of a Fire Management Plan (FMP) is to provide fire safety requirements to ensure that the construction and operation of the proposed Wonderheuvél PV ENERGY FACILITY, which are defensible from wildfire and, in turn, do not represent a significant threat of ignition source for the surrounding native habitat.

It must be noted that during extreme fire conditions, there are no guarantees that a given structure will not burn. Precautions and mitigating measures identified in this plan are designed to reduce the likelihood that fire would impinge upon the proposed structures as well as minimise the impact of fires if they do occur. This FMP does not guarantee that fire will not occur in the area or that fire will not damage property or cause harm to persons or their property.

Wonderheuvél PV Energy Facility will rely heavily on the co-operation and proactive participation between managers, employees and contractors to maintain a high level of Fire safety awareness at all times.

This management plan is also a reflection of Wonderheuvél PV Energy Facility commitment towards the constant safeguarding of employees against Fire hazards, whilst complying with the requirements of the Fire Safety Act, 6 of 2002 and Occupational Health and Safety Act, 85 of 1993.

9.11.1 Fire and Maintenance of Access Roads for PV Energy Facility

- A primary access and escape route will be visible and known to all who visit the facility and will be controlled by a security gate.
- There will be other dedicated secondary gravel roads leading to/from the project site to/from the primary access.
- There will be more than one vehicular access gate leading into the project.
- An escape route map with safe gathering points needs to be visible at all the entrance gates/construction camps for anyone to familiarise themselves with upon entry (and will be provided prior to construction once the final facility layout and building plans have been approved by the appropriate department/authority).

9.11.2 Fire Safety Act, 6 of 2002

A copy of the fire safety act is to be available at the facility for everyone's easy access purposes.

9.11.3 Principles of Fire Safety

The aims of implementing measures to limit the incidences and spread of fire are:

- To ensure the safety of people, minimising loss of life and injury.
- To minimise loss of and damage to property and possessions.
- To minimise the negative impact on the environment.
- To safely and effectively extinguish fire when needed

9.11.4 Requirements in Terms of the South African Bureau of Standards (SABS)

From a fire safety point of view, all buildings erected within the boundaries of South Africa must comply with the SABS 0400:1990- The application of the National Building Regulations. The following requirements

are appropriate and can be adapted for planning and design of buildings. Any building must be so designed, constructed and equipped that in case of fire:

- The protection of occupants or users therein is ensured and that provision is made for the safe evacuation of such occupants or users.
- The spread and intensity of such fire within such buildings and the spread of fire to any other building will be minimised.
- Adequate means of access and equipment for detecting, fighting, controlling and extinguishing such fire are adopted.

9.11.5 Management Commitment

It will be the responsibility of managers to:

- Enforce such measures as may be necessary in the interest of the preservation of employee's safety including safety against fire.
- Permit employees to perform work only once the precautionary measures are put in place.
- Provide the necessary supervision to staff to ensure that precautionary measures are maintained.
- Ensure that the staff are adequately trained in fire procedures.
- Ensure that all staff are informed regarding their scope of authority.
- Ensure that the FMP is reviewed and updated regularly to meet the projects needs at that particular point in time.
- Ensure that the firefighting equipment is regularly serviced.
- Make sure that the FMP forms part of the facility induction which will be made compulsory for each new member to the facility to attend.

9.11.6 Employees' Contribution to Fire Management

The successful implementation of the FMP will require the full co-operation of every employee.

In this regard it will be expected of every employee to:

- Take care of the fire detection and fire protection systems and equipment.
- Carry out any lawful order given to him/her and obey the fire procedures laid down, or authorised thereto, by Mainstream in the interest of health and fire safety.
- Report any situation which may cause fire to the supervisor and/or Health and Safety Representative.
- Be able to make recommendations to the relevant Health and Safety representative who will take the recommendation into consideration and if agreed upon then implemented.

Co-operation will be expected from any other Contractor or subcontractor to ensure that any duty or requirement imposed on Mainstream, as the employer, through legislation, is complied with.

9.11.7 Fire Prevention/Control

The following preliminary measures will be taken to try and prevent and/or control fires on site:

- Smoking and open flames will be prohibited in areas near flammable and/or combustible materials.
- Fire Fighting equipment will be sufficiently available on site and must comply with the relevant legislation.
- All equipment will be serviced annually and pressure tested every five years.

