

# NORTHAM SOLAR PV FACILITY, NEAR NORTHAM, LIMPOPO PROVINCE

Basic Assessment Report

August 2021

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# LIMPOPO

PROVINCIAL GOVERNMENT  
REPUBLIC OF SOUTH AFRICA

## DEPARTMENT OF ECONOMIC DEVELOPMENT, ENVIRONMENT & TOURISM

### BASIC ASSESSMENT REPORT - EIA REGULATIONS, 2014

Basic Assessment report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

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## PROJECT DETAILS

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## **DRAFT BASIC ASSESSMENT REPORT FOR REVIEW**

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This Basic Assessment (BA) Report has been prepared by Savannah Environmental to assess the potential environmental impacts associated with the proposed 10MW Northam Solar PV Facility, Limpopo Province. This process is being undertaken in support of an application for Environmental Authorisation (EA) from the Limpopo Department of Economic Development, Environment and Tourism (LDEDET) in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA).

The BA Report was made available for a 30-day review and comment period from 19 July 2021 – 19 August 2021 at (<http://www.savannahsa.com/public-documents/energy-generation/>). All comments received and recorded during the 30-day review and comment period have been included, considered, and addressed within this final BA Report (refer to **Appendix E**) submitted to the Competent Authority for consideration and decision-making. Changes made in this BA Report for submission have been underlined for ease of reference.

## SUMMARY AND OVERVIEW OF THE PROPOSED PROJECT

---

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

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

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

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

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

The wider study area was assessed for screening purposes, following which a project area of 20ha and a development footprint (i.e., area to be cleared) of 19.5ha were identified within the affected property (~126ha in extent) by NHM for the solar PV facility and associated infrastructure (refer to **Figure 1**).

Site-specific studies and assessments have delineated areas of potential sensitivity within the study area. These have been excluded from the layout proposed for the facility (refer to **Figure 2**).

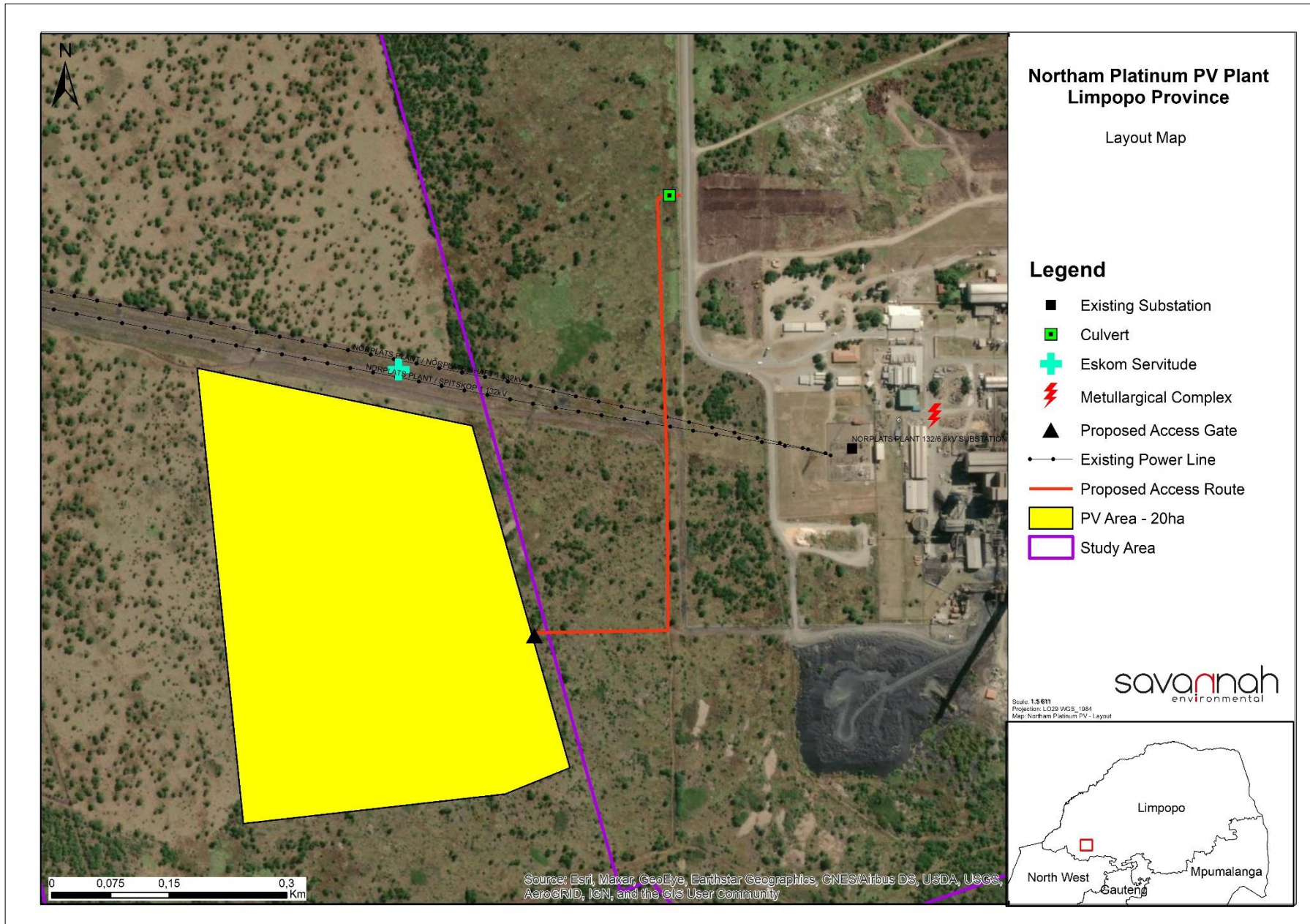


Figure 1: Site layout map

No environmental fatal flaws were identified in the detailed specialist studies conducted, provided that the recommended mitigation measures are implemented. These measures include, amongst others, the avoidance of features of high sensitivity within the study area, as specified by the specialists. As shown in **Figure 2**, areas of sensitivity have been avoided by the appropriate placement of infrastructure planned for the facility.

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

### **1.1. Impacts on Biodiversity (including flora and fauna) and Wetlands**

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

Six terrestrial habitats were identified within the study area, namely, Degraded Bushveld, Disturbed Bushveld, Rocky Koppie, Rocky Outcrops, Transformed Habitat and Wetlands. Of the six (6) terrestrial habitats identified within the wider study area, only three (3) are present within the project area, namely, Degraded Bushveld, Disturbed Bushveld and Rocky Outcrops. Historically, overgrazing from cattle and mismanagement has led to the deterioration of the area to a disturbed Bushveld that is encroached upon by exotic plant species. However, the degraded Bushveld habitat, rocky outcrops/koppie and wetlands/watercourses can be regarded as important, within the local landscape and regionally, as they are used for habitat, foraging and movement corridors for fauna, within a landscape fragmented by development. The habitat sensitivity of the rocky koppie habitat and wetland/water resources is regarded as high, due to the species recorded as well as the role of this intact unique habitat to biodiversity within a very fragmented local landscape; and identified sensitivity, according to various ecological datasets.

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

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

The Terrestrial Biodiversity and Wetland Assessment (**Appendix D1**) (BWIA) determined that there are no impacts associated with the project that cannot be mitigated to an acceptable level; and, as such, the

assessed layout was considered acceptable. Potential impacts expected to occur with the development of the project are:

- » Destruction, fragmentation and degradation of habitats and ecosystem.
- » Spread and/or establishment of alien and/or invasive species (AIPs).
- » Direct mortality of fauna.
- » Reduced dispersal/migration of fauna.
- » Environmental pollution due to water runoff, spills from vehicles and erosion.
- » Disruption/alteration of ecological lifecycles (breeding, migration, feeding) due to noise, dust, and light pollution.
- » Staff and others interacting directly with fauna (potentially dangerous) or poaching of animals.
- » Disturbance/degradation/loss to wetland soils or vegetation due to the construction of the solar facility.
- » Increased erosion and sedimentation.
- » Potential contamination of a wetland, specifically HGM3, with machine oils and construction materials.
- » Potential for increased stormwater runoff, leading to increased erosion and sedimentation.
- » Potential for increased contaminants entering the wetland systems.
- » Potential loss or degradation of nearby wetlands, specifically HGM3, through inappropriate closure.

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

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

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

## 1.2. Impacts on Avifauna

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

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

The project area mainly comprises Flat Black Turf Thornveld. The northern section of the project area was assigned a Low sensitivity, while the southern section was assigned a Medium sensitivity. The flat rocky outcrops

in the project area and wider study area were assigned a Medium Sensitivity. The koppie and wetlands in the wider study area were assigned High sensitivity.

The following impacts were identified by the specialist:

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

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

### **1.3. Impacts on Soil and Agricultural Potential**

A soil and agricultural potential assessment (SAA) of the project area was undertaken as part of the BA process (refer to **Appendix D3**). The study found that the project area falls within Land Type Ea70. The immediate area around the project area also consists of this land type, with Land Type Fb147 and Land Type Ae64 approximately 5km south-west and 5km south-east of the area, respectively. The SAA found that the project area comprises two natural soil forms, both with vertic topsoil, namely the Mkuze and Rustenburg soil forms. The Mkuze soil form makes up the northern and western sections of the project area (i.e., 11ha) and has a soil depth of 1.5m or deeper. The Rustenburg soil form makes up the southern and eastern sections of the project area (i.e., 8.7ha) and ranges in depth from 0.7m to 1.5m.

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

The following impacts were identified by the specialist:

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

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

### **1.4. Impacts on Heritage Resources (archaeological and palaeontological)**

The project area was thoroughly assessed in the field assessment, as detailed in the Heritage Impact Assessment (refer to **Appendix D4**) (HIA). During the field survey, no heritage sites of significance were identified within the project area.

Therefore, there will be no impact on heritage resources due to the proposed project.

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

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

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

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

### **1.5. Assessment of Cumulative Impacts**

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

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

### **1.6. Environmental Sensitivity Mapping**

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

The following features of very high and high sensitivity were identified within the broader study area. These features are not situated within the project area.



» **Ecological and freshwater features:**

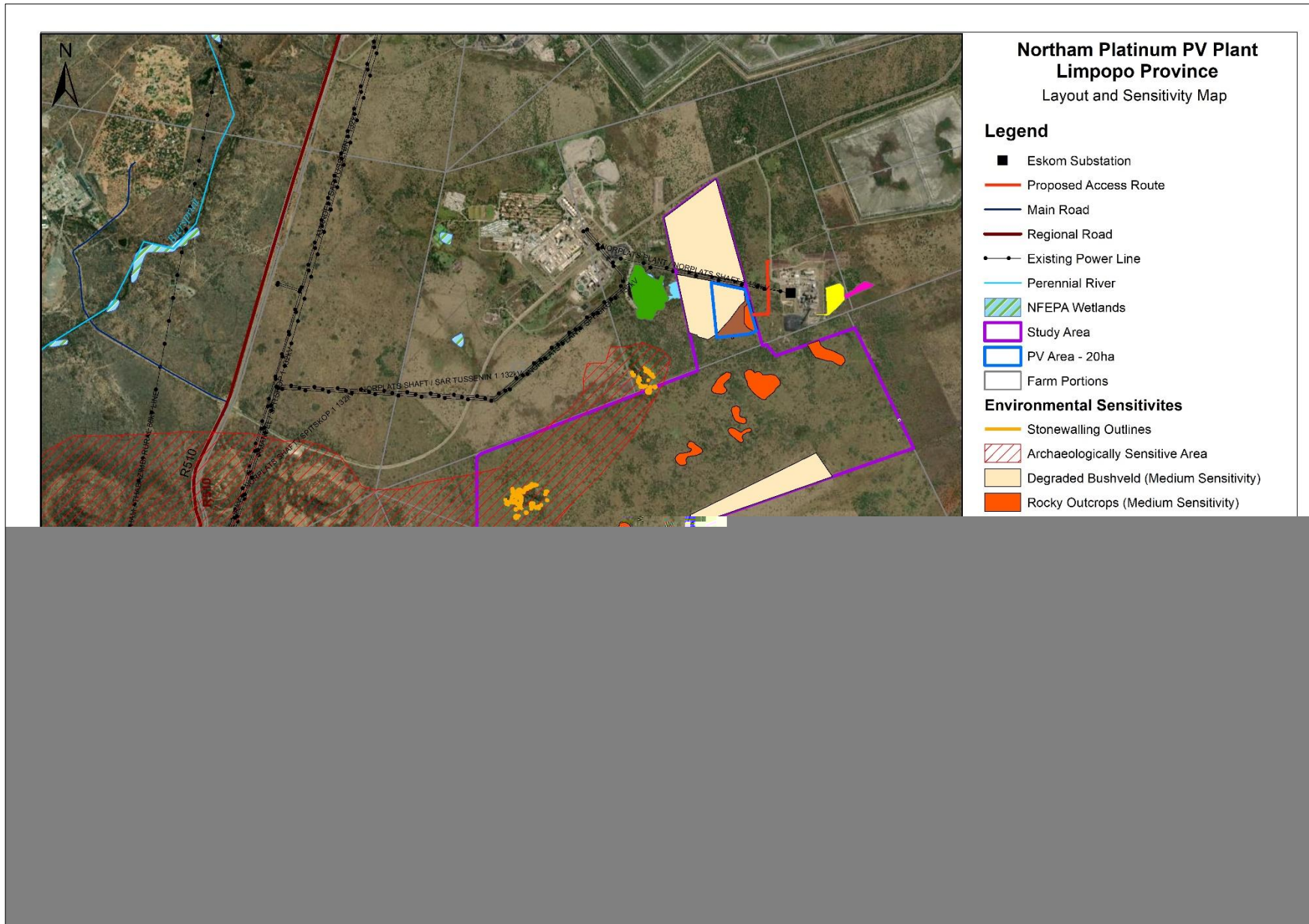
- \* All wetland features are deemed to be of High ecological sensitivity and a 22m 'no-go' buffer around them is recommended.

» **Avifaunal features:**

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

» **Heritage resources:**

- » The area where the stonewall complexes (Northam Site 4 Complex and Northam Site 5 Complex) are located within the broader study area is of Very High archaeological sensitivity, and it is recommended that the project does not take place within this area.



**Figure 2:** Environmental sensitivity map overlain with the layout of the proposed Northam solar PV facility.

## 1.7. Overall Conclusion (Impact Statement)

A technically viable study area for the project was proposed by NHM and assessed as part of the BA process. The environmental assessment of the project area (facility layout) was undertaken by independent specialists and their findings have informed the results of this BA Report.

The specialist findings have indicated that there are no identified environmental fatal flaws associated with the project's implementation. NHM has proposed a technically viable layout for the project and associated infrastructure, which has been assessed as part of the independent specialist studies. High sensitivity freshwater features (i.e., wetlands and heritage features (i.e., stonewalling complexes), which are regarded as 'no-go' areas, were identified around the broader study area.

The project area avoids these areas of high sensitivity. The proposed layout is therefore considered as the most appropriate from an environmental perspective and acceptable within all fields of specialist study undertaken for the project. All impacts associated with the proposed layout can be mitigated to acceptable levels through implementation of the recommended mitigation measures. The layout map included as **Figure 2** is considered the preferred facility layout for the project.

In addition, through the assessment undertaken in this BA Report, the following can be concluded regarding the key environmental considerations in terms of the International Finance Corporation (IFC) Project Developers Guide for the project:

- » *Construction phase impacts* (i.e., OHS, temporary air emissions from dust and vehicle emissions, noise related to excavation, construction and vehicle transit, solid waste generation and wastewater generation from temporary building sites) will be local in extent and of a low magnitude. The significance of impacts associated with the construction phase will be of a low rating post-mitigation due to the proximity of the project area to the Zondereinde Mine and Smelter.
- » *Water usage* (i.e., the cumulative water use requirements) will be kept to a minimum during the project's construction and operation. Appropriate water demand and conservation measures will be implemented.
- » *Landscape and visual impacts* (i.e., the solar panels' visibility within the wider landscape and associated impacts on landscape designations, character types and surrounding communities) will be of low significance, as the project area is situated between the Zondereinde Mine and Smelter.
- » *Land Matters* will be of low significance, as NHM is the owner of the affected property. There will be no involuntary land acquisition / resettlement associated with this project.
- » *Ecology and natural resources* (i.e., habitat loss/fragmentation, impacts on designated areas and disturbance or displacement of protected or vulnerable species) will be impacted on by the project. The layout of the facility has been designed to avoid areas of high sensitivity, thereby reducing impacts on these resources.
- » *Cultural heritage* (i.e., impacts on possible buried archaeological and palaeontological resources and the cultural landscape) is of low impact significance, and no heritage resources of significance are associated with the project area. However, two heritage resources of high significance were identified within the broader study area, and it is recommended that development activities associated with the PV facility avoid these sites.

- » Transport and access (i.e., impacts of transportation of materials and personnel) will be appropriately managed, and existing access roads to the Zondereinde Mine during construction and operation will be used.
- » *Consultation and disclosure* (i.e., consulting with key authorities, statutory bodies, affected communities and other relevant stakeholders) was undertaken for the project, and documented for inclusion in the assessment of the project. All identified stakeholders and interested and affected parties (I&APs) have been afforded the opportunity to participate in a meaningful way to the BA for the project.
- » An Environmental Management Programme (EMPr) has been compiled to ensure that mitigation measures, as identified by the specialist studies, undertaken are implemented as the project develops (refer to **Appendix F** of this BAR Report).

Therefore, through assessment of the development of the Northam solar PV facility within the project area, it can be concluded that the development is environmentally acceptable (subject to implementation of the recommended mitigation measures).

### 1.8. Overall Recommendation

Considering the findings of the independent specialist studies; the impacts identified; the proposed project area, which avoids all identified no-go/highly sensitive environmental features within the study area; and the potential to further minimise the impacts to acceptable levels through mitigation, it is the reasoned opinion of the EAP that the development of the Northam solar PV facility is acceptable within the landscape and can reasonably be authorised.

The preferred facility layout is illustrated in **Figure 2**. The period for which the Environmental Authorisation (EA) is required to remain valid is 10 years from the date of authorisation, with a period of 5 years for the design, planning, construction, and commissioning of the activity to be concluded.

The authorisation for the project would include the following key infrastructure and components:

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

The following key conditions would be required to be included within an authorisation issued for the project:

- » All mitigation measures detailed within this BA Report and specialist reports contained within **Appendices D1 to D4** are to be implemented.
- » The EMPr, as contained within **Appendix F** of this BA Report, should form part of the contract with the contractors appointed to construct and maintain the Northam solar PV facility, to ensure compliance

with environmental specifications and management measures. The implementation of this EMPr for all lifecycle phases of project is considered key in achieving the appropriate environmental management standards as detailed for this project.

- » The high sensitivity wetlands and their associated buffer areas should be regarded as no-go areas for all construction activities.
- » The proposed layout must be located within the identified project area. The final layout must be submitted to the Limpopo Department of Economic Development, Environment and Tourism (LDEDET) for review and approval following detailed design.
- » A pre-construction walk-through of the final project area for SCC that would be affected and can be translocated must be undertaken prior to the commencement of the construction phase.
- » Before construction commences, individuals of listed plant species within the project area that would be affected must be counted; marked; and translocated, where deemed necessary, by the ecologist conducting the pre-construction walk-through survey. Permits from the relevant national and provincial authorities must be obtained before the individuals are disturbed.
- » The necessary water use authorisation must be obtained from the Department of Human Settlements, Water and Sanitation (DHSWS) for impacts to a freshwater feature prior to construction.
- » The final project area must be kept as small as possible and consider all sensitive environmental features not considered to be suitable for development (as identified by the respective specialists).
- » AIP management at the site should take place according to the Alien Invasive Management Plan.

## DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

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Savannah Environmental has been appointed as the independent environmental consultancy to undertake the Environmental Basic Assessment, to identify and assess the potential environmental impacts associated with the proposed solar energy facility. Neither Savannah Environmental nor any of its specialist sub-consultants on this project are subsidiaries of or are affiliated to Northam Platinum Limited. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

Savannah Environmental is a specialist environmental consulting company providing holistic environmental management services, including environmental impact assessments (EIA) and planning to ensure compliance and evaluate the risk of development, and the development and implementation of environmental management tools. It benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

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

The project team responsible for this Basic Assessment process include:

- » **Mmakoena Mmola** holds a BSc Honours in Geochemistry from the University of the Witwatersrand. She is the principle author of this BA Report. She has 3.5 years of experience in the environmental management field. Her key focus is on undertaking EIAs, environmental permitting and authorisations, compliance auditing, public participation, and EMPs. She is registered as a Candidate Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP), Registration Number: 126748.
  
- » **Jo-Anne Thomas** holds a Master of Science Degree in Botany (M.S.c Botany) from the University of the Witwatersrand and is registered as a Professional Natural Scientist (400024/2000) with the South African Council for Natural Scientific Professions (SACNASP) and a registered Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioners Association of South Africa (EAPASA) (2019/726). She is the registered EAP for this project. She has over 20 years of experience in the field of environmental assessment and management, and the management of large environmental assessment and management projects. During this time, she has managed and coordinated a multitude of large-scale infrastructure EIAs and is also well versed in the management and leadership of teams of specialist consultants, and dynamic stakeholders. She has been responsible for providing technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, EIA studies, environmental permitting, public participation, EMPs and EMPs, environmental policy, strategy and guideline formulation, and integrated environmental management (IEM). Her responsibilities for environmental studies include project management, review and integration of specialist studies, identification and assessment of potential negative environmental impacts and benefits, and the identification of mitigation measures, and compilation of reports in accordance with applicable environmental legislation.

- » **Nicolene Venter** holds a Higher Secretarial Diploma and has over 20 years of experience in public participation, stakeholder engagement, awareness creation processes and facilitation of various meetings (focus group, public meetings, workshops, etc.). She is responsible for project management of public participation processes for a wide range of environmental projects across South Africa and neighbouring countries.

Curricula Vitae (CVs) detailing Savannah Environmental team's expertise and relevant experience are provided in **APPENDIX G1**.

## DEFINITIONS AND TERMINOLOGY

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

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

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

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

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

**Commissioning:** Commissioning commences once construction is completed. It covers all activities, including testing after all components of the wind turbine are installed.

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

**Cumulative impacts:** Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

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

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

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



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

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

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

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

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

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

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

**Environmental Authorisation (EA):** means the authorisation to be issued by the competent authority (Limpopo Department of Economic Development, Environment and Tourism (LDEDET) of a listed activity or specified activity in terms of the National Environmental Management Act (No 107 of 1998) (NEMA) and the EIA Regulations promulgated under the NEMA.

**Environmental Assessment Practitioner (EAP):** An individual responsible for the planning, management and coordinating of inter alia, BA Reports, EMPRs, or any other appropriate environmental instruments introduced by legislation.

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

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

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

**Environmental Management Programme (EMPr):** An operational plan that organises and co-ordinates mitigation, rehabilitation, and monitoring measures to guide the implementation of a proposal and its ongoing maintenance after implementation.

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

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

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

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

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

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

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

**Method statement:** A written submission to the ECO and the site manager (or engineer) by the EPC Contractor in collaboration with his/her environmental officer.

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

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

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

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

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

**Project description:** A description of the project that includes technical details of the siting and operation.

**Residual impacts:** Predicted effects of a project on the environment after proposed mitigation measures have been adopted; in other words, the predicted actual effects of the project.

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

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

## SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?

NO

If YES, please complete the form entitled "Details of specialist and declaration of interest" or appointment of a specialist for each specialist thus appointed:

Any specialist reports must be contained in Appendix D.

### 1. ACTIVITY DESCRIPTION

Describe the activity, which is being applied for, in detail<sup>1</sup>:

The proposed project entails the development of a photovoltaic (PV) solar energy facility on Portion 2 of the Farm Zondereinde 384, located approximately 35km south and 18km northwest of the towns of Thabazimbi and Northam, between the R510 in the west and the R511 in the east (refer to **Figure 1**). The project area falls within the jurisdiction of the TLM, which forms part of the Waterberg District in the Limpopo Province.

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

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

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

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

<sup>1</sup> Please note that this description should not be a verbatim repetition of the listed activity as contained in the relevant Government Notice but should be a brief description of activities to be undertaken as per the project description.

- » Access gravel road, internal gravel roads and fencing around the project area.

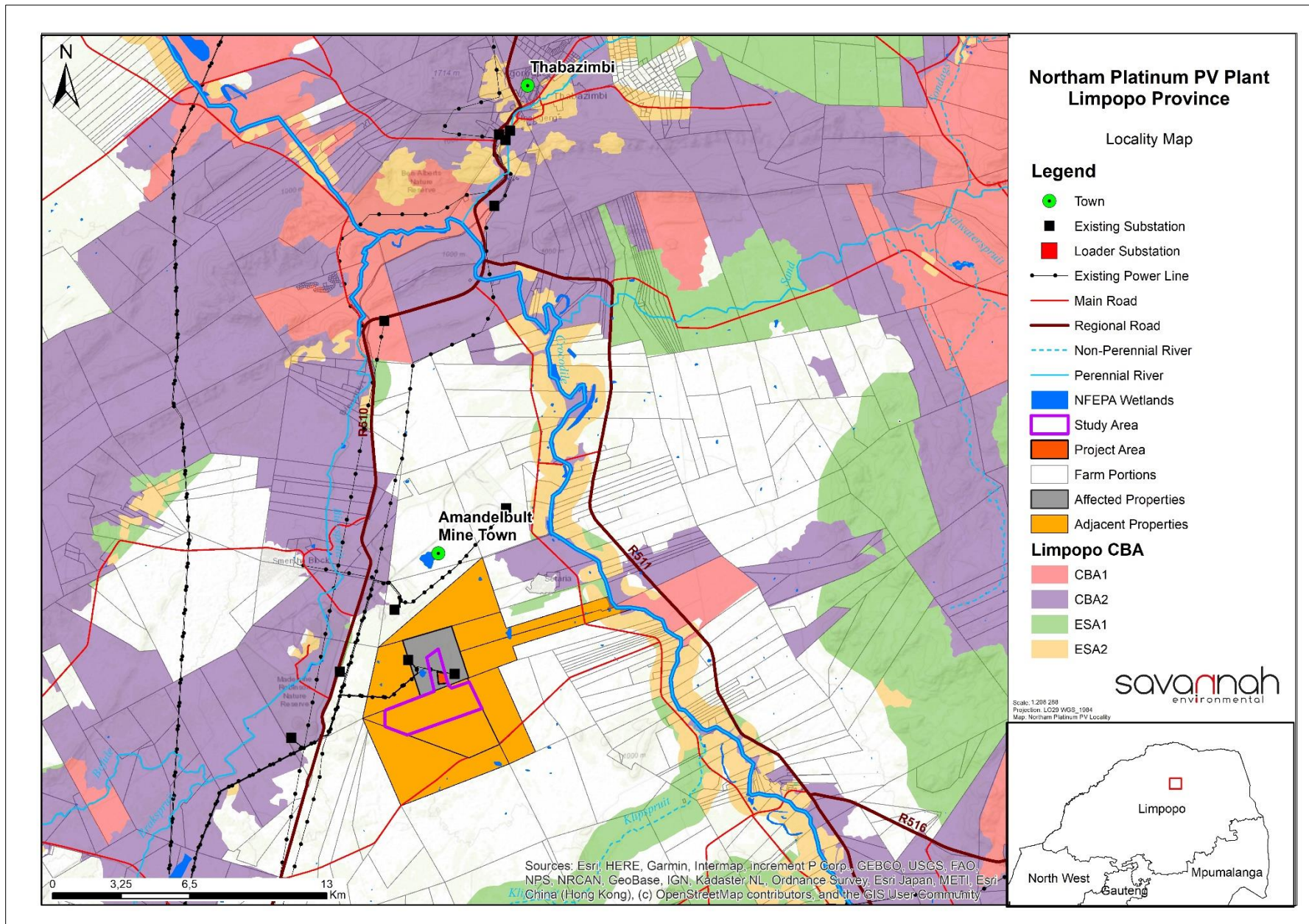
A project area of 20ha and a development footprint (i.e. area to be cleared) of 19.5ha have been identified within the affected property (~126ha) by NHM for the development. Site-specific studies and assessment have delineated areas of potential sensitivity within the study area.

**Table 1** below provides the details of the project, including the main infrastructure components and services that will be required during the project lifecycle.

**Table 1:** Planned infrastructure proposed as part of the Northam solar PV facility

Component	Description / Dimensions
Total extent of the study area	~126ha
Total extent of the project area	20ha
<u>Total extent of the development footprint (area to be cleared)</u>	<u>19.5ha</u>
Contracted capacity of the facility	10MW
Technology	Fixed tilt, single or double axis tracking photovoltaic (PV) panel technology.
PV panels	<ul style="list-style-type: none"> <li>» Height: ~3.5m from ground level (installed).</li> <li>» Constructed over an area of up to 15ha.</li> <li>» Between 80 000 – 110 000 panels required.</li> </ul>
On-site Facility Substation	<ul style="list-style-type: none"> <li>» Located within the project area and close to the site access point.</li> <li>» Approximately 1ha in extent.</li> <li>» The substation will facilitate the connection between the solar PV facility and mine electrical distribution system.</li> </ul>
Grid connection	<ul style="list-style-type: none"> <li>» 33kV power line (to be operated at 6.6kV).</li> <li>» Length up to ~500m from tie-in point.</li> <li>» Height up to 5.5m.</li> </ul>
Access gravel road and internal gravel roads	<ul style="list-style-type: none"> <li>» Direct access to the study area is provided by the existing Mine Road, which is connected to the R510.</li> <li>» A 6m wide main <u>gravel</u> access road will be constructed to provide direct access to the project area.</li> <li>» A network of 5m wide (with a total length of 8km) gravel internal access roads will be constructed, to provide access to the various components of the project.</li> </ul>
Laydown area	» Up to 5ha (Temporary Laydown Area).
Other infrastructure	<ul style="list-style-type: none"> <li>» Inverters and transformers</li> <li>» Cabling between project components</li> <li>» Combined gatehouse</li> <li>» Site offices</li> <li>» Storage facility</li> </ul>

Services required	<ul style="list-style-type: none"><li>» <i>Waste</i> – waste generated from the construction activities will be handled in accordance with the Zondereinde Mine Waste Management Plan; and collected by a private contractor and disposed of at a licensed waste disposal site off-site.</li><li>» <i>Sanitation</i> – since the project is located within the Zondereinde Mine Area, it is proposed that contractors utilise the existing toilet facilities available at the Mine during both the construction and operational phases. Alternatively, chemical toilets will be placed close to the project area. These facilities will be maintained and serviced regularly by an appropriate waste contractor.</li><li>» <i>Water supply</i> – during construction, water will be required for concrete; washing of solar panels and associated equipment; dust suppression; potable water for construction workers, etc. Once the facility is operational, water will be required for various purposes, such as washing of the solar panels. This water will be sourced from municipal supply via the existing mine supply network; or from groundwater abstraction, utilising the already authorised boreholes at the Zondereinde Mine.</li><li>» <i>Electricity supply</i> – Construction power will be sourced via a temporary overhead power line from the existing mine substation at the metallurgical complex, which is adjacent to the project area.</li></ul>
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**Figure 1:** Locality map illustrating the location of the study area and project area under investigation for development of the 10MW Northam Solar PV Facility

## 2. FEASIBLE AND REASONABLE ALTERNATIVES

“**alternatives**”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Describe alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the Department may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Paragraphs 3 – 13 below should be completed for each alternative.

- (a) the property on which or location where it is proposed to undertake the activity;

The placement of a solar PV facility is dependent on several factors, including the: land suitability; climatic conditions (solar irradiation levels); topography; location of the study area; availability of grid connection infrastructure; extent of the study area; and need and desirability of the project. NHM considers the preferred property and site location as being highly favourable and suitable from a technical perspective to establish a solar PV facility due to the following site-specific favourable characteristics:

- » **Solar resource:** The economic viability of a solar PV facility is directly dependent on the annual direct solar irradiation values of the area within which it will operate. The Global Horizontal Irradiation (GHI) for the study area is approximately 2086.8kWh/m<sup>2</sup>/annum. This is considered feasible for the development of a solar PV facility. Based on the solar resource available, no alternative locations are considered.
- » **Topography:** The project area is flat, with a slope between 0 and 2%, and no prominent hills. However, some rocky outcrops are present within and around the broader study area. The flat topography of the project area is considered beneficial in terms of the construction activities that will be required. Based on the suitable and preferable topography, no location alternatives are considered for the development.
- » **Site extent:** The study area is up to ~126ha in extent, which is sufficient for the installation of a facility with a contracted capacity of 10MW and allowing for avoidance of environmental site sensitivities. The project area of ~20ha in extent, which is equivalent to approximately 16% of the study area, and the development footprint of 19.5ha are sufficient for the project and therefore eliminate the need to consider alternative locations.



- » **Site access:** Access to the study area is provided by the existing Mine Road, which is connected to the R510. Sufficient access is therefore available for the delivery of equipment and project components during construction and to access the site during operation. Based on the sufficient access available for the project, no alternative locations are considered.
- » **Land suitability:** The current land use of the project area is an important consideration in site selection, to limit disruption to existing land use parcels. The broader study area is currently used for mining and metal processing purposes. The proposed project will not conflict with the current land use or any future mine expansions. Sites that facilitate easy construction conditions (i.e., relatively flat topography, lack of major rock outcrops etc.) are favoured during the site selection process for a solar PV facility, and the project area fits this criterion.
- » **Geographic location:** The project area is close to the Zondereinde Mine (the exclusive user of the generated power). There is no evidence of livestock or game farming, nor recent rainfed crop production within the project area. The project area compliments the proposed land use by repurposing undeveloped land with an economically viable land use.
- » **Environmental screening and consideration of sensitive environmental features:** Following the confirmation of the study area as being technically feasible for the development of a solar PV facility, specialist investigations of the study area were undertaken, during which sensitive features were identified. The sensitivity spatial data compiled by the specialist team for the project area and broader study area was provided to NHM prior to lodging of the application for the EA. Through integration of the specialist sensitivity data obtained, NHM optimised the project area to consider areas and features of high environmental sensitivity through avoidance as far is practically possible. Where avoidance was not possible, mitigation measures have been proposed to reduce the significance of the potential environmental impacts associated with the project. This has resulted in the consideration of a project area and development footprint as part of the BA process which is designed to be environmentally appropriate as far is possible.

As the overall purpose of the facility is to generate power for use by Zondereinde Mine, NHM has identified Portion 2 of the Farm Zondereinde 384 as the most feasible option for the development of the facility. This decision was based on land availability for the development of a solar PV facility; the proximity to the Zondereinde Mine (exclusive user of the generated power); and distance away from dust sources, such as tailings facilities.

Based on the above site-specific attributes and considerations, the project area was identified by NHM as being the most technically feasible and viable site within the broader study area for further investigation in support of an application for EA. As a result, no feasible alternative sites were identified for assessment as part of this BA process.

(b) the type of activity to be undertaken;

Considering the available natural energy resource within the area (i.e. solar irradiation); unsuitability of the site for wind generation; and unavailability of biofuels in the area, solar PV power generation is considered the preferred option within the project area. In addition, grid connection infrastructure to connect the solar PV facility to the Smelter's existing substation is present on site, which will enable an easy and short connection.

Considering the above, no activity alternatives are considered within this BA process.

(c) the design or layout of the activity;

The full extent of the affected property (i.e., Portion 2 of the Farm Zondereinde 384) is ~126ha in extent, which is sufficient for the installation of a solar PV facility with a contracted capacity of 10MW, while allowing for the avoidance of environmental site sensitivities. A project area of ~20ha and a development footprint of 19.5ha have been identified within the affected property, within which the solar PV facility will be located. The location of the project area was informed by the findings of the specialist investigations undertaken during the BA process.

Areas to be avoided by the project were identified, specifically relating to heritage and hydrological features, ecological, soils and agricultural sensitivities. The identified sensitivities were utilised as a tool by NHM, to identify and locate the project area within the study area. This was undertaken with the aim of avoiding possible sensitive areas within the project area as far as possible, to limit impacts associated with the project.

Only one feasible layout was provided for investigation within the BA process. This layout was however optimised considering the findings of the specialist studies and BA process.

(d) the technology to be used in the activity;

Since the study area is unsuitable for wind generation and no biofuels are available in the area, solar energy has been identified by NHM as the preferred technology for implementation on the project area. Few technology options are available for solar facilities. Those that are considered are usually differentiated by weather and temperature conditions that prevail in the area, so that optimality is obtained by the final site selection. Solar energy is considered the most suitable renewable energy technology for this area, based on site location, ambient conditions and energy resource availability. Solar PV was therefore determined as the most suitable option for further assessment, and no other technology alternatives are being assessed for the project.

Several solar PV technology alternatives are available, including *inter alia*:

- » Bifacial PV panels.
- » Monofacial PV panels.
- » Fixed mounted PV systems (static / fixed-tilt panels).
- » Single-axis tracking or double-axis tracking systems (with solar panels that rotate around a defined axis to follow the sun's movement).
- » Monocrystalline modules, polycrystalline modules or thin film modules.

The primary difference between PV technologies available relate to the extent and height of the facility; however, the potential for environmental impacts remains similar in magnitude. Fixed mounted PV systems can occupy a smaller extent and have a lower height when compared to tracking PV systems, which require both a larger extent of land, and are taller in height. However, both options are considered acceptable for implementation from an environmental perspective. Bifacial solar PV panels offer many advantages over monofacial PV panels, as power can be produced on both sides of the module, increasing total energy generation. Monocrystalline polycrystalline or thin film modules differ mainly in their cost and efficiency values, but do not represent a fundamentally different panel design type from an environmental perspective. The preference will, therefore, be determined on technical considerations and the site conditions.

The PV panels are designed to operate continuously for more than 20 years, mostly unattended and with low maintenance. The impacts associated with the construction, operation, and decommissioning of the facility are anticipated to be the same irrespective of the PV panel selected for implementation.

(e) the operational aspects of the activity; and

No alternative is applicable.

(f) the option of not implementing the activity.

The 'Do-Nothing' alternative is the option of not constructing the Northam PV facility. Should this alternative be selected, there would be no environmental impacts or benefits due to the construction and operation activities associated with a solar PV facility. This alternative is assessed in detail in Section D(3).

### 3. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the Hartebeeshoek 94 WGS84 spheroid in a national or local projection.

List alternative sites, if applicable.

	Latitude (S):			Longitude (E):		
<b>Alternative:</b>						
Alternative S1 <sup>2</sup> (preferred or only site alternative)	24°	50'	9.05"S	27°	'21	27.77"E
Alternative S2 (if any)						
Alternative S3 (if any)						

#### In the case of linear activities:

	Latitude (S):			Longitude (E):		
<b>Alternative:</b>						
Alternative S1 (preferred or only route alternative)						
• Starting point of the activity	27°	50'	5.51"	27°	21'	33.78"
• Middle/Additional point of the activity	24°	50'	5.32"	27°	21'	42.27"

<sup>2</sup> "Alternative S.." refer to site alternatives.