9.11.8 Response

- The facility must at all times have emergency numbers readily available to all employees and staff. These include the fire department as well as emergency care numbers to make sure that fires are

quickly extinguished when they occur and that the victims (if any) are medically treated and taken to a nearby hospital or clinic if needs be.

- The staff will be trained to use the firefighting equipment for small fires that can be contained but alternatively if the fire cannot be contained, the appropriate authorities must be contacted to assist in extinguishing the fire.
- If the fire cannot be contained, workers must evacuate the site in an orderly manner led by a trained Health and Safety representative.
- During construction phase, fire protection measures like placing fire extinguishers on site are compulsory before any hot work can commence or where any flammable substances are present.
- During operation phase, Fire protection equipment like Fire Extinguishers will be situated at carefully selected locations for easy access during an emergency.

9.11.9 Management Plan

The following will form the key elements of the FMP:

- Legal Compliance
 - A work place that is safe and without risk to the health and safety of employees in compliance with the requirements of the Occupational Health and Safety Act 85 of 1993 and its regulations as well as the Fire Safety Act, 6 of 2002.
- Fire hazard identification and risk assessment
 - Identify any fire hazards and risks and then determine the extent and impact.
 - Endeavour to eliminate fire hazards and develop control measures to contain the fires.
- Fire Safety, Health and Environmental Proficiency
 - Ensure that employees are conversant with the potential fire hazards and the precautionary measures required with respect to these hazards through regular awareness training.
 - Incorporate and discuss Fire Safety into the daily Toolbox talks.
- Written Safe Work Procedures
 - Develop written safe work procedures for all fire high risks and provide the necessary training to employees if needs be.
- Training and Education
 - Include the fire management plan in all Health and Safety training and assessments and provide the necessary training and awareness to all categories of employees.
 - Provide awareness and training to all new employees including temporary employees and contractors on site.
- Prevention
 - Suitable preventative measures against exposure to hazards are an integral part of daily activities.
 - Personnel protective equipment must be provided for the protection of employees when necessary.
 - Corrective and/or fire preventative measures must be put in place.
- Elimination of Fire Incidents
 - The elimination of fire incidents, including injuries on duty to which employees and the public can be exposed to will be achieved through the proper investigation of any fire incidents. Factors which cause any fire incidences will be determined and then corrective and preventative measures will be developed and implemented in liaison with all relevant stakeholders.
- First Aid kit

- A first aid kit will be available on site which will contain all the necessary medication (e.g. pain medication) and equipment to pre-treat any fire injury depending on the magnitude of the injury. If the injury is too severe, the victim must be taken to the nearest hospital or clinic to be treated by professionals and not treated on site.
- There will be a sufficient number of employees trained in first aid medical assistance in case of small controllable fire incidents occurring on site.
- Machinery, Plant and Equipment
 - All mechanical equipment will be safeguarded in order to protect the health and safety of persons that must be exposed to such equipment.
 - Regular maintenance of all equipment (including firefighting equipment) and inspections will be recorded.
 - Only equipment that is safe and in working condition will be used by the employees. Equipment is to be inspected every day before use.
- Sub-Contractors
 - Sub-contractors will sign an agreement with the Developer to ensure their compliance with the FMP.
 - Sub-contractors will work according to the Health and Fire Safety standards.

9.12 Environmental Awareness Plan

Legislation requires that a company who prepares an environmental management program must develop an environmental awareness plan describing the manner in which the company intends to inform his or her employees of any environmental risks which must result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment. In recognition of the need to protect our environment, environmental management should not only be seen as a legal obligation but also as a moral obligation.

This Environmental Awareness Plan is intended to create the required awareness and culture with personnel and contractors/service providers on environmental safety and health issues associated with the development activities.

9.12.1 Policy on Environmental Awareness

This Environmental Awareness Plan must serve as the basis for the induction of all new employees (as well as contractors depending on the nature of their work on site) on matters as described herein and read in conjunction with the EMP. The Plan will also be used to hone awareness of all employees on a continuous basis.

Specific environmental awareness performance criteria will also form part of the job descriptions of employees, to ensure diligence and full responsibility at all levels of the organisational work force.

9.12.2 Implementation of Environmental Awareness

General environmental awareness will be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout the project's duration. This will ensure that environmental accidents are minimised and environmental compliance maximised.