• End point of the activity	24°	50'	5.12"	27°	21'	50.80"
Alternative S2 (if any)						
• Starting point of the activity						
• Middle/Additional point of the activity						
• End point of the activity						
Alternative S3 (if any)						
• Starting point of the activity						
• Middle/Additional point of the activity						
• End point of the activity						

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

**4. PHYSICAL SIZE OF THE ACTIVITY**

Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

**Alternative:**

- Alternative A1<sup>3</sup> (preferred activity alternative)
- Alternative A2 (if any)
- Alternative A3 (if any)

or,

for linear activities:

**Alternative:**

- Alternative A1 (preferred activity alternative)
- Alternative A2 (if any)
- Alternative A3 (if any)

**Size of the activity:**

~195 000m <sup>2</sup>

**Length of the activity:**

~500m

Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

**Alternative:**

- Alternative A1 (preferred activity alternative)
- Alternative A2 (if any)
- Alternative A3 (if any)

**Size of the site/servitude:**


**5. SITE ACCESS**

**Does ready access to the site exist?**

**[Direct access to the study area is provided by the existing Mine Road, which is connected to the R510]**

	NO
--	----

<sup>3</sup> "Alternative A.." refer to activity, process, technology or other alternatives.

**If NO, what is the distance over which a new access road will be built**

**~755m**

**Describe the type of access road planned:**

A 6m wide main gravel access road will be constructed to provide direct access to the project area from the existing Mine Road. In addition, a network of 5m wide (with a total length of 8km) gravel internal access roads will be constructed to provide access to the various components of the facility.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

## 6. SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- 6.1 the scale of the plan which must be at least a scale of 1:500;
- 6.2 the property boundaries and numbers of all the properties within 50 metres of the site;
- 6.3 the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
- 6.4 the exact position of each element of the application as well as any other structures on the site;
- 6.5 the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
- 6.6 all trees and shrubs taller than 1.8 metres;
- 6.7 walls and fencing including details of the height and construction material;
- 6.8 servitudes indicating the purpose of the servitude;
- 6.9 sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):
  - rivers;
  - the 1:100 year flood line (where available or where it is required by Department of Water Affairs);
  - ridges;
  - cultural and historical features;
  - areas with indigenous vegetation (even if it is degraded or invested with alien species);
- 6.10 for gentle slopes the 1 metre contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and
- 6.11 the positions from where photographs of the site were taken.

A locality map has been included as part of this report as **Appendix A1**. A layout plan has been included as part of this report within **Appendix A2**.

## 7. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this form. It must be supplemented with additional photographs of relevant features on the site, if applicable.

Refer to **Appendix B** for the site photographs.

## 8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

A facility illustration has been included as part of this report within **Appendix C**.

## 9. ACTIVITY MOTIVATION

### 9(a) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	<b>R100 million</b>
What is the expected yearly income that will be generated by or as a result of the activity?	<b>N/A</b>
Will the activity contribute to service infrastructure?	<b>NO</b>
Is the activity a public amenity?	<b>NO</b>
How many new employment opportunities will be created in the development phase of the activity?	<b>100</b>
What is the expected value of the employment opportunities during the development phase?	<b>R5 million</b>
What percentage of this will accrue to previously disadvantaged individuals?	<b>&gt;50%</b>
How many permanent new employment opportunities will be created during the operational phase of the activity?	<b>10 – 12</b>
What is the expected current value of the employment opportunities during the first 10 years?	<b>R10 million</b>
What percentage of this will accrue to previously disadvantaged individuals?	<b>&gt;50%</b>

### 9(b) Need and desirability of the activity

Motivate and explain the need and desirability of the activity (including demand for the activity):

<b>NEED:</b>	
i.	Was the relevant municipality involved in the application? TLM has been included in the consultation process.
ii.	Does the proposed land use fall within the municipal Integrated Development Plan? Some of the municipal strategic objectives, as stated in the Integrated Development Plan (IDP) for the TLM, include: (i) ensuring sustainable spatial development; and (ii) creating a conducive environment for sustainable local development. One of the ways this can be achieved is through transitioning to a low carbon economy.

	<p>The project will enhance the competitiveness and therefore the sustainability of the <u>NHM</u> Zondereinde operations by reducing energy costs and reliance on Eskom grid power. In terms of environmental impact, it will result in a reduction of Scope 2 GHG emissions by 22 kilotons per year of CO<sub>2</sub>e, thereby supporting government commitments made in the Paris Accord and contributing to a healthier environment in South Africa. The project will therefore be in line with the TLM's IDP in terms of ensuring sustainable developments.</p> <p>Transformation of the economy and job creation is one of the priority areas in the TLM. The project will create direct job opportunities, stimulating local economic growth. It will also result in a capital investment of over R100 million in infrastructure and technology locally - generating over 150 employment opportunities for all project phases (short-term during the construction period), with priority placed on local recruitment.</p> <p>The development of renewable energy also offers the opportunity to establish a new industry within the South African economy.</p>
iii.	<p>If the answer to questions 1 and / or 2 was NO, please provide further motivation / explanation:</p>

<b>DESIRABILITY:</b>			
i.	Does the proposed land use / development fit the surrounding area?	<b>YES</b>	
	The project fits in with the surrounding area, as the project area is located between the Zondereinde Mine and Smelter.		
ii.	Does the proposed land use / development conform to the relevant structure plans, Spatial development Framework, Land Use Management Scheme, and planning visions for the area?	<b>YES</b>	
	<p>The project falls within the TLM, which is part of the Waterberg District Municipality. The TLM has a Spatial Development Framework (SDF) for its entire jurisdiction. In terms of the SDF, the affected property is located near the town of Northam (~18km), a municipal growth point. The land uses typically found in this area include:</p> <ul style="list-style-type: none"> <li>» Subsistence agriculture areas.</li> <li>» Conservation areas and nature reserves.</li> <li>» Tourism facilities and related activities.</li> <li>» Formal and informal residential areas.</li> <li>» Business of office nodes.</li> <li>» Industrial and commercial areas.</li> <li>» Mines.</li> <li>» Government uses.</li> </ul> <p>The project is therefore a unique land use in the area, but is associated with a mine, which is included as a typical land use in the area.</p>		
iii.	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	<b>YES</b>	

The project will have several socio-economic and environmental benefits that will occur at a large scale (i.e., national, regional, and local level). These benefits include:

- » **Exploitation of the country's significant renewable energy resource:** At present, valuable national resources, including biomass by-products, solar radiation and wind power, remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio.
- » **Pollution reduction:** The releases of by-products through the burning of fossil fuels for electricity generation have a particularly hazardous impact on human health and contribute to ecosystem degradation.
- » **Climate friendly development:** The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of greenhouse gas (GHG) emissions. South Africa is estimated to be responsible for ~1% of global GHG emissions and currently ranked 9th worldwide in terms of per capita CO<sub>2</sub> emissions.
- » **Employment creation:** The sale, development, installation, maintenance, and management of renewable energy facilities have significant potential for job creation in South Africa.
- » **Acceptability to society:** Renewable energy offers various tangible benefits to society, including reduced pollution concerns; improved human and ecosystem health; and climate friendly development.
- » **Support to a new industry sector:** Renewable energy development offers the opportunity to establish a new industry within the South African economy.

Negative impacts associated with the project include:

- » Potential impact on buried archaeological and palaeontological resources due to construction activities.
- » Habitat loss, fragmentation, and the degradation of surrounding habitat.
- » Disturbance and displacement of fauna during the construction and maintenance phases.
- » Direct fauna mortality during the construction phase.
- » Direct disturbance / degradation / loss of wetland soils or vegetation due to the construction of the solar PV facility.
- » Increased erosion and sedimentation in wetland areas.
- » Potential for increased contamination of wetland systems.
- » Collision and electrocution of birds.
- » Direct loss of nests for avifauna SCC.
- » Soil erosion, compaction, and pollution.

Positive impacts associated with the proposed project include:

- » Enhancing the competitiveness and therefore the sustainability of the NHM Zondereinde operations by reducing energy costs and reliance on Eskom grid power. In terms of environmental impact, it will result in a reduction of Scope 2 GHG emissions by 22 kilotons per year of CO<sub>2</sub>e, thereby supporting government commitments made in the Paris Accord and contributing to a healthier environment in South Africa.



	<p>» Reducing the Zondereinde Mine's dependency on direct supply from the Eskom's national grid for operation activities and decreasing its carbon footprint, thereby freeing up this energy (10MW supplied by Eskom) for other users.</p> <p>The negative impacts associated with the project are anticipated to occur at a site-specific level. Their significance can be largely reduced through the application of appropriate mitigation measures; and the appropriate placement of infrastructure within areas of low sensitivity identified within the study area and project area. The project's benefits are expected to occur at a larger scale (i.e., national, regional and local level) and partially offset the localized negative impacts of the project.</p>
iv.	<p>If the answer to any of the questions 1-3 was NO, please provide further motivation / explanation:</p> <p>[REDACTED]</p>
v.	<p>Will the proposed land use / development impact on the sense of place? <input type="checkbox"/> <b>NO</b></p> <p>The project area is located between the Zondereinde Mine and Zondereinde Smelter, with Amandelbult Mine located to the north of the area. There are no dwellings close to the project area and broader study area. The closest towns, Northam and Thabazimbi, are situated ~18km and ~35km away respectively. Therefore, the project is unlikely to have any impact on the sense of place of the area, as it is not close to sensitive receptors and is within an area that has been extensively transformed by mining activities.</p>
vi.	<p>Will the proposed land use / development set a precedent? <input type="checkbox"/> <b>NO</b></p> <p>There are three solar PV facilities with an approved EA situated within 30km of the study area. Therefore, the project will not set a precedent for the construction of solar PV facilities in the area.</p>
vii.	<p>Will any person's rights be affected by the proposed land use / development? <input type="checkbox"/> <b>NO</b></p> <p>The project will take place on land privately owned by NHM, within its mining boundary. The Zondereinde Mine is intended to be the exclusive user of the power to be generated. No infrastructure or negative impacts associated with the project will extend beyond the mining area's boundaries and, as such, no rights of any persons will be negatively affected.</p>
viii.	<p>Will the proposed land use / development compromise the "urban edge"? <input type="checkbox"/> <b>NO</b></p> <p>The project will not compromise the "urban edge", as it is located outside the urban areas of Northam and Thabazimbi (~35km south and ~18 km northwest respectively) and is not an urban development.</p>
ix.	<p>If the answer to any of the question 5-8 was YES, please provide further motivation / explanation.</p> <p>[REDACTED]</p>

<b>BENEFITS:</b>	
i.	<p>Will the land use / development have any benefits for society in general? <input checked="" type="checkbox"/> <b>YES</b></p>
ii.	<p>Explain:</p> <p>Job opportunities, although limited (expected to be up to 150), will be created during the project's construction, operation and decommissioning. In addition, local and regional economic benefits would be realized through the additional revenue generated due to the project (through direct and indirect job opportunities, local spend, local procurements, etc.).</p>

	The primary benefit to society in general will be a reduction in the use of non-renewable resources for the generation of power, contributing to a sustainable environment and development.	
iii.	Will the land use / development have any benefits for the local communities where it will be located?	<b>YES</b>
iv.	<p>Explain:</p> <p>The project will enhance the competitiveness and therefore the sustainability of the <u>NHM</u> Zondereinde operations by reducing energy costs and reliance on Eskom grid power.</p> <p>Job opportunities, although limited, will be created during the project's construction and operation. In addition, local and regional economic benefits would be realized through the additional revenue generated due to the project (through direct and indirect job opportunities, local spend, local procurements, etc.).</p> <p>The primary benefit to local communities in general will be a reduction in the use of non-renewable resources for the generation of power generation, contributing to a sustainable environment and development.</p>	

## 10. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

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

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements																																						
	<p>associated with it is avoided, stopped or minimised.</p> <p>Under NEMA, it is the legal duty of a project proponent to consider a project holistically, and the cumulative effect of a variety of impacts.</p> <p>Considering the capacity of the proposed solar PV facility (i.e., contracted capacity of 10MW) and the triggering of Activity 1 of Listing Notice 1 (GN R.983), a Basic Assessment process is required in support of the application for EA.</p>		<p><b><u>Listing Notice</u></b></p> <p>Listing Notice 1, GN R.327, 17 April 2017</p>	<p><b><u>Activity No</u></b></p> <p>1(ii)</p>	<p><b><u>Description of each listed activity</u></b></p> <p><u>The Solar PV facility will generate an electricity output of 10 MW. A development footprint of 19.5ha in extent will be occupied by the PV panels and associated infrastructure.</u></p> <p><u>The development of the project will require vegetation clearance of 19.5ha for the: Solar PV facility; the main access road to and internal roads within the project area; and overhead power line towers. The project would therefore result in the clearance of an area of indigenous vegetation of 1ha or more, but less than 20ha in extent.</u></p> <p><u>The corner co-ordinates of the area to be cleared (i.e., the development footprint) are as follows:</u></p> <table border="1" data-bbox="1499 1127 1961 1471"> <thead> <tr> <th colspan="2"><b><u>Latitude (S):</u></b></th> <th colspan="4"><b><u>Longitude (E):</u></b></th> </tr> </thead> <tbody> <tr> <td><u>24°</u></td> <td><u>49'</u></td> <td><u>58.82"</u></td> <td><u>27°</u></td> <td><u>21'</u></td> <td><u>20.08"</u></td> </tr> <tr> <td><u>24°</u></td> <td><u>50'</u></td> <td><u>1.34"</u></td> <td><u>27°</u></td> <td><u>21'</u></td> <td><u>32.49"</u></td> </tr> <tr> <td><u>24°</u></td> <td><u>50'</u></td> <td><u>15.52"</u></td> <td><u>27°</u></td> <td><u>21'</u></td> <td><u>36.73"</u></td> </tr> <tr> <td><u>24°</u></td> <td><u>50'</u></td> <td><u>16.55"</u></td> <td><u>27°</u></td> <td><u>21'</u></td> <td><u>33.82"</u></td> </tr> <tr> <td><u>24°</u></td> <td><u>50'</u></td> <td><u>17.66"</u></td> <td><u>27°</u></td> <td><u>21'</u></td> <td><u>21.93"</u></td> </tr> </tbody> </table>	<b><u>Latitude (S):</u></b>		<b><u>Longitude (E):</u></b>				<u>24°</u>	<u>49'</u>	<u>58.82"</u>	<u>27°</u>	<u>21'</u>	<u>20.08"</u>	<u>24°</u>	<u>50'</u>	<u>1.34"</u>	<u>27°</u>	<u>21'</u>	<u>32.49"</u>	<u>24°</u>	<u>50'</u>	<u>15.52"</u>	<u>27°</u>	<u>21'</u>	<u>36.73"</u>	<u>24°</u>	<u>50'</u>	<u>16.55"</u>	<u>27°</u>	<u>21'</u>	<u>33.82"</u>	<u>24°</u>	<u>50'</u>	<u>17.66"</u>	<u>27°</u>	<u>21'</u>	<u>21.93"</u>
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<p>National Environmental Management Act (Act No 107 of 1998)</p>	<p>In terms of the "Duty of Care and Remediation of Environmental Damage" provision in Section 28(1) of NEMA, every person who causes, has caused or may cause significant pollution or environmental degradation must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or environmental <u>degradation</u>.</p> <p>Under NEMA, it is the legal duty of a project proponent to consider a project holistically, <u>including</u> the cumulative effect of a variety of impacts.</p>	<p>LDEDET</p>	<p>While no permitting or licensing requirements arise directly by virtue of the project through this section, it finds application through the consideration of potential cumulative, direct, and indirect impacts. It will continue to apply throughout the lifecycle of the project.</p>			
<p>Environment Conservation Act (Act No 73 of 1989) (ECA)</p>	<p>The Noise Control Regulations in terms of Section 25 of the ECA are</p>	<p>LDEDET TLM</p>	<p>Noise impacts are expected to be associated with the project's construction phase. Considering the project area's location in relation to residential areas, and provided that appropriate</p>			

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	<p>applicable for noise control in the Limpopo Province.</p>		<p>mitigation measures are implemented, construction noise is unlikely to present a significant intrusion to the local community. There is therefore no requirement for a noise permit in terms of this legislation.</p>
<p>National Water Act (Act No 36 of 1998)</p>	<p>A water use listed under Section 21 of the NWA must be licensed with the Regional DHSWS, unless it is listed in Schedule 1 of the NWA (i.e. is an existing lawful use); is permissible under a General Authorisation (GA); or if a responsible authority waives the need for a water use licence (WUL).</p> <p>Water use is defined broadly and includes                      consumptive water uses: taking and storing water; activities which reduce stream flow; waste discharges and disposals; controlled activities (activities which impact detrimentally on a water resource); altering a watercourse; removing water found underground for certain purposes; and recreation.</p> <p>Consumptive water uses may include taking water from a water resource (Section 21(a)) and storing water (Section 21(b)).</p> <p>Non-consumptive water uses may include impeding or diverting of flow in a watercourse (Section 21(c)); and altering of bed, banks or</p>	<p>Regional Department of Human Settlements, Water and Sanitation (DHSWS)</p>	<p>A WUL or GA is required to be obtained if water resources are impacted on. The project area is located within the 500m regulated area of one wetland feature (i.e., a seepage wetland). A <u>GA</u> for the project will therefore need to be registered with the DHSWS for water uses 21(c)&amp;21(i), which process has commenced.</p>

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
National Water Act (Act No 36 of 1998) (NWA)	<p>characteristics of a watercourse (Section 21 (i)).</p> <p>In terms of Section 19, NHM must ensure that reasonable measures are taken throughout the project's lifecycle to prevent and remedy pollution to water resources from occurring, continuing, or recurring.</p>	Regional DHSWS	This section will apply with respect to the potential impact on the seepage wetland, located within the 500m regulated area of the project area, primarily during the construction phase (i.e., pollution from construction vehicles).
Minerals and Petroleum Resources Development Act (Act No 28 of 2002) (MPRDA)	<p>In accordance with the MPRDA, a mining right <u>or</u> permit is required where a mineral in question is to be mined, including the mining of materials from a borrow pit.</p> <p>Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the <u>MPRDA</u>, or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner.</p>	Department of Mineral Resources and Energy (DMRE)	<p>NHM is the holder of a mining right over the project area.</p> <p>The project area is within the Zondereinde Mine Area and there is no plan to conduct opencast operations on the project area. None of the MPRDA's objectives will be impeded by the solar PV facility and accordingly, Section 53 consent is not required.</p>
National Environmental Management: Air Quality Act (Act No 39 of 2004) (NEM:AQA)	<p>The National Dust Control Regulations (GNR 827), published under Section 32 of NEM:AQA, prescribe the general measures for dust control in all areas, and a standard for acceptable dustfall rates in residential and non-residential areas.</p> <p>In accordance with these Regulations, any person who conducts any activity in such a way as to give rise to dust in quantities and concentrations that may exceed the dustfall standard set out in Regulation 3 must, upon receipt</p>	LDEDET  Waterberg District Municipality	If the project results in the generation of excessive levels of dust, a dustfall monitoring programme would be required for the project. Dustfall monitoring results from the dustfall monitoring programme would then need to be included in a dust monitoring report and a dust management plan developed.