Environmental awareness will be fostered in the following manner:

- Induction course for all workers on site, before commencing work on site.
- Refresher courses as and when required

- Daily toolbox talks with all workers on the site at the start of each day, where workers can be alerted to particular environmental concerns associated with their tasks for that day or the area/habitat in which they are working.
- Displaying of information posters and other environmental awareness material at the general assembly points.

9.12.3 Training and awareness

The MC is to take responsibility for the management of their staff and subcontractors on the project site during the construction phase and supervise them closely at all times. The onus is on the MC to make sure that all their staff and subcontractors fully comprehend the contents of the EMPr. The MC must organise environmental awareness training programmes, which should be targeted at the two levels of employee: management and labour.

9.12.4 Training of construction workers

All construction staff must receive basic training in environmental awareness, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must be informed of how to recognise historical / archaeological artefacts that may be uncovered. They must also be apprised of the EMPr's requirements. Environmental awareness training programmes need to be formulated for these employee levels and must comprise:

- A record of all names, positions and duties of staff to be trained;
- A framework for the training programmes;
- A summarised version of the training course(s); and
- An agenda for the delivery of the training courses.

Such programmes will set out the training requirements, which need to be conducted prior to any construction works occurring and will include:

- Acceptable behaviour with regard to flora and fauna;
- Management and minimising of waste, including waste separation;
- Maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, lubricants, cement, mortar and other chemicals;
- Responsible handling of chemicals and spills;
- Environmental emergency procedures and incident reporting; and
- General code of conduct towards I&APs.

The ECO may be requested to provide additional on-site training (in a first language) in respect of environmental aspects that are unclear to the construction personnel. A translator may be required to assist with this additional training. The cost for the translator will be borne by the MC.

10 CONCLUSION

The environmental and social impacts of the project were identified through the four project phases (pre-construction, construction, operation and decommissioning) in compliance with National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) (as amended) and the EIA Regulations 2014 (as amended). No fatal flaws have been found for the proposed development. No unacceptable negative impacts have been identified that cannot be reduced with the implementation of the proposed mitigation and management measures. Both positive and negative project impacts have been identified.

Based on the above information and proposed mitigation measured, SiVEST is of the opinion that the Project will not have significant adverse social and environmental impacts. Most adverse impacts will be of a temporary nature during the construction phase and can be managed to acceptable levels with implementation of the recommended mitigation measures for the Project such that the overall benefits from the Project will greatly outweigh the few adverse impacts.

All the negative impacts could be easily mitigated. Generally, the proposed PV Energy Facility will result in appreciable benefits to the people in the project area of influence and bring opportunities for development to the country.

The EAP is satisfied that the EMPr is in compliance with National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) (as amended) and the EIA Regulations 2014 (as amended)

ANNEXURE A
CURRICULUM VITAE



ANNEXURE D

MANAGEMENT OF SOILS: GUIDELINES

Topsoil

- Source of topsoil
- Topsoil must be stripped from all areas that are to be utilised during the construction period and where permanent structures and access is required. These areas will include temporary and permanent access roads, construction camps, and lay down areas. Topsoil must be stripped after clearing of woody vegetation and before excavation or construction commences.
- The topsoil is regarded as the top 300mm of the soil profile irrespective of the fertility appearance, structure, agricultural potential, fertility and composition of the soil.

Topsoil stripping

- Soil must be stripped to a minimum depth of 150mm and maximum depth of 300mm or to the depth of bedrock where soil is shallower than 300mm. Herbaceous vegetation, overlying grass and other fine organic matter must not be removed from the stripped soil.
- No topsoil which has been stripped must be buried or in any other way be rendered unsuitable for further use by mixing with spoil or by compaction using machinery.
- Topsoil must preferably be stripped when it is in a dry condition in order to prevent compaction.

Topsoil stockpiling

- The Consulting Engineer or Environmental Control Officer must stockpile stripped topsoil in areas, which have been approved. Soil stockpiles must take the form of windows.
- To prevent erosion, material stockpiled for long periods (2 weeks) must be retained in a bermed area.
- Topsoil, mulch and subsoil stockpiles must be placed in higher-lying areas of the sit, and must not be positioned within stormwater channels or areas of ponding.
- Topsoil stripped from different soil ones must be stockpiled separately and clearly identified as such. Under no circumstances must topsoil obtained from different soil ones be mixed.
- Soil stockpiles must not be higher than 2m or stored for a period longer than one year. The slopes of soil stockpiles must not be steeper than 1 vertical to 2.5 horizontal.
- No vehicles must be allowed access onto the stockpiles after they have been placed. Topsoil stockpiles must be clearly demarcated in order to prevent vehicle access and for later identification when required.
- Soil stockpiles must not become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation in the soil.
- After topsoil removal has been completed, the Contractor must apply soil conservation measures to the stockpiles where and as directed by the Consulting Engineer or Environmental Control Officer. This must include the use of erosion control fabric or grass seeding.

Topsoil replacement

- Topsoil must be replaced to a minimum depth of 75mm over all areas where it has been stripped and over disused borrow pits, after construction in those areas has ceased. Topsoil placement must follow as soon as construction in an area has ceased.
- All areas onto which topsoil is to be spread must be graded to the approximate original landform with maximum slopes of 1:25 and must be ripped prior to topsoil placement. The entire area must be ripped parallel to the contours to a minimum depth of 300mm.

- Topsoil must be placed in the same soil one from which it had been stripped. However, if there is insufficient topsoil available from a particular soil one to produce the minimum specified depth, topsoil must be brought from other soil ones at the approval of the Consulting Engineer or Environmental Control Officer.
- Where topsoil that has been stripped by the Contractor is insufficient to provide the minimum specified depth, the Contractor must obtain suitable substitute material from other sources at no cost to the employer. The suitability of the substitute material must be determined by means of soil analyses, which are acceptable to the Consulting Engineer or Environmental Control Officer.
- No vehicles must be allowed access onto or through topsoil after it has been reinstated.
- After topsoil reinstatement is complete, cleared and stockpiled vegetative matter must be spread randomly by hand over the top soiled area. The vegetative material must be replaced on the areas from where it has been removed.

ANNEXURE E

ESKOM REQUIREMENTS FOR WORK IN OR NEAR ESKOM SERVITUDES

1. Eskom's rights and services must be acknowledged and respected at all times.
2. Eskom shall at all times retain unobstructed access to and egress from its servitudes.
3. Eskom's consent does not relieve the developer from obtaining the necessary statutory, land owner or municipal approvals.
4. Any cost incurred by Eskom as a result of non-compliance to any relevant environmental legislation will be charged to the developer.
5. If Eskom has to incur any expenditure in order to comply with statutory clearances or other regulations as a result of the developer's activities or because of the presence of his equipment or installation within the servitude restriction area, the developer shall pay such costs to Eskom on demand.
6. The use of explosives of any type within 500 metres of Eskom's services shall only occur with Eskom's previous written permission. If such permission is granted the developer must give at least fourteen working days prior notice of the commencement of blasting. This allows time for arrangements to be made for supervision and/or precautionary instructions to be issued in terms of the blasting process. It is advisable to make application separately in this regard.
7. Changes in ground level may not infringe statutory ground to conductor clearances or statutory visibility clearances. After any changes in ground level, the surface shall be rehabilitated and stabilised so as to prevent erosion. The measures taken shall be to Eskom's satisfaction.
8. Eskom shall not be liable for the death of or injury to any person or for the loss of or damage to any property whether as a result of the encroachment or of the use of the servitude area by the developer, his/her agent, contractors, employees, successors in title, and assignees. The developer indemnifies Eskom against loss, claims or damages including claims pertaining to consequential damages by third parties and whether as a result of damage to or interruption of or interference with Eskom's services or apparatus or otherwise. Eskom will not be held responsible for damage to the developer's equipment.
9. No mechanical equipment, including mechanical excavators or high lifting machinery, shall be used in the vicinity of Eskom's apparatus and/or services, without prior written permission having been granted by Eskom. If such permission is granted the developer must give at least seven working days' notice prior to the commencement of work. This allows time for arrangements to be made for supervision and/or precautionary instructions to be issued by the relevant Eskom Manager

Note: Where and electrical outage is required, at least fourteen work days are required to arrange it.
10. Eskom's rights and duties in the servitude shall be accepted as having prior right at all times and shall not be obstructed or interfered with.
11. Under no circumstances shall rubble, earth or other material be dumped within the servitude restriction area. The developer shall maintain the area concerned to Eskom's satisfaction. The developer shall be liable to Eskom for the cost of any remedial action which has to be carried out by Eskom.