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	<p>of a notice from the air quality officer, implement a dustfall monitoring programme.</p> <p>Any person who has exceeded the dustfall standard must, within three months after submission of the dustfall monitoring report, develop and submit a dust management plan to the air quality officer for approval.</p>		
<p>National Heritage Resources Act (Act No 25 of 1999) (NHRA)</p>	<p>Relevant sections include- Section 7 stipulates assessment criteria and categories of heritage resources according to their significance. Section 35 provides for the protection of all archaeological and palaeontological sites, and meteorites.  Section 36 provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority.  Section 38(1) lists activities which require developers or any person who intends to undertake a listed activity to obtain consent from the responsible heritage resources authority through the procedure set out in section 38. This is not required where <i>inter alia</i> a basic assessment is undertaken under NEMA, including a HIA, and SAHRA's requirements are considered by the</p>	<p>South African Heritage Resources Agency (SAHRA)  Limpopo Heritage Resources Authority</p>	<p>A HIA (including palaeontology) was undertaken for the project, as per the requirements of Section 38 of the NHRA (refer to <b>Appendix D4</b>).</p> <p>No heritage resources of significance were identified within the project area.</p> <p>No palaeontological resources were identified within the project area, and no impacts to palaeontological heritage are expected, as the broader study area is underlain by Pyramid Gabbro-Norite, which has zero palaeontological sensitivity.</p> <p>Should a heritage resource be impacted upon, a permit may be required from SAHRA or Limpopo Heritage Resources Authority, in accordance with of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668).</p>



Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	<p>competent authority when granting the EA.</p> <p>Section 44 requires the compilation of a Conservation Management Plan and a permit from SAHRA for the presentation of archaeological sites as part of public enjoyment, education, research, tourism attraction.</p>		
<p>National Environmental Management Biodiversity Act (Act No 10 of 2004) (NEM:BA)</p>	<p>Section 53 of NEM:BA provides for the MEC / Minister to identify any process or activity in a listed ecosystem as a threatening process.</p> <p>Three government notices have been published in terms of Section 56(1) of NEM:BA as follows:</p> <ul style="list-style-type: none"> <li>» Commencement of TOPS Regulations, 2007 (GNR 150).</li> <li>» Lists of critically endangered, vulnerable, and protected species (GNR 151), as amended in 2020 (GN627).</li> <li>» TOPS Regulations (GNR 152).</li> </ul> <p>NEM:BA provides for listing threatened or protected ecosystems in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information</p>	<p>DFFE and LDEDET</p>	<p>Under NEM:BA, a permit would be required for any activity that is of a nature that may negatively impact on the survival of a listed protected species.</p> <p>A Biodiversity Impact Assessment has been undertaken as part of the BA process (refer to <b>Appendix D1</b>). No protected species which require a permit under NEM:BA were identified within the project area.</p>

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	<p>on the listing process, including the: purpose and rationale for listing ecosystems; criteria used to identify listed ecosystems; implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (NEM:BA: National list of ecosystems that are threatened and in need of protection, (Government Gazette 1002, 9 December 2011, GG 34809)).</p>		
<p>National Environmental Management Biodiversity Act (Act No 10 of 2004)</p>	<p>Chapter 5 of NEM:BA pertains to alien and invasive species. It states that: a person may not carry out a restricted activity involving a specimen of an AIP without a permit issued in terms of Chapter 7 of NEM:BA; and a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out.</p> <p>Applicable, and exempted AIP are contained within the Alien and Invasive Species List 2020, GNR 1003 of Government Gazette No. 43726.</p>	<p>DFFE and LDEDET</p>	<p>The BWIA (refer to <b>Appendix D1</b>) was undertaken as part of the BA process to identify any AIPs present on site. Four (4) AIPs listed under the Alien and Invasive Species List 2020 as Category 1b were recorded within the study area, namely <i>Datura ferox</i>, <i>Flaveria bidentis</i>, <i>Jacaranda mimosifolia</i> and <i>Xanthium spinosum</i>.</p>
<p>Conservation of Agricultural Resources Act (Act No 43 of 1983) (CARA) and Regulations (GN R1048) (CARA Regulations)</p>	<p>Section 5 of CARA provides for the prohibition of the spreading of weeds. Relevant sections include:</p> <p>Regulation 15 provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur.</p>	<p>Department of Agriculture, Land Reform and Rural Development (DALRD)</p>	<p>CARA will apply throughout the project's lifecycle. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented.</p> <p>In terms of Regulation 15E, where Category 1, 2 or 3 plants occur a land user is required to control them by means of one or more of the following methods:</p> <ul style="list-style-type: none"> <li>» Uprooting, felling, cutting or burning.</li> </ul>

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	<p>Regulation 15E provides requirements and methods to implement control measures for different categories of AIPs.</p>		<ul style="list-style-type: none"> <li>» Treatment with a weed killer that is registered for use in connection with such plants, in accordance with the directions for the use of such a weed killer.</li> <li>» Biological control, carried out in accordance with the stipulations of the Agricultural Pests Act (No. 36 of 1983), the ECA and any other applicable legislation.</li> <li>» Any other method of treatment recognised by the executive officer that has as its object the control of plants concerned, subject to the provisions of sub-regulation 4.</li> <li>» A combination of one or more of the methods prescribed, save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods if the agents are destroyed or become ineffective.</li> </ul>
<p>National Forests Act (Act No. 84 of 1998) (NFA)</p>	<p>According to the NFA, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the NFA was published in GNR 536.</p> <p>The prohibitions provide that “no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister”.</p>	<p>DFFE</p>	<p>A permit would need to be obtained for any protected trees that are affected by the project.</p> <p>The BWIA included a site visit, which allowed for the identification of protected trees that may require a license in terms of the NFA within the project area (refer to <b>Appendix D1</b>). Two (2) species of protected trees under the NFA were observed in the study area, namely <i>Sclerocarya birrea. subsp. caffra</i> (Marula) and <i>Combretum imberbe</i> (Leadwood).</p> <p>Should individuals of these tree species be impacted directly by the project, a permit from LDEDET for the removal/relocation thereof will need to be applied for.</p>
<p>National Veld and Forest Fire Act (Act 101 of 1998) (NVFFA)</p>	<p>Chapter 4 places a duty on owners to prepare and maintain firebreaks; the procedure in this regard; and the role of adjoining owners and the fire protection association. NHM must ensure that: firebreaks are wide and</p>	<p>DFFE</p>	<p>Whilst the NVFFA has no permitting or licensing requirements, it will be applicable during the construction and operation of the project for the preparation and maintenance of firebreaks; and provision of appropriate equipment and trained personnel for firefighting purposes.</p>

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	<p>long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land; it does not cause soil erosion; and it is reasonably free of inflammable material capable of carrying a veldfire across it.</p> <p>Chapter 5 places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn, or from whose land it may spread, must have such equipment; protective clothing; and trained personnel for extinguishing fires. Such owners must ensure that in their absence responsible persons are present on or near their land who, in the event of fire, will extinguish it, or assist in doing so, and take all reasonable steps to alert adjoining landowners and the relevant fire protection association, if any.</p>		
<p>Hazardous Substances Act (Act No 15 of 1973)</p>	<p>This Act regulates the control of: (i) substances that may cause injury, ill health, or death (due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances); and (ii) certain electronic products. It provides for the: rating of such substances or products by the degree of danger; and prohibition and control of the importation,</p>	<p>Department of Health</p>	<p>It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may be on the project area and in what operational context they are used, stored or handled. If applicable, a licence would be required to be obtained from the Department of Health.</p>

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	<p>manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.</p> <ul style="list-style-type: none"> <li>» <i>Group I and II:</i> Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance.</li> <li>» <i>Group IV:</i> any electronic product, and</li> <li>» <i>Group V:</i> any radioactive material.</li> </ul> <p>The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate licence being in force.</p>		
<p>National Environmental Management: Waste Act, 2008 (Act No 59 of 2008) (NEMWA)</p>	<p>The Minister may by notice in the <i>Gazette</i> publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment.</p> <p>The Minister may amend the list by –</p> <ul style="list-style-type: none"> <li>» adding other waste management activities to the list;</li> <li>» removing waste management activities from the list; and</li> <li>» making other changes to the particulars on the list.</li> </ul>	<p>DFFE (hazardous waste) LDEDET (general waste)</p>	<p>No waste listed activities are triggered by project, therefore, no Waste Management Licence is required to be obtained.</p> <p>General and hazardous waste handling, storage and disposal will be required during construction and operation. The National Norms and Standards for the Storage of Waste (GNR 926), published under Section 7(1)(c) of NEM:WA, will need to be considered in this regard.</p>

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	<p>In terms of the Regulations published in terms of NEMWA (GN 921), a basic assessment or EIA is required to be undertaken for identified listed waste management activities.</p> <p>Any person who stores waste must at least take steps, unless otherwise provided by this NEMWA, to ensure that:</p> <ul style="list-style-type: none"> <li>» the containers in which any waste is stored are intact and not corroded or in any other way rendered unfit for the safe storage of waste;</li> <li>» adequate measures are taken to prevent accidental spillage or leaking;</li> <li>» the waste cannot be blown away;</li> <li>» nuisances, such as odour, visual impacts and breeding of vectors, do not arise; and</li> <li>» environmental pollution and harm to health are prevented.</li> </ul>		
<p>National Road Traffic Act (Act No 93 of 1996) (NRTA)</p>	<p>The technical recommendations for highways (TRH 11): "<i>Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads</i>" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads; and the prescribed procedures in</p>	<p>South African National Roads Agency Limited (national roads)</p> <p>Limpopo Department of Roads and Transport</p>	<p>An abnormal load/vehicle permit may be required to transport the various components to site for construction. These include route clearances and permits for vehicles carrying abnormally heavy or abnormally dimensioned loads; and transport vehicles exceeding the dimensional limitations (length) of 22m. Depending on the trailer configuration and height when loaded, some of the on-site substation components may not meet specified dimensional limitations (height and width).</p>

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	<p>applying for exemption permits are described and discussed.</p> <p>Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts.</p> <p>The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the NRTA and its relevant Regulations.</p>		
<p>Astronomy Geographic Advantage Act (Act No. 21 of 2007) (AGA)</p>	<p>The AGA provides for: the preservation and protection of areas within South Africa that are uniquely suited for optical and radio astronomy; intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas; and matters connected thereto.</p> <p>Chapter 2 of the AGA allows for the declaration of astronomy advantage areas. Chapter 3 pertains to the management and control of</p>	<p>Department of Science and Technology.</p>	<p>The study area is located within the Limpopo Province and well outside of those areas considered as nationally significant astronomy advantage areas. Therefore, the <u>AGA's</u> requirements are not considered applicable.</p>

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




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

## 11. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

### 11(a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

<b>YES</b>	
Not determined as this stage.	

If yes, what estimated quantity will be produced per month?


How will the construction solid waste be disposed of (describe)?

All waste generated at the project area will be handled in accordance with the Zondereinde Mine Waste Management Plan. Solid waste generated during construction will mainly be construction material, excavated substrate and domestic solid waste. Cardboard waste will be produced from panel packaging; and compacted on site prior to removal. Other wastes will include rubber caps on panel edges, wooden pallets and plastic wrapping (all related to the panel packaging). There may also be some broken panels, which must be removed as per the latest regulations regarding producer responsibilities to minimise waste. Waste will be disposed of in either waste skips and/or scavenger proof recycling bins (where possible) and temporarily placed in a central location for removal by an appropriate contractor. Where possible, waste will be recycled. Non-recyclable solid construction waste will be temporarily held in skips or other appropriate waste containers, to be disposed of at an appropriately licensed landfill site. Any other waste and excess material will be removed once construction is complete and disposed of at a registered waste facility.

Where will the construction solid waste be disposed of (describe)?

Recyclable waste will be recycled through accredited recycling companies and non-recyclable solid construction waste will be disposed at the registered Thabazimbi municipal solid waste disposal site.

Will the activity produce solid waste during its operational phase?

<b>YES</b>	
Not determined at this stage.	

If yes, what estimated quantity will be produced per month?

How will the solid waste be disposed of (describe)?

The operation of the PV facility will result in the generation of general solid waste, such as damaged or broken panels; general waste from the offices; and oils from the on-site substation. General solid waste generated during the operational phase will be temporarily stored in either waste skips and/or scavenger proof recycling bins (where possible), for removal by an appropriate contractor and subsequent disposal at an appropriately licensed landfill site. Where possible, waste will be recycled. Hazardous waste produced during the operational phase will be appropriately stored in banded areas for removal by an appropriate contractor and subsequent disposal at a registered hazardous waste disposal facility.

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

All solid waste generated during the operational phase will be fed into a municipal waste stream.

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the department to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?  **NO**

If yes, inform the department and request a change to an application for scoping and EIA.

Is the activity that is being applied for a solid waste handling or treatment facility?  **NO**

If yes, then the applicant should consult with the Department to determine whether it is necessary to change to an application for scoping and EIA.

### 11(b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?  **NO**

If yes, what estimated quantity will be produced per month?

Will the activity produce any effluent that will be treated and/or disposed of on site?  **NO**

If yes, the applicant should consult with the Department to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility?  **NO**

If yes, provide the particulars of the facility:

Facility name:

Contact person:

Postal address:

Postal code:

Telephone:

E-mail:

Describe the measures that will be taken to ensure the optimal reuse or recycling of wastewater, if any:

The following measures could be put in place, to ensure optimal reuse or recycling of wastewater:

- » During the construction phase, measures may be put in place to separate clean and dirty water.
- » Sewage will be handled/managed through using the Mine's existing ablutions and establishing portable ablution facilities.
- » Water used within the construction process, if tested and found to be within the required limits, may be used for dust suppression.

### 11(c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere?  **NO**

If yes, is it controlled by any legislation of any sphere of government?

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the emissions in terms of type and concentration:

Solar energy installations operate by converting solar energy into electricity. This is characterised as a non-consumptive use of a natural resource and consumes no fuel for its continuing operation. Solar PV facilities produce an insignificant quantity of greenhouse gasses over their lifecycle. During the construction phase, minor dust impacts and exhaust emissions may occur; however, acceptable limits will not be exceeded. The operational phase of a solar PV facility does not produce carbon dioxide, sulphur dioxide, mercury, particulates, or any other type of pollution.

### 11(d) Generation of noise

Will the activity generate noise?

NO
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If yes, is it controlled by any legislation of any sphere of government?

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the noise in terms of type and level:

Minimal noise will occur during the construction phase due to vehicle movement; the presence of construction workers on site; and machinery operation. This is not regarded as a significance noise source / impact and will not constitute a “disturbing noise”. No noise will be generated during the operation phase.

### 12. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es)

<b>Municipal</b>	water board	groundwater	river, stream, dam or lake	<b>other</b>	the activity will not use water
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During the construction phase, the appointed contractor will bring their own water to site. Water required for the operational activities will be sourced from the municipal supply via the existing mine water supply network. Alternatively, water will be supplied via truck from municipal sources. No groundwater abstraction from boreholes is proposed.

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate

the volume that will be extracted per month:

N/A
-----

Does the activity require a water use permit from the Department of Water Affairs?

YES
-----

If yes, please submit the necessary application to the Department of Water Affairs and attach proof thereof to this application if it has been submitted.

**[The application process will only commence once a positive EA is received from the Competent Authority].**

### 13. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

The activity is in itself an activity that is proposed to generate electricity from a cleaner alternative energy source (i.e., solar radiation).

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

The purpose of a solar PV facility is to utilise a renewable energy source (i.e., solar radiation) for electricity production. Therefore, it is not required to consider any additional alternative energy sources.

## SECTION B: SITE/AREA/PROPERTY DESCRIPTION

### Important notes:

- For linear activities (pipelines, etc.) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases, please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No.   
 (e.g. A):

- Paragraphs 1 - 6 below must be completed for each alternative.

- Has a specialist been consulted to assist with the completion of this section?

YES	
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If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed:

All specialist reports must be contained in Appendix D.

Property description/physical address:

Component	Description / Dimensions										
District Municipality	Waterberg District Municipality										
Local Municipality	Thabazimbi Local Municipality										
Ward Number (s)	Ward 5										
Nearest town(s)	Northam (~18km)										
Farm name(s) and number(s) of properties affected by the Solar Facility	Portion 2 of the Farm Zondereinde 384 (TOKQ00000000038400002).										
Portion number(s) of properties affected by the Solar Facility											
SG 21 Digit Code (s)											
Site Coordinates (centre of project area)	24°50'9.05"S 27°21'27.77"E										
Site Coordinates (Corner Points of the project area)	The four corner points of the 10MW project area are: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Latitude</th> <th>Longitude</th> </tr> </thead> <tbody> <tr> <td>24°49'58.77"S</td> <td>27°21'19.99"E</td> </tr> <tr> <td>24°50'1.29"S</td> <td>27°21'32.43"E</td> </tr> <tr> <td>24°50'15.59"S</td> <td>27°21'36.69"E</td> </tr> <tr> <td>24°50'17.70"S</td> <td>27°21'21.90"E</td> </tr> </tbody> </table>	Latitude	Longitude	24°49'58.77"S	27°21'19.99"E	24°50'1.29"S	27°21'32.43"E	24°50'15.59"S	27°21'36.69"E	24°50'17.70"S	27°21'21.90"E
Latitude	Longitude										
24°49'58.77"S	27°21'19.99"E										
24°50'1.29"S	27°21'32.43"E										
24°50'15.59"S	27°21'36.69"E										
24°50'17.70"S	27°21'21.90"E										

(Farm name, portion etc.) Where a large number of properties are involved (e.g., linear activities), please attach a full list to this application. In instances where there is more than one town or district involved, please attach a list of towns or districts to this application.

Current land-use zoning: The project falls within the authorized mining boundary of NHM. It is however currently zoned for agricultural use.

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to this application.

Is a change of land-use or a consent use application required?  
 Must a building plan be submitted to the local authority?

<b>YES</b>	
<b>YES</b>	

Locality map: An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map). The map must indicate the following:

- an indication of the project site position as well as the positions of the alternative sites, if any;
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection)

**1. GRADIENT OF THE SITE**

**Indicate the general gradient of the site.**

Preferred Site:

<b>Flat</b>	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S1 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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## 2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

2.1 Ridgeline		<b>2.6 Plain</b>	<b>X</b>
2.2 Plateau		2.7 Undulating plain / low hills	
2.3 Side slope of hill/mountain		2.8 Dune	
2.4 Closed valley		2.9 Seafront	
2.5 Open valley			

## 3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	<b>Preferred Site:</b>	<b>Alternative S1 (if any):</b>	<b>Alternative S2 (if any):</b>
Shallow water table (less than 1.5m deep)	<b>NO</b>	YES NO	YES NO
Dolomite, sinkhole or doline areas	<b>NO</b>	YES NO	YES NO
Seasonally wet soils (often close to water bodies)	<b>YES</b>	YES NO	YES NO
Unstable rocky slopes or steep slopes with loose soil	<b>NO</b>	YES NO	YES NO
Dispersive soils (soils that dissolve in water)	<b>NO</b>	YES NO	YES NO
Soils with high clay content (clay fraction more than 40%)	<b>YES</b>	YES NO	YES NO
Any other unstable soil or geological feature	<b>NO</b>	YES NO	YES NO
An area sensitive to erosion	<b>NO</b>	YES NO	YES NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

## 4. GROUNDCOVER

Indicate the types of groundcover present on the site:

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition <sup>E</sup>	Natural veld with scattered aliens <sup>E</sup>	<b>Natural veld with heavy infestation<sup>E</sup></b>	Veld dominated by alien species <sup>E</sup>	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an "E" is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.



## 5. LAND USE CHARACTER OF SURROUNDING AREA

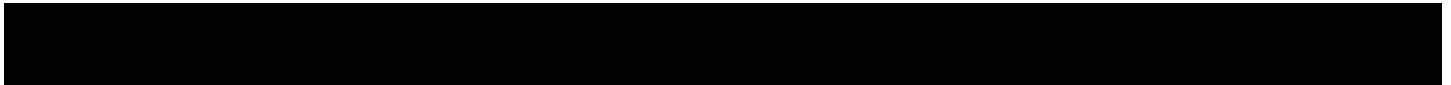
Indicate land uses and/or prominent features that does currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:



<b>5.1 Natural area</b>	<b>X</b>	5.22 School	
5.2 Low density residential		5.23 Tertiary education facility	
5.3 Medium density residential		5.24 Church	
5.4 High density residential		5.25 Old age home	
5.5 Medium industrial <sup>AN</sup>		5.26 Museum	
5.6 Office/consulting room		5.27 Historical building	
5.7 Military or police base/station/compound		5.28 Protected Area	
5.8 Spoil heap or slimes dam <sup>A</sup>		5.29 Sewage treatment plant <sup>A</sup>	
5.9 Light industrial		5.30 Train station or shunting yard <sup>N</sup>	
5.10 Heavy industrial <sup>AN</sup>		5.31 Railway line <sup>N</sup>	
5.11 Power station		5.32 Major Road (4 lanes or more)	
5.12 Sport facilities		5.33 Airport <sup>N</sup>	
5.13 Golf course		5.34 Harbour	
5.14 Polo fields		5.35 Quarry, sand or borrow pit	

5.15 Filling station <sup>H</sup>		5.36 Hospital/medical centre	
5.16 Landfill or waste treatment site		5.37 River, stream or wetland	
5.17 Plantation		5.38 Nature conservation area	
5.18 Agriculture		5.39 Mountain, koppie or ridge	
5.19 Archaeological site		5.40 Graveyard	
5.20 Quarry, sand or borrow pit		5.41 River, stream or wetland	
5.21 Dam or Reservoir		5.42 Other land uses (describe)	

If any of the boxes marked with an "N" are ticked, how will this impact / be impacted upon by the proposed activity?



If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity?

If YES, specify and explain:	
If NO, specify:	

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	
If NO, specify:	

**6. CULTURAL/HISTORICAL FEATURES**

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including

Archaeological or palaeontological sites, on or close (within 20m) to the site?

If YES, explain:



NO

If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist:

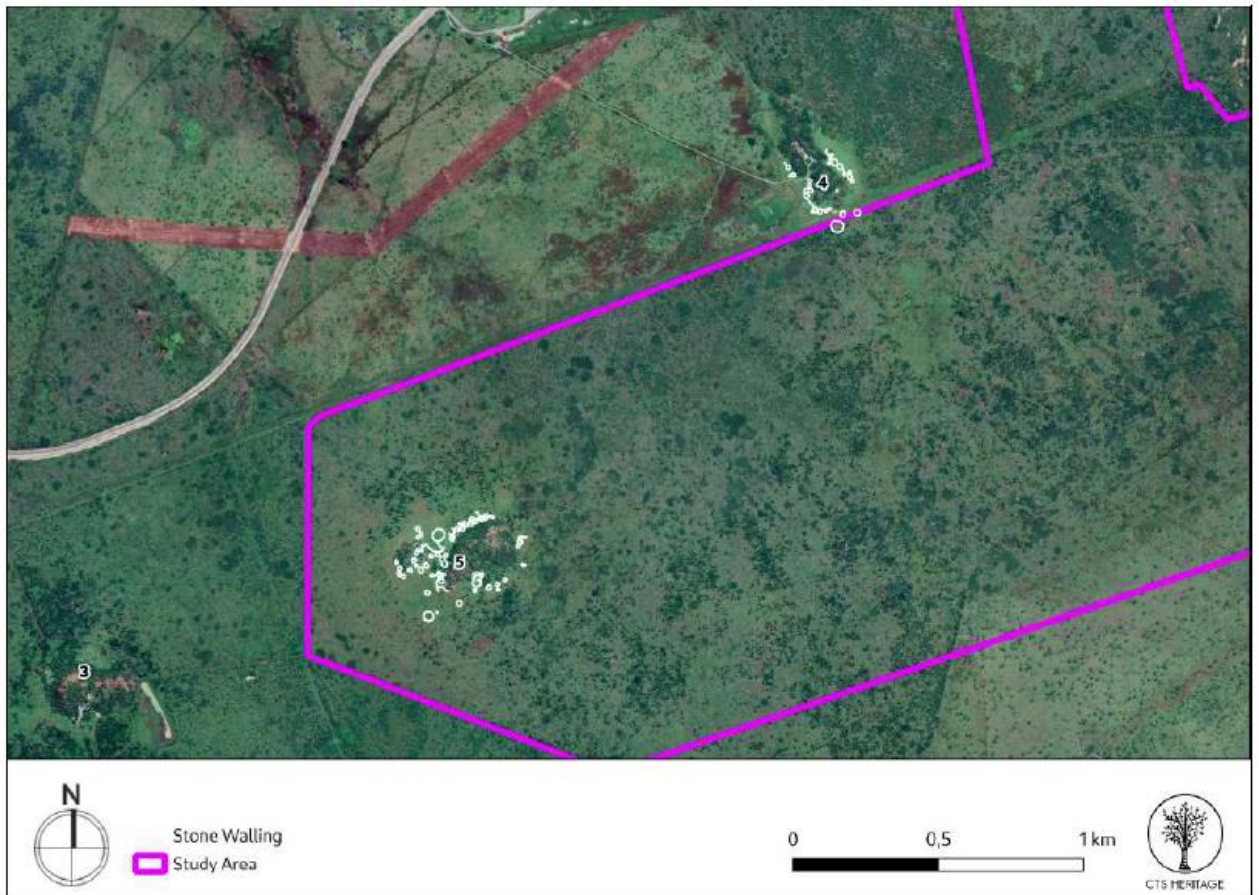
The HIA (refer to **Appendix D**) was undertaken for the project. A HIA is required in terms of Section 38(8) of the NNHRA. The findings of the assessment are described below:

**Heritage resources identified**

A survey of the broader study area was conducted on foot and by vehicle, with a high clearance to move through the tracks along the fence lines that are maintained as fire breaks. During the survey, no heritage sites of significance were identified within the 20ha project area for the 10MW solar PV facility.

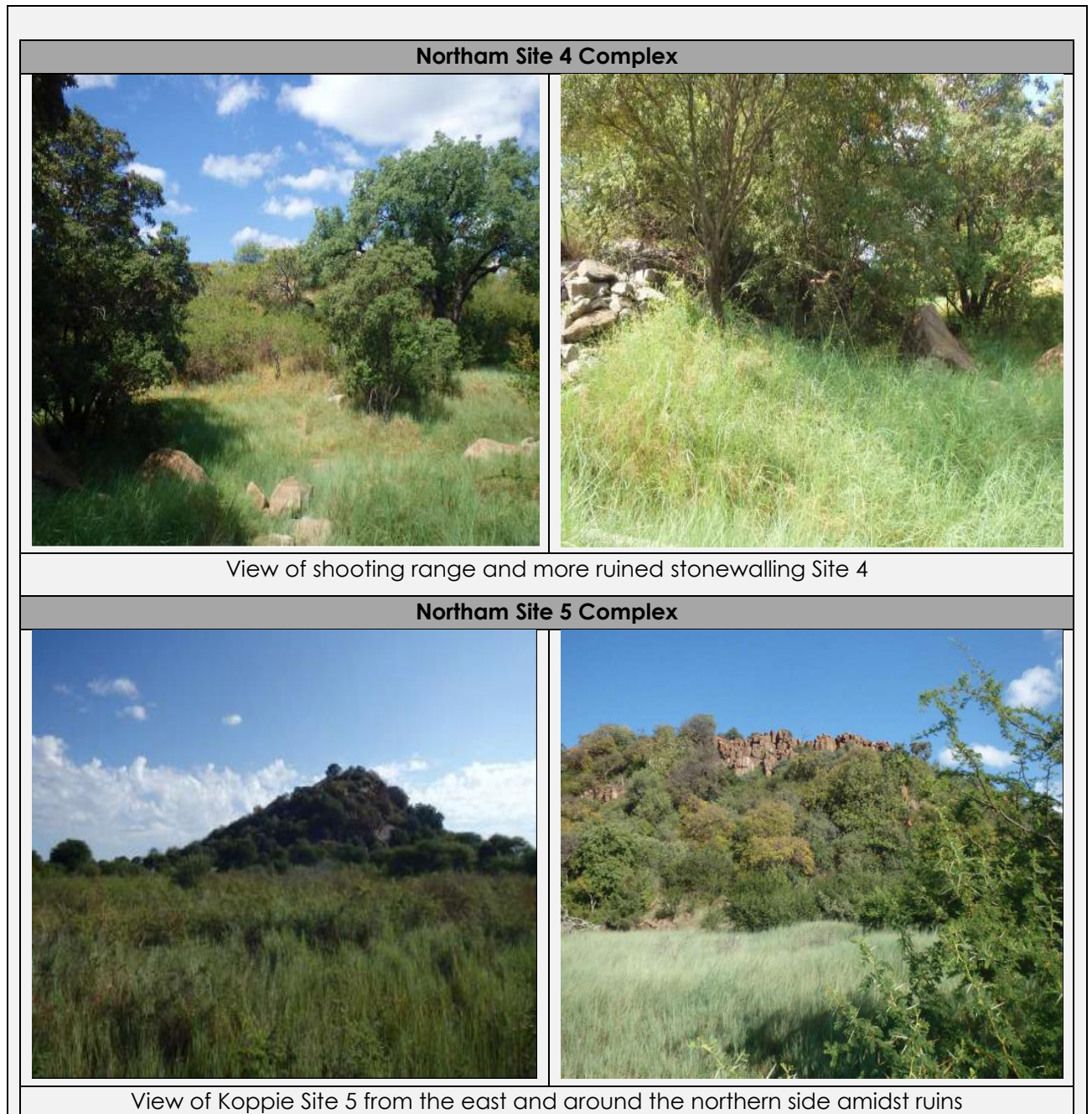
Two main site complexes (stone walling), previously recorded by Van Vollenhoven (2013), were identified within the broader study area, namely, Northam Site 4 Complex and Northam Site 5 Complex, which have a high heritage significance and a heritage rating of IIIA.

**Figure 2** provides a locality map of the heritage resources identified within the broader study area, and **Figure 3** provides of photographic record of the heritage finds.



**Figure 2:** Map of heritage resources identified during the field assessment, relative to the broader study area

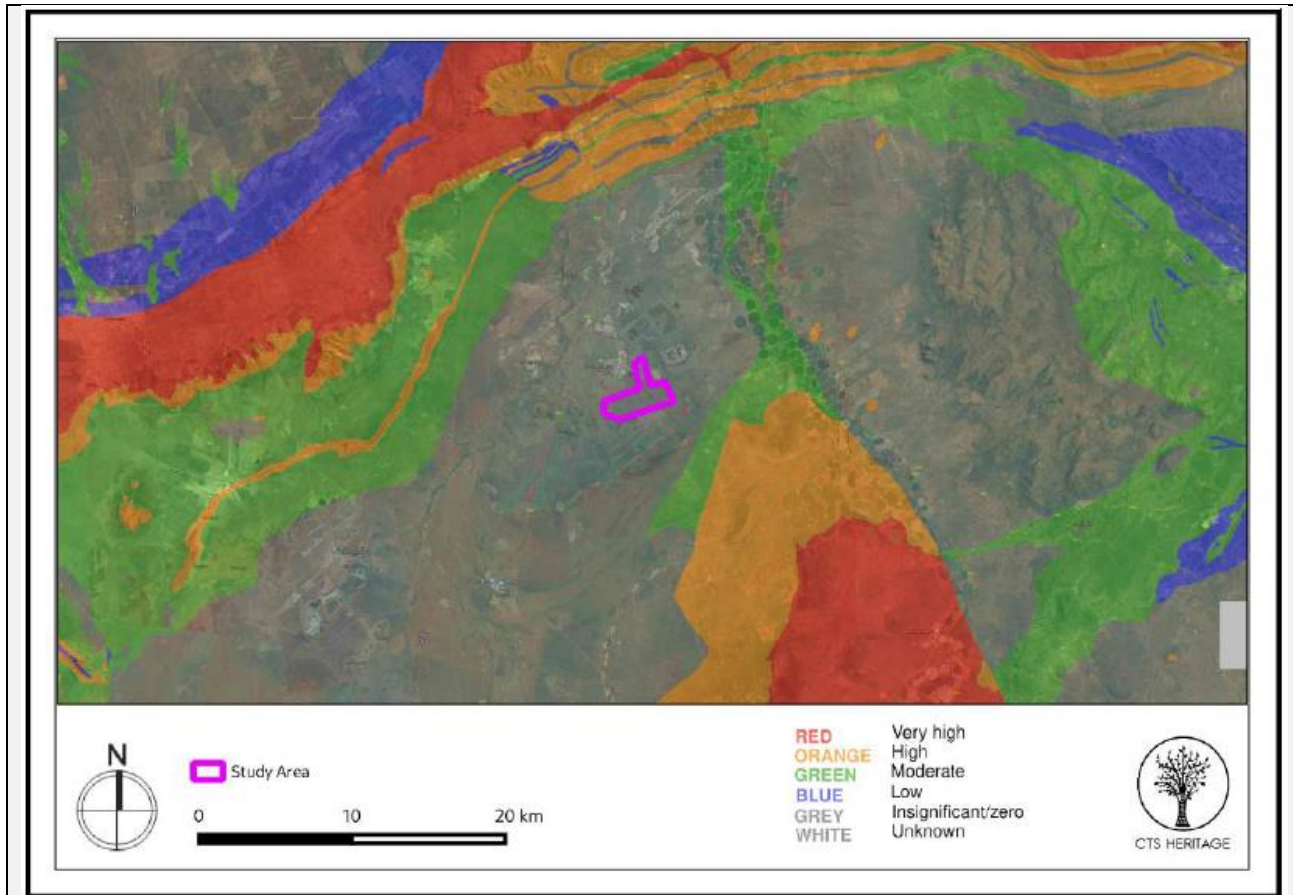




**Figure 3:** Photographic record of heritage resources found within the broader study area.

**Palaeontology**

According to the SAHRIS Palaeosensitivity Map (**Figure 4**), the area proposed for the development of the solar PV facility is underlain by sediments that have zero palaeontological sensitivity. As such, no palaeontological resources will be impacted by the project and no further specialist palaeontological assessment is recommended.



**Figure 4:** Palaeontological sensitivity of the area surrounding the broader study area

### **Potential Impacts**

Due to the very low palaeontological sensitivity of the project area and broader study area, no impact to palaeontological resources is anticipated.

Provided that the project area remains within the areas identified as having low or moderate archaeological sensitivity, no impacts to significant heritage resources are anticipated.

### **Potential Cumulative Impacts**

The project is located within an area that has been previously impacted by the Zondereinde Mine's development. As such, it is not anticipated that the project will have a negative cumulative impact on the broader landscape, which is already dominated by mining infrastructure and agriculture.

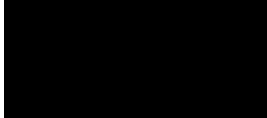
### **Recommendations and Conclusions**

It is the specialist's opinion that the proposed project be authorised on condition that:

- » The project is within the low or moderate sensitivity areas identified as preferred, as they have low archaeological sensitivity.
- » The areas marked as having high archaeological sensitivity are avoided and no development activities associated with the project take place within this area.
- » Should any previously unrecorded archaeological resources or possible burials be identified during construction activities, work must cease in the immediate vicinity of the find, and SAHRA must be contacted regarding an appropriate way forward.

Will any building or structure older than 60 years be affected in any way?

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

	<b>NO</b>
	<b>NO</b>

If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.

## SECTION C: PUBLIC PARTICIPATION

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### 1. ADVERTISEMENT

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by—

- (a) fixing a notice board (of a size at least 60cm by 42cm; and must display the required information in lettering and in a format as may be determined by the department) at a place conspicuous to the public at the boundary or on the fence of—
- (i) the site where the activity to which the application relates is or is to be undertaken; and
  - (ii) any alternative site mentioned in the application;

Two site notices were placed on site and at the nearest town (i.e., Northam, which is situated ~18km away from the site) on 15 June 2021. Please refer to **Appendix E2** for photos of the site notices.

- (b) giving written notice to—
- (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
  - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
  - (v) the municipality which has jurisdiction in the area;
  - (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
  - (vii) any other party as required by the department;

Notification letters announcing the commencement of the BA process, and the availability of the draft BA Report for a 30-day review and comment period were distributed via e-mail to identified I&APs and stakeholders on 14 July 2021. Please refer to **Appendix E5** for proof of distribution of the notification letters.

- (c) placing an advertisement in—
- (i) one local newspaper; or
  - (ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
- (d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the local municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official *Gazette* referred to in subregulation 54(c)(ii); and

An advertisement announcing the commencement of the BA process was placed in the Rustenburg Herald on 15 July 2021. Please refer to **Appendix E2**.

- (e) using reasonable alternative methods, as agreed to by the department, in those instances where a person is desiring of but unable to participate in the process due to—
- (i) illiteracy;
  - (ii) disability; or
  - (iii) any other disadvantage.

Alternative means of undertaking consultation have been designed and implemented by Savannah Environmental to ensure that I&APs are afforded sufficient opportunity to access project information and raise comments on the project through an interactive web-based platform (i.e. online stakeholder engagement platform) readily available and accessible to any person registering their interest in the project. It ensures that the public participation process is undertaken in line with Regulations 41 to 44 of the EIA Regulations, 2014, as amended. The online stakeholder engagement platform implemented by Savannah Environmental for the project allows the EAP to visually present details regarding the project and consultation documentation, including project maps and plans, presentations, and posters. It also contains the BA Report available for review. The use of an online tool enables stakeholders and I&APs to explore the project-specific content in their own time, whilst still participating in a meaningful way in the consultation process.

Virtual Focus Group Meetings with the relevant stakeholder groups (i.e., landowners, authorities, and stakeholders (including Organs of State, local municipality and official representatives of community-based organisations)) were held during the 30-day public review and comment period due to the COVID-19 pandemic, the details of which are provided below:

- » **03 August 2021:** Focus Group Meetings with the relevant local and district municipalities, and national departments.
- » **13 August 2021:** Focus Group Meetings with national departments and adjacent landowners.
- » **19 August 2021:** Focus Group Meeting with the councillors for wards 11 and 6 (affected wards).

Refer to **Appendix E7** for the minutes of each meeting.

## 2. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:

- (a) indicate the details of the application which is subjected to public participation; and
- (b) state—
  - (i) that the application has been submitted to the department in terms of these Regulations, as the case may be;
  - (ii) whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental authorisation;
  - (iii) the nature and location of the activity to which the application relates;
  - (iv) where further information on the application or activity can be obtained; and
  - (v) the manner in which and the person to whom representations in respect of the application may be made.

Please refer to **Appendix E2** for copies of the advertisement and site notice.



### 3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the department in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of these Regulations.

Advertisements and notices must make provision for all alternatives.

The project will not have impacts that extend beyond the municipal area within which it is situated. The Rustenburg Herald, which is a local newspaper, was used to advertise the project. A description was given of the project; affected property; and BA process being undertaken.

### 4. DETERMINATION OF APPROPRIATE MEASURES

The practitioner must ensure that the public participation is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate. Please note that public concerns that emerge at a later stage that should have been addressed may cause the department to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

Virtual Focus Group Meetings with the relevant stakeholder groups (i.e., landowners, authorities, and stakeholders (including Organs of State, local municipality, and official representatives of community-based organisations)) were held during the 30-day public review and comment period, the details of which are provided below:

- » **03 August 2021:** Focus Group Meetings with the relevant local and district municipalities, and national departments.
- » **13 August 2021:** Focus Group Meetings with national departments and adjacent landowners.
- » **19 August 2021:** Focus Group Meeting with the councillors for wards 11 and 6 (affected wards).

Refer to **Appendix E7** for notes for the minutes of each meeting.

### 5. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments and respond to each comment of the public before the application is submitted. The comments and responses must be captured in a comments and response report as prescribed in these Regulations and be attached to this application. The comments and response report must be attached under Appendix E.

A Comments and Responses Report, which includes comments received following announcement of the BA process and during the 30-day review and comment period of the draft BAR have been included in the Comments and Responses Report within this final BA Report. The Comments and Responses Report is included as **Appendix E8**.

## 6. AUTHORITY PARTICIPATION

Please note that a complete list of all organs of state and or any other applicable authority with their contact details must be appended to the basic assessment report or scoping report, whichever is applicable.