12. The clearances between Eskom's live electrical equipment and the proposed construction work shall be observed as stipulated by *Regulation 15 of the Electrical Machinery Regulations of the Occupational Health and Safety Act, 1993 (Act 85 of 1993)*.
13. Equipment shall be regarded electrically live and therefore dangerous at all times.
14. In spite of the restrictions stipulated by Regulation 15 of the Electrical Machinery Regulations of the Occupational Health and Safety Act, 1993 (Act 85 of 1993), as an additional safety precaution, Eskom will not approve the erection of houses, or structures occupied or frequented by human beings, under the power lines or within the servitude restriction area.
15. Eskom may stipulate any additional requirements to highlight any possible exposure to Customers or Public to coming into contact or be exposed to any dangers of Eskom plant.
16. It is required of the developer to familiarise himself with all safety standards related to Electrical plant.
17. Any third party servitudes encroaching on Eskom servitudes shall be registered against Eskom's title deed at the developer's own cost. If such a servitude is brought into being, its existence should be endorsed on the Eskom servitude deed concerned, while the third party's servitude deed must also include the rights of the affected Eskom servitude.

John Geeringh (Pr Sci Nat)
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Eskom GC: Land Development

ANNEXURE F

HERITAGE MANAGEMENT GUIDELINES AND PLAN

GENERAL MANAGEMENT GUIDELINES

1. In the event that an area previously not included in an archaeological or cultural resources survey is to be disturbed, the SAHRA needs to be contacted. An enquiry must be lodged with them into the necessity for a Heritage Impact Assessment.
2. In the event that a further heritage assessment is required it is advisable to utilise a qualified heritage practitioner, preferably registered with the Cultural Resources Management Section (CRM) of the Association of Southern African Professional Archaeologists (ASAPA).
 - a) This survey and evaluation must include:
 - b) The identification and mapping of all heritage resources in the area affected;
 - c) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7 of the National Heritage Resources Act;
 - d) An assessment of the impact of the development on such heritage resources;
 - e) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
 - f) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
 - g) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
 - h) Plans for mitigation of any adverse effects during and after the completion of the proposed development.
3. It is advisable that an information section on cultural resources be included in the SHE training given to contractors involved in surface earthmoving activities. These sections must include basic information on:
 - a) Heritage;
 - b) Graves;
 - c) Archaeological finds; and
 - d) Historical Structures.
4. This module must be tailor made to include all possible finds that could be expected in that area of construction. Possible finds include:
 - a) Open air Stone Age scatters, disturbed during vegetation clearing. This will include stone tools.
 - b) Palaeontological deposits such as bone, and teeth in fluvial riverbank deposits.
5. In the event that a possible find is discovered during construction, all activities must be halted in the area of the discovery and a qualified archaeologist contacted.
6. The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures.
7. If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA.
8. After mitigation, an application must be lodged with SAHRA for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued may such a site be destroyed.
9. If during the initial survey sites of cultural significance are discovered, it will be necessary to develop a management plan for the preservation, documentation or destruction of such a site. Such a program must include an archaeological/palaeontological monitoring programme, timeframe and agreed upon schedule of actions between the company and the archaeologist.
10. In the event that human remains are uncovered, or previously unknown graves are discovered, a qualified archaeologist needs to be contacted and an evaluation of the finds made.

11. If the remains are to be exhumed and relocated, the relocation procedures as accepted by SAHRA need to be followed. This includes an extensive social consultation process.

ANNEXURE G
PLANT RESCUE PLAN

TO BE INCLUDED IN FINAL EMPR PRIOR TO CONSTRUCTION

ANNEXURE H
ECOLOGICAL MANAGEMENT PLAN

TO BE INCLUDED IN FINAL EMPR PRIOR TO CONSTRUCTION

ANNEXURE I
ALIEN PLANT MANAGEMENT PLAN

TO BE INCLUDED IN FINAL EMPR PRIOR TO CONSTRUCTION

ANNEXURE J
REHABILITATION PLANS

TO BE INCLUDED IN FINAL EMPR PRIOR TO CONSTRUCTION

ANNEXURE K
OPEN SPACE MANAGEMENT PLAN

TO BE INCLUDED IN FINAL EMPR PRIOR TO CONSTRUCTION

ANNEXURE L

TRAFFIC MANAGEMENT PLAN

TO BE INCLUDED IN FINAL EMPR PRIOR TO CONSTRUCTION

ANNEXURE M
TRANSPORTATION PLAN

TO BE INCLUDED IN FINAL EMPR PRIOR TO CONSTRUCTION



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