All organs of state and/or any other applicable authorities, including their contact details, have been included in the I&AP database (refer to **Appendix E1**)

Authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input<sup>4</sup>.

<b>Name of Authority informed:</b>	<b>Comments received (Yes or No)</b>
Waterberg District Municipality ("WDM")	No written comments received to date. <u>The WDM did however attend the Focus Group Meeting held on 03 August 2021, during which they commented on the project (refer to <b>Appendix E7</b>).</u>
Thabazimbi Local Municipality	No written comments received to date.
Limpopo Department of Economic Development, Environment and Tourism	<u>Comments received via e-mails on 26 July 2021 and 11 August 2021 (refer to <b>Appendix E8</b>).</u>
Limpopo Department of Agriculture, Rural Development and Land Reform	No written comments received to date.
Roads Agency Limpopo	No written comments received to date.
Limpopo Heritage Resource Authority	No written comments received to date.
Department of Mineral Resources and Energy: Limpopo Region ("LDMRE")	No written comments received to date. <u>The LDMRE did however attend the Focus Group Meeting held on 13 August 2021 during which they commented on the project (refer to <b>Appendix E7</b>).</u>
Department of Human Settlements, Water and Sanitation	No written comments received to date.
Department of Agriculture, Land Reform and Rural Development	No written comments received to date.
Eskom	Comment received from John Geeringh via e-mail on 14 July 2021 (refer to <b>Appendix E8</b> ).
South African Heritage Resources Agency	No written comments received to date.
South African National Roads Agency Limited	<u>Comment received via email on 19 August 2021 (refer to <b>Appendix E8</b>).</u>

<sup>4</sup> Contact details of the relevant authorities have been excluded as per the requirements of the POPI Act.

## 7. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for linear activities, or where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the department.

Proof of any such agreement must be provided, where applicable.

**Has any comment been received from stakeholders?**

**YES**

**If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):**

Comments received from stakeholders during the 30-day public review and comment period of the BA Report have been captured in the Comments and Responses Report (refer to **Appendix E8**); and copies of such correspondence are attached as **Appendix E5**.

## SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

### 1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by interested and affected parties.

The following issues were raised by I&APs during the 30-day public and review comment period of the draft BA Report:

- » It was requested by the LDEDET that:
  - The application form submitted on 19 July 2021 be revised, to: describe each listed activity as per project description (and not a verbatim repetition of the listed activity as in the Regulations); and include the thresholds that determine which activities are triggered; and resubmitted, with an EAP declaration form and an original copy of the applicant declaration.
  - Possible impacts of the clayish soil present on site on underground electric cables and foundation be assessed in the final BA Report.
- » A representative from the Amandebult Mine (adjacent landowner) raised concerns regarding the possible glare impact from the solar panels and how this will affect users of the Mine Road.
- » The DFFE requested clarification as to why the LDEDET is the competent authority for the project.
- » The WDM requested clarification on the methods used to consult with communities.

Refer to **Appendix E6, E7 and E8** for a record of issued raised by I&APs.

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached to this report as Annexure E):

The following responses were provided by the EAP:

- » Revised copies of the application form were submitted to the LDEDET on 30 July 2021 and 16 August 2021, with copies of the EAP declaration form and original copies of the applicant declaration. As per the LDEDET's request, the revised application forms described each listed activity as per project description and included thresholds that determine which activities are to be triggered.
- » Possible impacts of the clayish soil present on site on underground electric cables and foundation have been included in Section 2.6 (Section D) of this BA Report.
- » A visual impact assessment was not deemed necessary, as the project area is located between the smelter and the mining area, and no visual sensitive receptors were identified in proximity to it. It is not envisaged that the glare from the solar panels will have an impact on motorists using the mine road close to the project area, as this is located approximately 1 km away.
- » As the project is not aligned with the Integrated Resource Plan (IPR); will not be bid in the Renewable Energy Independent Power Producer Procurement (REIPPP) Programme; and is intended as a combined approach (i.e., the energy will be generated for use by the mine, but any excess energy is to be exported to the national grid), the competent authority would be the provincial environmental department.

» Methods used to consult communities included holding Focus Group Meetings with the relevant Ward councillors, placing site notices on site and at the nearest town (i.e., Northam), placing an advertisement in the Rustenburg Herald and distributing notification letters to identified I&APs.

## 2. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

List the potential direct, indirect and cumulative property/activity/design/technology/operational alternative related impacts (as appropriate) that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed.

### 2.1. Outcomes of the Department of Forestry, Fisheries and the Environment (DFFE) Web-Based Screening Tool

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16(1)(b)(v) of the 2014 EIA Regulations (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of applications in terms of Regulations 19 and 21 of the EIA Regulations.

The requirement for the submission of a Screening Report (**Appendix G3**) for the project is applicable as it triggers Regulation 19 of the EIA Regulations, 2014 (as amended). **Table 2** provides a summary of the specialist assessments identified in terms of the screening tool and responses to each assessment from the project team, considering the project area under consideration.

**Table 2:** Sensitivity ratings from the DFFE's web-based online Screening Tool associated with the development of the solar PV facility and associated infrastructure.

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
Agricultural Impact Assessment	Medium	The SAA was undertaken for the project, included as <b>Appendix D3</b> .
Visual Impact Assessment	Not Rated	Due to the location of the project area within the Zondereinde Mine Area and the distance of the area from sensitive receptors, a Visual Impact Assessment was not undertaken for the project.
Archaeological and cultural heritage Impact assessment	Low	The HIA was undertaken for the project, to comply with the NHRA's requirements, and is included as <b>Appendix D4</b> . The HIA also considers archaeology.
Palaeontological Impact assessment	Medium	The HIA was undertaken for the project, to comply with the NHRA's requirements, included as <b>Appendix D4</b> . The HIA also considers palaeontology.

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
Terrestrial biodiversity Impact assessment	Very high	The BWIA (including flora and fauna) was undertaken for the project, included as <b>Appendix D1</b> .
Aquatic biodiversity Impact assessment	Very high	The BWIA (including wetlands) was undertaken for the project, attached as <b>Appendix D1</b> .
Avian Impact assessment	High	The AIA was undertaken for the project, included as <b>Appendix D2</b> .
Civil Aviation Assessment	Medium	A Civil Aviation Assessment was not deemed necessary for the Northam solar PV facility. The Civil Aviation Authority will be consulted during the BA process and any specific requirements will be addressed by NHM.
Defence Assessment	Low	As per GNR 320 (of 20 March 2020), no Defence Assessment is required where a low sensitivity is determined.
Radio Frequency Interference (RFI) Assessment	Medium	The project is not located within any sensitive regions in terms of RFI and therefore no study is deemed necessary. <u>No comments were received from the South African Radio Astronomy Observatory (SARAO) and Sentech during the assessment process.</u>
Geotechnical Assessment	The Screening Report did not include a rating for this theme	An in-depth geotechnical investigation will be conducted by NHM to inform the final site layout once the project has been granted EA by the Competent Authority.
Socio-economic Assessment	The Screening Report did not include a rating for this theme	A Social Impact Assessment was not undertaken for the project due to the extent of the project and limited employment opportunities.
Plant species assessment	Low	The BWIA (including flora and fauna) was undertaken for the facility and is included as <b>Appendix D1</b> .
Animal species assessment	Medium	

## 2.2. Assessment of Issues Identified through the BA Process

Issues which required investigation during the BA process and the specialist consultants involved in the assessment of these impacts are indicated in **Table 3** below.

**Table 3:** Specialist studies undertaken as part of the BA process

Specialist Study	Specialist Company	Specialist Name	Appendix
Biodiversity and Wetland Impact Assessment	The Biodiversity Company	Marnus Erasmus	<b>Appendix D1</b>

Avifauna Assessment	Impact	The Biodiversity Company	Tyron Clark	<b>Appendix D2</b>
Soils and Agricultural Compliance Statement		TerraAfrica Consult cc	Mariné Pienaar	<b>Appendix D3</b>
Heritage Assessment	Impact	CTS Heritage	Jenna Lavin Nicholas Wiltshire	<b>Appendix D4</b>

Specialist studies considered direct and indirect environmental impacts associated with the development of all components of the facility. Identified impacts are assessed in terms of the following criteria:

- » The **nature**, a description of what causes the effect, what will be affected, and how it will be affected.
- » The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high).
- » The **duration**, wherein it is indicated whether:
  - \* The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1.
  - \* The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2.
  - \* Medium-term (5–15 years) – assigned a score of 3.
  - \* Long-term (> 15 years) - assigned a score of 4.
  - \* Permanent - assigned a score of 5.
- » The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - \* 0 is small and will have no effect on the environment.
  - \* 2 is minor and will not result in an impact on processes.
  - \* 4 is low and will cause a slight impact on processes.
  - \* 6 is moderate and will result in processes continuing but in a modified way.
  - \* 8 is high (processes are altered to the extent that they temporarily cease).
  - \* 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- » The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
  - \* 1–5, where 1 is very improbable (probably will not happen).
  - \* 2 is improbable (some possibility, but low likelihood.)
  - \* 3 is probable (distinct possibility).
  - \* 4 is highly probable (most likely).
  - \* 5 is definite (impact will occur regardless of any prevention measures).
- » The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- » The **status**, which is described as either positive, negative or neutral.
- » The degree to which the impact can be reversed.
- » The degree to which the impact may cause irreplaceable loss of resources.
- » The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

$$S = (E+D+M) P; \text{ where}$$

S = Significance weighting  
E = Extent  
D = Duration  
M = Magnitude  
P = Probability

The **significance weightings** for each potential impact are as follows:

- » **< 30 points:** Low (i.e. where this impact would not have a direct influence on the decision to develop in the area).
- » **30-60 points:** Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated).
- » **60 points:** High (i.e. where the impact must have an influence on the decision process to develop in the area).

Specialist studies also considered cumulative impacts associated with similar developments within a 30km radius of the project. The purpose of the cumulative assessment is to test if such impacts are relevant to the project in the proposed location (i.e. whether the addition of the project in the area will increase the impact). In this regard, specialist studies considered whether the construction of the project will result in:

- » Unacceptable risk
- » Unacceptable loss.
- » Complete or whole-scale changes to the environment or sense of place.
- » Unacceptable increase in impact.

A conclusion regarding whether the project will result in any unacceptable loss or impact considering all the projects proposed in the area is included in the respective specialist reports.

As NHM has the responsibility to avoid or minimise impacts and plan for their management (in terms of the requirements of NEMA and the 2014 EIA Regulations (GNR 326)), the mitigation of significant impacts is discussed. Assessment of impacts with mitigation is made, to demonstrate the effectiveness of the proposed mitigation measures. An EMPr that includes all the mitigation measures recommended by the specialists for the management of significant impacts is included as **Appendix F** to this BA Report.

### **Alternative (preferred alternative)**

#### **2.3. Assessment of Impacts on Biodiversity (Flora and Fauna)**

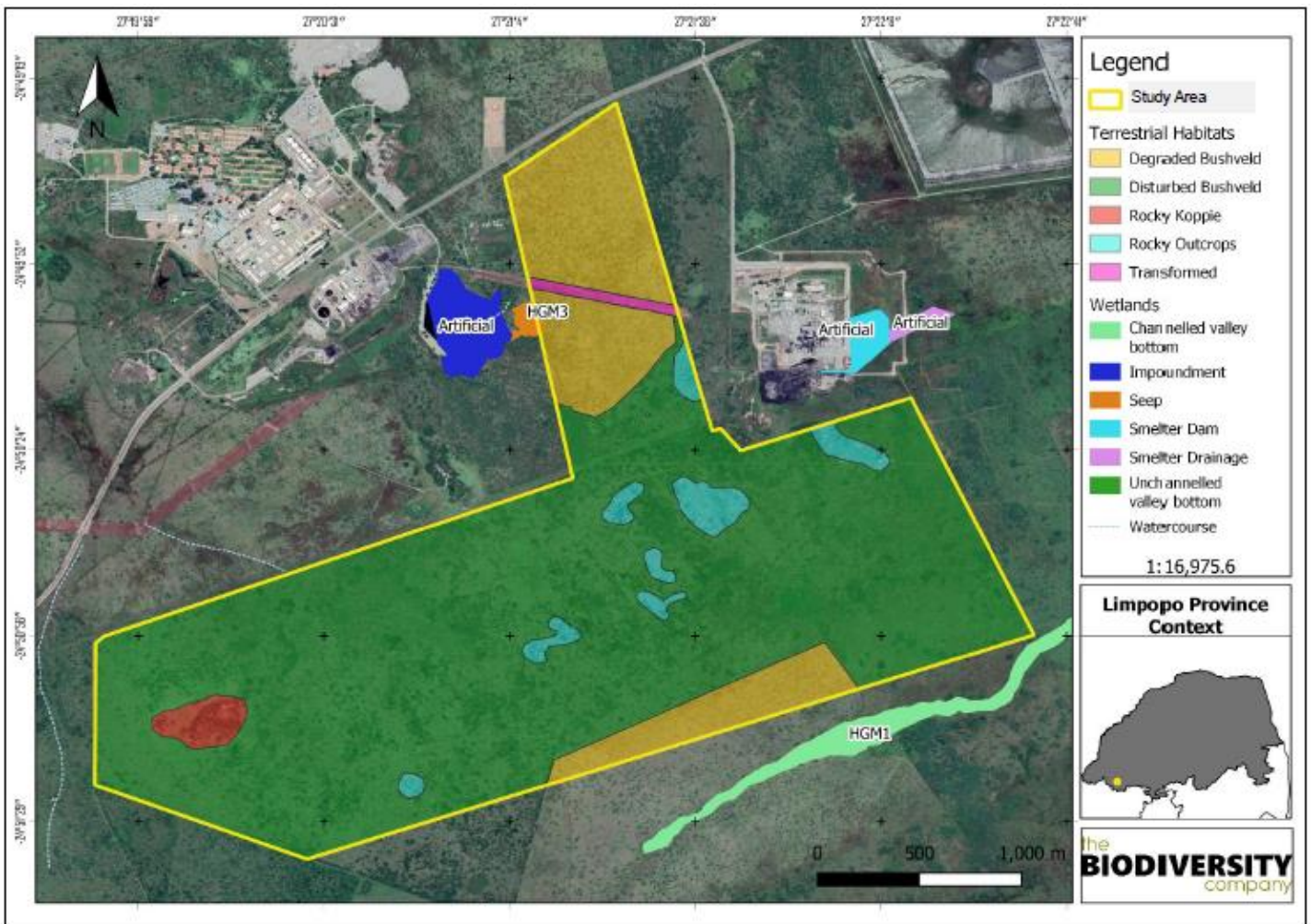
Potential impacts on biodiversity resulting from the project would stem from a variety of different activities and risk factors associated with the project's pre-construction, construction, and operation phases. Potential impacts; their relative significance; and the recommended mitigation measures are summarised below (refer to **Appendix D1** for more details).



### 2.3.1. Results of the Biodiversity Impact Assessment

Six (6) habitats were identified within the wider study area, namely, Degraded Bushveld, Disturbed Bushveld, Rocky Koppie, Rocky Outcrops Transformed habitats and wetlands (refer to **Figure 5**). Of the six (6) terrestrial habitats identified within the wider study area, only three (3) are present within the project area, namely, Degraded Bushveld, Disturbed Bushveld and Rocky Outcrops.

The present land use had a direct impact on both the fauna and the flora in the study area and project area, which is evident in the disturbed and transformed habitats. Historically, overgrazing from cattle and mismanagement has led to the deterioration of most of the area to a disturbed Bushveld that is either encroached upon or invaded by exotic plant species. However, the Degraded Bushveld habitat, rocky outcrops/koppie and wetlands/watercourses can be regarded as important, not only within the local landscape, but also regionally, as they are used for habitat, foraging and movement corridors for fauna within a landscape fragmented by development.



**Figure 5:** Habitats identified in the study area

The biodiversity specialist determined the following ecological sensitivities on site (refer to **Figure 6**), based on the respective ecological contribution and delineation of various habitat types present on site.

The habitat sensitivity of the rocky koppie habitat and wetland/water resources is regarded as high, due to the species recorded; the role of this intact unique habitat to biodiversity within a very fragmented local landscape; and their sensitivity according to various ecological datasets. A 22m 'no-go' buffer around the identified wetland features is recommended. The rocky koppie is also considered a 'no-go' area.

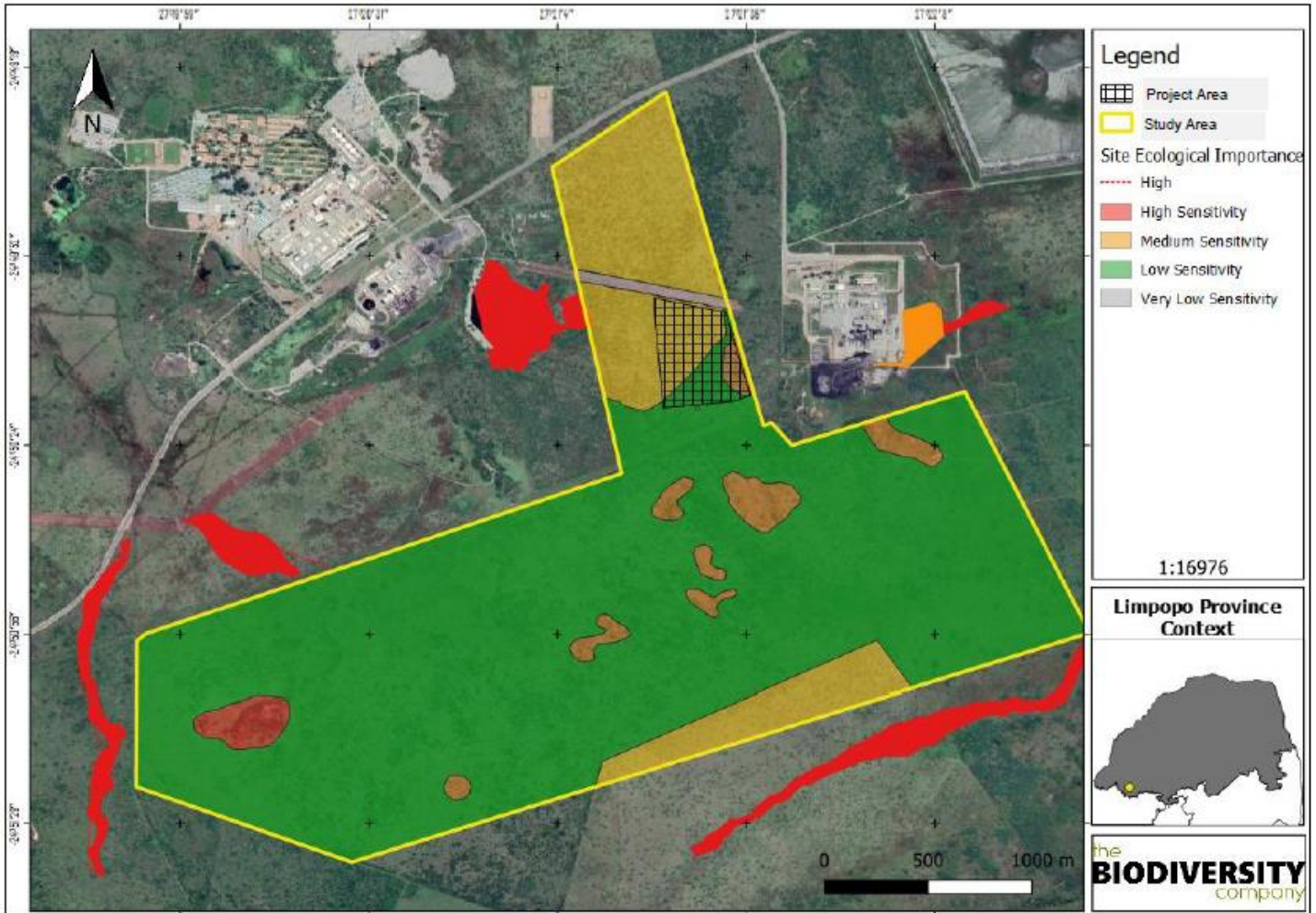
Medium sensitivity areas (within which development was considered acceptable) were the rocky outcrops and the degraded Bushveld. The disturbed Bushveld and transformed area were considered to be of low and very low sensitivity, respectively.

The ecological integrity, importance and functioning of these terrestrial biodiversity areas provide a variety of ecological services considered beneficial, with one key service being the maintenance of biodiversity. The preservation of these systems is the most important aspect to consider for the proposed project.

Any development within the high sensitivity areas must be avoided.

Development within the degraded Bushveld and rocky outcrops (both medium sensitivity) will lead to the direct destruction and loss of functional habitats, and the faunal species that are expected to utilise this habitat. Thus, if these areas are not maintained in a natural or near natural state, destroyed or fragmented, then meeting targets for biodiversity features will not be achieved. Therefore, the mitigation measures, management and associated monitoring regarding the expected impacts will be the most important factor of this project and must be considered by the issuing authority.

As is evident from **Figure 6** below, the project area is within areas of moderate and low sensitivity.



**Figure 6:** Sensitivity map for the broader study area and project area

### 2.3.2. Description of Impacts on Biodiversity

Overall, no significant terrestrial biodiversity fatal flaws were identified within the BWIA. The most significant potential impacts expected to occur due to the project include:

- » Destruction, fragmentation and degradation of habitats and ecosystem.
- » Spread and/or establishment of AIP.
- » Direct mortality of fauna.
- » Reduced dispersal/migration of fauna.
- » Environmental pollution due to water runoff, spills from vehicles and erosion.
- » Disruption/alteration of ecological lifecycles (breeding, migration, feeding) due to noise, dust and light pollution.
- » Staff and others interacting directly with fauna (potentially dangerous) or poaching of animals.

### 2.3.3. Impact tables summarising the significance of impacts on terrestrial biodiversity

**Direct Impacts**

**Construction Phase**

<b>Impact Nature: Loss of vegetation within project area</b>		
Destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Moderate (3)	Very low (1)
<b>Duration</b>	Permanent (5)	Short term (2)
<b>Magnitude</b>	Moderate (6)	Minor (2)
<b>Probability</b>	Highly probable (4)	Improbable (2)
<b>Significance</b>	<b>Medium (56)</b>	<b>Low (10)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Moderate	High
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	Yes, although this impact cannot be well mitigated as the loss of vegetation is unavoidable.	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>» Areas rated as High sensitivity in proximity to the project area should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent access to this area from construction workers and machinery.</li> <li>» Areas of indigenous vegetation, even secondary communities outside of the project area, should under no circumstances be fragmented or disturbed further than that proposed for the project. Clearing of vegetation should be minimized and avoided where possible.</li> <li>» Where possible, existing access routes and walking paths must be used.</li> <li>» All laydown areas, chemical toilets etc. should be restricted to very low/ low sensitivity areas. Any materials may not be stored for extended periods and must be removed from the project area once the construction/closure phase has been concluded. No storage of vehicles or equipment will be allowed outside of the designated project area.</li> <li>» A hydrocarbon spill management plan must be put in place, to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment may occur on site unless necessary. All contaminated soil / yard stone shall be treated <i>in situ</i> or removed; and placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.</li> <li>» It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species, whether indigenous or exotic, should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.</li> <li>» A fire management plan needs to be compiled and implemented to restrict the impact fire might have on the surrounding areas.</li> <li>» Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis, to prevent rodents and pests entering the site. <ul style="list-style-type: none"> <li>* Refuse bins will be emptied and secured;</li> <li>* Temporary storage of domestic waste shall be in covered waste skips; and</li> <li>* Maximum domestic waste storage period will be 10 days.</li> </ul> </li> <li>» Toilets at the recommended health and safety standards must be provided. These should be emptied twice a day, to prevent staff from using the surrounding vegetation.</li> <li>» The contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility. Under no circumstances may domestic waste be burned on site.</li> </ul>		



- » Suitable temporary solid waste facilities are to be incorporated into the design to prevent unsanitary conditions. These are to be weekly cleared and waste collected by the local waste management department. Personnel and contractors must be encouraged to recycle.
- » All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area, to inform contractors and site staff of the presence of Red / Orange List species; their identification, conservation status and importance, biology, habitat requirements; and management requirements stated in the EA and EMP.
- » Speed limits must be put in place to reduce erosion.
- » A stormwater management plan must be compiled and implemented.

**Residual Impacts:**

- » The loss of currently intact vegetation is an unavoidable consequence of the project and cannot be entirely mitigated. The residual impact would however be low.

**Impact Nature: Introduction of alien species, especially plants**

Degradation and loss of surrounding natural vegetation

	Without mitigation	With mitigation
<b>Extent</b>	High (4)	Low (2)
<b>Duration</b>	Long term (4)	Short term (2)
<b>Magnitude</b>	Moderate (6)	Minor (2)
<b>Probability</b>	Highly probable (4)	Improbable (2)
<b>Significance</b>	<b>Medium (56)</b>	<b>Low (12)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Moderate	High
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	Yes	

**Mitigation:**

- » Compilation of and implementation of an AIP management plan must be undertaken.
- » The project area of the construction should be kept to a minimum. The project area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas.
- » Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis, to prevent rodents and pests entering the site.
- » A pest control plan must be put in place and implemented; it is imperative that poisons not be used due to the likely presence of SCCs.
- » Construction areas within the project area should be kept to a minimum. It must be clearly demarcated, to avoid unnecessary disturbances to adjacent areas.

**Residual Impacts:**

- » Long term broad scale AIP infestation if not mitigated.

**Impact Nature: Destruction of protected plant species**

Construction activity will likely lead to direct loss of protected tree species

	Without mitigation	With mitigation
<b>Extent</b>	Low (2)	Very low (1)
<b>Duration</b>	Permanent (5)	Short term (2)
<b>Magnitude</b>	Moderate (6)	Minor (2)
<b>Probability</b>	Highly probable (4)	Improbable (2)
<b>Significance</b>	<b>Medium (52)</b>	<b>Low (10)</b>
<b>Status (positive or negative)</b>	Negative	Negative

<b>Reversibility</b>	Moderate	High
<b>Irreplaceable loss of resources?</b>	Yes	No
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>» Areas rated as High sensitivity in proximity to the project area should be declared as 'no-go' areas during the project's life, and all efforts must be made to prevent access to this area from construction workers, machinery.</li> <li>» Areas of indigenous vegetation, even secondary communities outside of the direct project area, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible.</li> <li>» Where possible, existing access routes and walking paths must be used.</li> <li>» All laydown areas, chemical toilets etc. should be restricted to very low/ low sensitivity areas. Any materials may not be stored for extended periods and must be removed from the project area once the construction/closure phase has been concluded. No storage of vehicles or equipment will be allowed outside of the designated project areas.</li> <li>» Areas that are denuded during construction need to be re-vegetated with indigenous vegetation, to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by AIPs.</li> <li>» Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion.</li> <li>» A hydrocarbon spill management plan must be put in place, to ensure that, should there be any chemical spill, it does not run into the surrounding areas. The contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when unused. No servicing of equipment may occur on site, unless necessary. All contaminated soil / yard stone shall be treated <i>in situ</i> or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) to prevent them leaking and entering the environment.</li> <li>» It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species, whether indigenous or exotic, should be brought into/taken from the project area, to prevent the spread of AIPs or the illegal collection of plants.</li> <li>» A fire management plan needs to be compiled and implemented, to restrict the impact fire might have on the surrounding areas.</li> <li>» All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area, to inform contractors and site staff of the presence of Red / Orange List species; their identification, conservation status and importance; biology, and habitat requirements; and management requirements in the EA and EMPr.</li> </ul>		
<b>Residual Impacts:</b>		
<ul style="list-style-type: none"> <li>» Loss of protected plants.</li> </ul>		

<b>Impact Nature: Displacement of faunal community due to habitat loss, direct mortalities and disturbance</b>		
Construction activity will likely lead to direct mortality of fauna due to earthworks, vehicle collisions, accidental hazardous chemical spills and persecution. Disturbance due to dust and noise pollution and vibration may disrupt behaviour.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Moderate (3)	Very low (1)
<b>Duration</b>	Short term (2)	Very short term (1)
<b>Magnitude</b>	Moderate (6)	Minor (2)
<b>Probability</b>	Highly probable (4)	Improbable (2)
<b>Significance</b>	<b>Medium (44)</b>	<b>Low (8)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Moderate	High
<b>Irreplaceable loss of resources?</b>	No	No

<b>Can impacts be mitigated?</b>	Yes, to some extent. Noise and disturbance cannot be well mitigated, impacts on fauna due to human presence such as vehicle collisions, poaching, and persecution can be mitigated.
<b>Mitigation:</b>	
<ul style="list-style-type: none"> <li>» The project area must be specifically demarcated, to prevent movement of staff or any individual into the surrounding environments. Signs must be put up to enforce this.</li> <li>» Noise must be kept to an absolute minimum during the evenings and at night, to minimize all possible disturbances to amphibian species and nocturnal mammals.</li> <li>» No trapping, killing, or poisoning of any wildlife is to be allowed. Signs must be put up to enforce this.</li> <li>» Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided; and sodium vapor (green/red) lights used wherever possible.</li> <li>» All construction motor vehicle operators should undergo an environmental induction, including instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced, to ensure that road killings and erosion is limited.</li> <li>» Schedule activities during least sensitive periods, to avoid migration, nesting, and breeding seasons.</li> <li>» Any excavations or holes must be conducted in a progressive manner. Should the holes/excavations stay open overnight, they must be covered temporarily to ensure no small fauna species fall in.</li> <li>» A qualified ECO must be on site when construction begins. The area must be walked through prior to construction, to ensure no faunal species remain in the habitat and get killed. Should animals not move out of the area on their own, relevant specialists must be contacted to advise on how the species can be relocated.</li> <li>» Dust-reducing mitigation measures must be put in place and strictly adhered to. This includes wetting of exposed soft soil surfaces. No non environmentally friendly suppressants may be used, as this could result in pollution of water sources.</li> <li>» All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area, to inform contractors and site staff of the presence of Red / Orange List species; their identification, conservation status and importance; and biology, habitat requirements and management requirements in the EA and EMP.</li> <li>» Reduce the dust generated by the listed activities, especially the earth moving machinery, through wetting the soil surface and putting up signs to enforce speed limit and speed bumps built to force slow speeds. Signs must be put up to enforce this.</li> </ul>	
<b>Residual Impacts:</b>	
<ul style="list-style-type: none"> <li>» It is probable that some individuals of susceptible species will be lost to construction-related activities, despite mitigation. However, this is not likely to impact the viability of the local population of any fauna species.</li> </ul>	

## Operational Phase

<b>Impact Nature: Continued fragmentation and degradation of habitats and ecosystems</b>		
Disturbance created during the construction phase will leave the project area vulnerable to AIP encroachment.		
	Without Mitigation	With Mitigation
<b>Extent</b>	Low (2)	Low (2)
<b>Duration</b>	Permanent (5)	Very short term (1)
<b>Magnitude</b>	High (8)	Minor (2)
<b>Probability</b>	Highly probable (4)	Improbable (2)

<b>Significance</b>	<b>Medium (60)</b>	<b>Low (10)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Moderate	High
<b>Irreplaceable loss of resources?</b>	Yes	No
<b>Can impacts be mitigated?</b>	Yes, with proper management and avoidance, this impact can be mitigated to a low level.	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>» Stormwater run-off and discharge water quality monitoring must be undertaken.</li> <li>» It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species, whether indigenous or exotic, should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.</li> <li>» A fire management plan needs to be compiled and implemented, to restrict the impact fire might have on the surrounding areas.</li> <li>» Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis, to prevent rodents and pests entering the site.</li> <li>» Refuse bins will be emptied and secured.</li> <li>» Temporary storage of domestic waste shall be in covered waste skips.</li> <li>» Maximum domestic waste storage period will be 10 days.</li> <li>» Toilets at the recommended Health and Safety standards must be provided. These should be emptied twice a day, to prevent staff from using the surrounding vegetation.</li> <li>» The contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility. Under no circumstances may domestic waste be burned on site.</li> <li>» All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area, to inform contractors and site staff of the presence of Red / Orange List species; their identification, conservation status and importance; and biology, habitat requirements and management requirements in the EA and EMPr.</li> <li>» Speed limits must be put in place to reduce erosion.</li> <li>» A stormwater management plan must be compiled and implemented.</li> </ul>		
<b>Residual Impacts:</b>		
<ul style="list-style-type: none"> <li>» There is still the potential for erosion and AIP encroachment even with the implementation of control measures but would have a low impact.</li> </ul>		

<b>Impact Nature: Spread of alien and/or invasive species</b>		
Degradation and loss of surrounding natural vegetation		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	High (4)	Low (2)
<b>Duration</b>	Long term (4)	Short term (2)
<b>Magnitude</b>	Moderate (6)	Minor (2)
<b>Probability</b>	Highly probable (4)	Improbable (2)
<b>Significance</b>	<b>Medium (56)</b>	<b>Low (12)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Moderate	High
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>» Compilation of and implementation of an AIP management plan must be undertaken.</li> </ul>		



- » Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis, to prevent rodents and pests entering the site.
- » A pest control plan must be put in place and implemented; it is imperative that poisons not be used due to the likely presence of SCCs.

**Residual Impacts:**

- » Long term broad-scale AIP infestation if not mitigated.

**Impact Nature: Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration)**

The operation and maintenance of the project may lead to disturbance or persecution of fauna in the vicinity of the project area.

	Without Mitigation	With Mitigation
<b>Extent</b>	Low (2)	Very low (1)
<b>Duration</b>	Long term (4)	Short term (2)
<b>Magnitude</b>	High (8)	Minor (2)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Medium (42)</b>	<b>Low (10)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Moderate	High
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	Yes	

**Mitigation:**

- » The project area must be specifically demarcated, to prevent movement of staff or any individual into the surrounding environments. Signs must be put up to enforce this.
- » Noise must be kept to an absolute minimum during the evenings and at night, to minimize all possible disturbances to amphibian species and nocturnal mammals.
- » No trapping, killing, or poisoning of any wildlife is to be allowed. Signs must be put up to enforce this.
- » Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible.
- » All maintenance motor vehicle operators should undergo an environmental induction, including instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced, to ensure that road killings and erosion is limited.
- » Schedule maintenance during least sensitive periods, to avoid migration, nesting, and breeding seasons.
- » All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area, to inform contractors and site staff of the presence of Red / Orange List species; their identification, conservation status and importance; and biology, habitat requirements and management requirements of the EA and EMPr.

**Residual Impacts:**

- » Disturbance from maintenance activities will occur albeit at a low and infrequent level.

**Indirect Impacts**

No impacts anticipated.

### **2.3.4. Implications for Project Implementation**

The main expected impacts of the project will include the following:

- » Habitat loss and fragmentation.
- » Degradation of surrounding habitat.
- » Disturbance and displacement caused during the construction and maintenance phases.
- » Direct mortality during the construction phase.

Mitigation measures provided in preceding subsection can be implemented, to reduce the significance of the risk, but there is still a possibility of impacts. Considering that this area that has been identified as being of significance for biodiversity maintenance and ecological processes (ESAs), development may proceed but with caution and only with the implementation of mitigation measures. No fatal flaws are evident for the proposed project. It is the opinion of the specialist that the project may be favourably considered, on condition that all prescribed mitigation measures and supporting recommendations are implemented.

## **2.4. Assessment of Impacts on Wetlands**

The impacts on freshwater features associated with the project was assessed, to ascertain the significance of potential impacts on the key drivers and receptors of these freshwater features. Potential impacts, the relative significance of the impacts and the recommended mitigation measures are summarised below (refer to **Appendix D1** for more details).

### **2.4.1. Results of the Wetland Impact Assessment**

A total of six (6) water resources were identified and delineated within the 500m regulated area surrounding the study area (refer to **Figure 7**), four (4) of which are relevant to the project area.

These comprised both natural and artificial systems, with the artificial systems comprising of an impoundment, a dam and a drainage feature associated with the smelter. Of the four (4) water resources relevant to the project area, only one is classified as a natural system, namely HGM3, which is a seepage wetland.

A portion/segment of the seepage wetland (HGM3) encroaches into the study area, but not within the project area. This wetland unit is situated approximately 300m from the project area. Overall, HGM 3 scored Intermediate in terms of its wetland ecosystem services and is considered relatively important for regulating and supporting benefits. The wetland is considered highly important in terms of its direct provisioning of harvestable resources and cultivated foods for humans, as the systems are actively cultivated. The integrity (or health) for HGM 3 was rated as being in a Moderately Modified state (class: C). The ecological importance of HGM3 was determined to be Moderate.

In addition to the seepage wetland, two (2) other natural wetland systems were identified in the 500m regulated area surrounding the study area, which are not relevant to the project area, namely, a channelled valley bottom wetland (HGM1) and an unchanneled valley bottom wetland (HGM2). HGMs 1 and 2 scored Moderately High in terms of their wetland ecosystem services. They are considered relatively important for regulating and supporting ecological benefits. The most benefits are associated with HGM 2. These wetlands are also considered highly important in terms of their direct provisioning of harvestable resources and cultivated

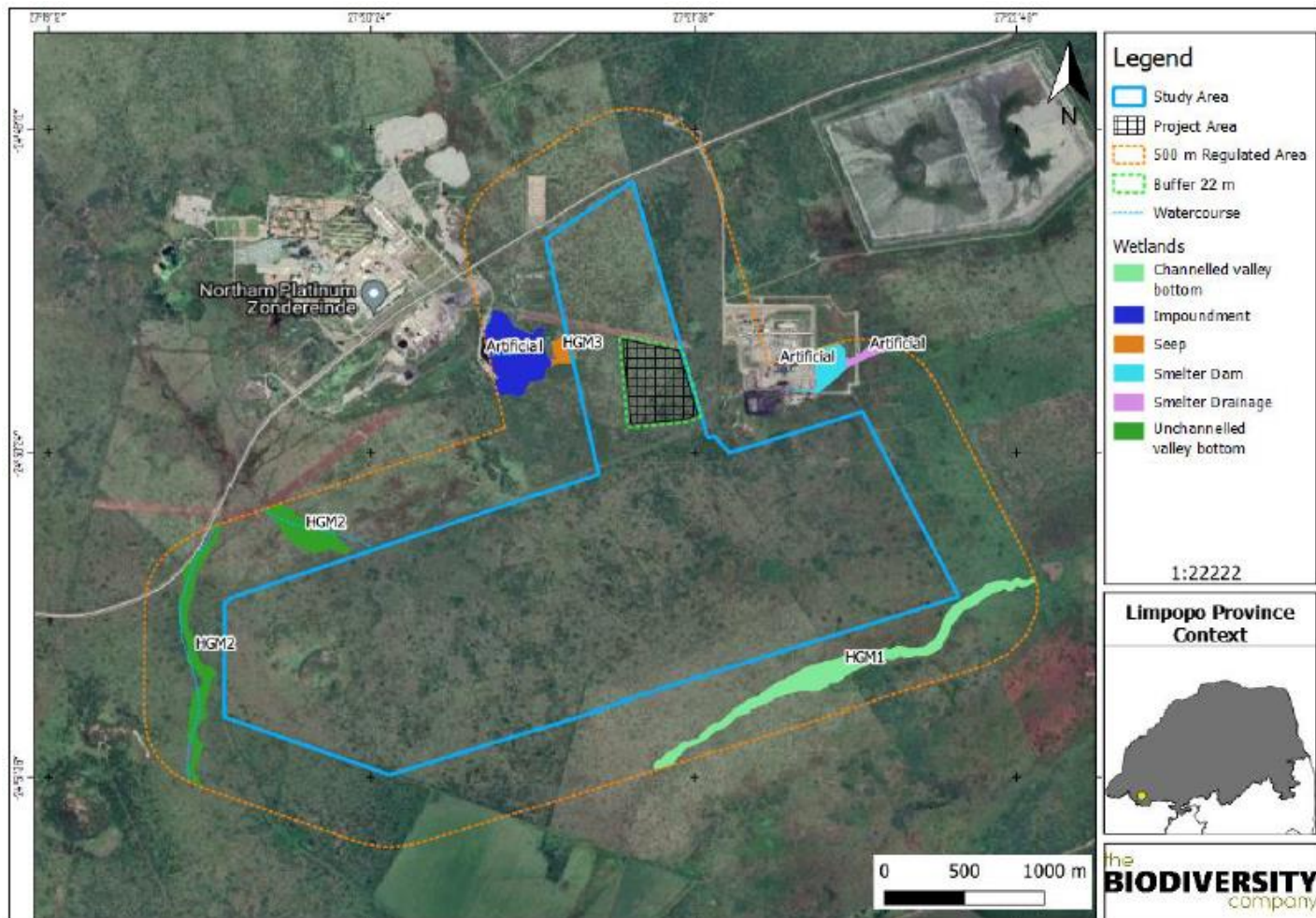
foods for humans, as the systems are actively cultivated. The integrity (or health) for HGM 1 and 2 was rated as being in a Largely Natural state (class: B). The unchanneled valley bottom is classified as Vulnerable.

The Ecological Importance and Sensitivity (EIS) of the units was determined to be Very High and High for the HGM 1 and HGM 2 and HGM 3, respectively.

A 22m buffer was recommended around the wetland units. All identified wetland HGM units were classified as having a High sensitivity, while their associated 22m buffers were assigned a Medium sensitivity.

A risk assessment was conducted, in accordance with the requirements of GN 509, published in the Government Gazette (no. 40229) under Section 39 of the NWA in August 2016. The GN 509 process provides an allowance to apply for a WUL for Section 21(c) & (i) under a GA, as opposed to a full WULA. The results of the risk assessment indicate that high risks are not applicable, as the wetlands will not be directly impacted on by the proposed development. Medium risk refers to wetland areas that are either on the periphery of the infrastructure or at an indirect risk. Low risks are wetland systems beyond the project area that would be avoided, or wetland areas that could be avoided if feasible. The significance of all post-mitigation risks was determined to be low.

In terms of GN 509, owing to the expected post-mitigation Low risks, a GA is permissible for the development. Further to this, the seepage wetland is situated within the 500m regulated area of the project area.



**Figure 7:** Wetlands delineated within the 500m regulated area of the study area

#### 2.4.2. Description of Impacts on Wetlands

All wetland features and their associated buffer areas have been excluded from the project area and, as such, direct impacts during construction, operation and decommissioning are unlikely. However, there is a slight potential for indirect impacts, which may include:

- » Disturbance/degradation/loss to wetland soils or vegetation due to the construction of the solar facility.
- » Increased erosion and sedimentation.
- » Potential contamination of wetland with machine oils and construction materials.
- » Potential for increased stormwater runoff leading to increased erosion and sedimentation.
- » Potential for increased contaminants entering the wetland systems.
- » Potential loss or degradation of nearby wetlands through inappropriate closure.

### 2.4.3. Impact tables summarising the significance of impacts on terrestrial biodiversity

#### Direct Impacts

No impacts anticipated.

#### Indirect Impacts

#### Construction Phase

<b>Impact Nature: Wetland disturbance / loss</b>		
Direct disturbance / degradation / loss to wetland soils or vegetation due to the construction of the solar facility		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Low (2)	Very low (1)
<b>Duration</b>	Permanent (5)	Short term (2)
<b>Magnitude</b>	Low (4)	Minor (2)
<b>Probability</b>	Highly probable (4)	Improbable (2)
<b>Significance</b>	<b>Medium (44)</b>	<b>Low (10)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Moderate	High
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	Yes, avoidance of wetlands is possible.	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>» Clearly demarcate the construction footprint and restrict all construction activities to within the project area.</li> <li>» When clearing vegetation, allow for some vegetation cover as opposed to bare areas.</li> <li>» Minimize the disturbance footprint and the unnecessary clearing of vegetation outside of this area.</li> <li>» Use the wetland shapefiles to signpost the edge of the wetlands closest to site. Place the sign 25 m from the edge (this is the buffer zone). Label these areas as environmentally sensitive areas, keep out.</li> <li>» Educate staff and relevant contractors on the identified wetlands' location and importance, through toolbox talks and by including them in site inductions and the overall master plan.</li> <li>» All activities (including driving) must adhere to the 22 m buffer area.</li> <li>» Promptly remove / control all AIPs that may emerge during construction (i.e., weedy annuals and other alien forbs).</li> <li>» All alien vegetation along the transmission servitude should be managed in terms of the CARA Regulations.</li> <li>» Landscape and re-vegetate all denuded areas as soon as possible.</li> </ul>		
<b>Residual Impacts:</b>		
<ul style="list-style-type: none"> <li>» The loss of wetlands directly is unexpected, as no wetlands overlap with the project area. The residual impact would be low.</li> </ul>		

<b>Impact Nature: Water runoff from construction site</b>		
Increased erosion and sedimentation		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	High (4)	Low (2)
<b>Duration</b>	Long term (4)	Short term (2)
<b>Magnitude</b>	Moderate (6)	Minor (2)
<b>Probability</b>	Highly probable (4)	Improbable (2)
<b>Significance</b>	<b>Medium (56)</b>	<b>Low (12)</b>

<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Moderate	High
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>» Limit construction activities near (&lt; 50m) of HGM 3 to winter (as much as possible), when rain is least likely to wash concrete and sand into the wetland. Activities in black turf soils can become messy during the height of the rainy season and construction activities should be minimised during these times to avoid unnecessary soil disturbances.</li> <li>» Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash.</li> <li>» No activities are permitted within the wetland and associated buffer areas.</li> <li>» Landscape and re-vegetate all unnecessarily denuded areas as soon as possible.</li> </ul>		
<b>Residual Impacts:</b>		
<ul style="list-style-type: none"> <li>» Long-term broad scale erosion and sedimentation.</li> </ul>		

### Operational Phase

<b>Impact Nature: Hardened surfaces</b>		
Potential for increased stormwater runoff leading to increased erosion and sedimentation		
	Without Mitigation	With Mitigation
<b>Extent</b>	Low (2)	Low (2)
<b>Duration</b>	Permanent (5)	Very short term (1)
<b>Magnitude</b>	High (8)	Minor (2)
<b>Probability</b>	Highly probable (4)	Improbable (2)
<b>Significance</b>	<b>Medium (60)</b>	<b>Low (10)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Moderate	High
<b>Irreplaceable loss of resources?</b>	Yes	No
<b>Can impacts be mitigated?</b>	Yes, with proper management and avoidance, this impact can be mitigated to a low level.	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>» Design and implement an effective stormwater management plan.</li> <li>» Promote water infiltration into the ground beneath the solar panels.</li> <li>» Release only clean water into the environment.</li> <li>» Stormwater leaving the project area should not be concentrated in a single exit drain but spread across multiple drains around the area, each fitted with energy dissipaters (e.g., slabs of concrete with rocks cemented in).</li> <li>» Re-vegetate denuded areas as soon as possible.</li> <li>» Regularly clear drains.</li> <li>» Minimise the extent of concreted / paved / gravel areas.</li> <li>» A covering of soil and grass (regularly cut and maintained) below the solar panels is ideal for infiltration. If not feasible, then gravel is preferable over concrete or paving.</li> <li>» Avoid excessively compacting the ground beneath the solar panels.</li> </ul>		
<b>Residual Impacts:</b>		
<ul style="list-style-type: none"> <li>» Long-term broad scale erosion and sedimentation.</li> </ul>		

<b>Impact Nature: Contamination</b>		
Potential for increased contaminants entering the wetland systems		
	<b>Without mitigation</b>	<b>With mitigation</b>

<b>Extent</b>	High (4)	Low (2)
<b>Duration</b>	Long term (4)	Short term (2)
<b>Magnitude</b>	Moderate (6)	Minor (2)
<b>Probability</b>	Highly probable (4)	Improbable (2)
<b>Significance</b>	<b>Medium (56)</b>	<b>Low (12)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Moderate	High
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>		
» Where possible, minimise the use of surfactants to clean solar panels and herbicides to control vegetation beneath the panels. If surfactants and herbicides must be used, do so well prior to any significant predicted rainfall events.		
<b>Residual Impacts:</b>		
» Wetland deterioration over time.		

#### 2.4.4. Implications for Project Implementation

It is the opinion of the specialist that the project may be favourably considered, on condition that all prescribed mitigation measures and supporting recommendations are implemented.

In terms of Water Use Authorisation, owing to the expected post-mitigation Low risks, a GA is permissible for the development.

## 2.5. Assessment of Impacts on Avifauna

Potential impacts on avifauna and the relative significance of the impacts associated with the construction and operation of the project are summarised below (refer to **Appendix D2** for more details).

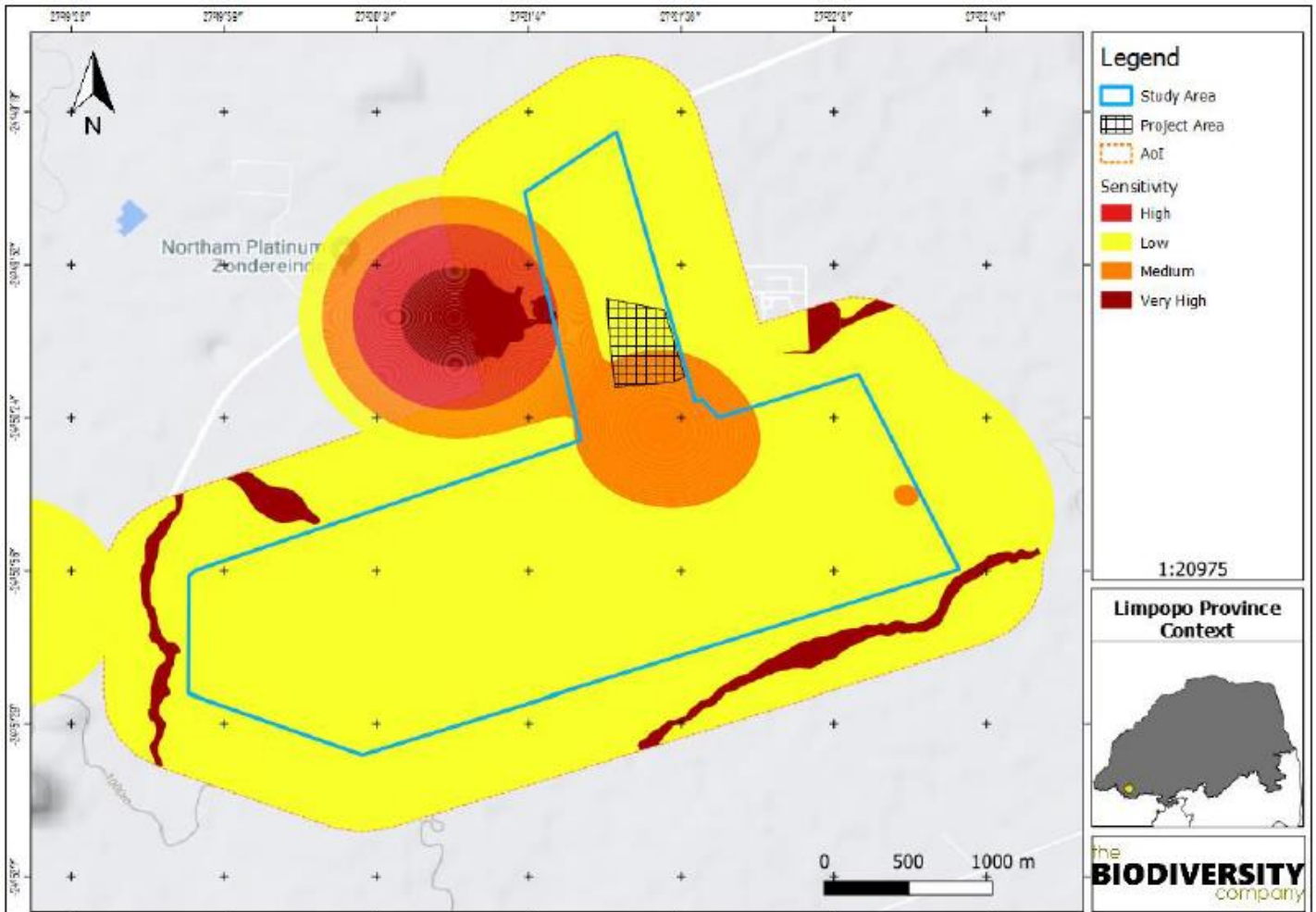
### 2.5.1. Results of the Avifauna Impact Assessment

On-site surveys were conducted from 29 – 31 March 2021, during which a total of 102 species were observed within the study area, through a combination of 38-point counts and incidental observations. Four main avifaunal habitats were identified within the area of influence, namely Flat Black Turf Thornveld, Rocky Black Turf Thornveld, Wetlands and Transformed Grassland. Of the four habitats, the highest avian diversity was observed in the Flat Black Turf Thornveld, followed by Wetland, Transformed Grassland and lastly Rocky Black Turf Thornveld. However, the high diversity in the Flat Black Turf Thornveld is likely an artefact of the inherently uneven sample sizes between the habitats due to the scarcity of rocky and wetland habitat on site. In reality, the Rocky Black Turf Thornveld and Wetland habitats are likely the most diverse and unique, due to their higher microhabitat diversity, structural complexity and resource diversity. The project area mainly comprises Flat Black Turf Thornveld.

Although no SCC were observed during the site visit, Cape Vulture was observed on a previous survey by the specialist in the vicinity and as many as 16 other regionally occurring species have the potential to occur on site. Of these, only Secretary Bird and Lanner Falcon are considered marginally likely to breed within the study area based on habitat suitability. In terms of avifaunal sensitivity (refer to **Figure 8**), all watercourses and modelled hotspots of collision prone species were designated as being of Very High sensitivity. The koppies in

the broader area were assigned a High sensitivity and the flat rocky outcrops a Medium Sensitivity. All other areas comprising mainly Flat Black Turf Thornveld were assigned a Low sensitivity.

The northern section of the project area was assigned a Low sensitivity, while the southern section was assigned a Medium sensitivity



**Figure 8:** Avifaunal sensitivity of the broader study area and project area for the Northam solar PV facility

### 2.5.2. Description of Impacts on Avifauna

The main impacts on avifauna identified through the avifaunal study include the following:

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



### 2.5.3. Impact tables summarising the significance of impacts on avifauna

#### Direct Impacts

#### Construction, Operation and Decommissioning Phases

The anticipated impacts during the construction, operation and decommissioning phases of the project are presented in the tables, which follow along with the prescribed mitigation and residual impact rating.

<b>Nature: Habitat loss (construction, operation, and decommissioning)</b>		
Habitat loss, degradation and fragmentation		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Moderate (3)	Low (2)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	High (8)	High (8)
<b>Probability</b>	Definite (5)	Highly probable (4)
<b>Significance</b>	<b>High (75)</b>	<b>Medium (36)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Moderate
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>» Avoid placing solar panels and associated infrastructure within the areas demarcated as being of High. Development in Moderate avifaunal sensitivity areas must be mitigated.</li> <li>» Rehabilitate all areas that were redundantly disturbed by the construction of the project immediately after construction.</li> <li>» Develop and implement an Alien and Invasive Plant Control Plan.</li> <li>» Develop, budget for, and implement a decommissioning and rehabilitation plan to re-instate the Black Turf Thornveld in the project area following decommissioning of the project.</li> <li>» Demarcate High sensitivity areas during construction and sign post them as “environmentally sensitive areas keep out”.</li> </ul>		
<b>Residual Impacts:</b>		
<ul style="list-style-type: none"> <li>» Despite implementation of the mitigation measures, the project will invariably result in the loss of a significant area of avifaunal habitat. This impact would permanently alter the natural thornveld habitat. However, it must be noted that this habitat has already been altered by intense livestock grazing.</li> </ul>		

<b>Nature: Infrastructure-induced mortality (operation)</b>		
Collision and electrocution		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Moderate (3)	Moderate (3)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	High (8)	Moderate (6)
<b>Probability</b>	Definite (5)	Highly probable (4)
<b>Significance</b>	<b>High (75)</b>	<b>Medium (52)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	High	High

<b>Irreplaceable loss of resources?</b>	Yes	No
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>» All exposed electrically charged components must be covered (insulated) to reduce electrocution risk.</li> <li>» All power cables within the project area should be thoroughly insulated and preferably buried in demarcated corridors.</li> <li>» White strips should be placed along the edges of the panels, to help reduce similarity to water and deter birds and insects following Horvath et al. (2010).</li> <li>» Install bird deterrent devices around panels to limit collision risk.</li> <li>» Fit the entire length of the power line between the plant and the main road, especially nearer the dam, wetlands and koppies within bird flappers to minimise collision risk.</li> </ul>		
<b>Residual Impacts:</b>		
<ul style="list-style-type: none"> <li>» Despite the implementation of the mitigation measures, there will still always be a collision and electrocution risk associated with a solar plant, however, it will be reduced to a Moderate significance. This is because the large dam will always attract flocks of waterfowl.</li> </ul>		

<b>Nature: Loss of key SCC avifauna sources</b>		
Direct loss of SCC nests		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Moderate (3)	Low (2)
<b>Duration</b>	Long term (4)	Short term (2)
<b>Magnitude</b>	Moderate (6)	Minor (2)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Medium (39)</b>	<b>Low (12)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Moderate	High
<b>Irreplaceable loss of resources?</b>	Yes	No
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>» If any overlooked nests of raptors or large terrestrial birds are found during construction, halt construction activities and call an avifaunal specialist immediately for advice on the way forward.</li> <li>» Avoid all areas of Very High and High avifaunal sensitivity.</li> </ul>		
<b>Residual Impacts:</b>		
<ul style="list-style-type: none"> <li>» No residual impact anticipated, as no SCC nests were encountered within the project area.</li> </ul>		

<b>Nature: Sensory disturbance</b>		
Sensory disturbance and extirpation of SCC		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Moderate (3)	Low (2)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Moderate (6)	Low (4)
<b>Probability</b>	Highly probable (4)	Improbable (2)
<b>Significance</b>	<b>Medium (52)</b>	<b>Low (20)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Moderate	Moderate
<b>Irreplaceable loss of resources?</b>	No	No

<b>Can impacts be mitigated?</b>	Yes
<b>Mitigation:</b>	
<ul style="list-style-type: none"> <li>» Attempt as far as possible to conduct most of the high intensity construction activities during winter, to minimize disturbance of avifauna during sensitive life stages (such as lekking, courting, nesting and fledging).</li> <li>» Keep lighting to a minimum and fit external lighting with downward facing hoods.</li> <li>» Demarcate natural areas beyond the surface infrastructure footprint and restrict access of personnel into these areas, through education and signposting.</li> <li>» All construction and maintenance motor vehicle operators must undergo an environmental induction, including instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife.</li> <li>» Speed limits must be enforced, to ensure that road killings and erosion is limited.</li> <li>» Schedule activities and operations during least sensitive periods, to avoid migration, nesting and breeding seasons (July-September).</li> </ul>	
<b>Residual Impacts:</b>	
<ul style="list-style-type: none"> <li>» Although dust, noise and human activity during construction is unavoidable, much can be done to reduce the effect of these sensory disturbance impacts on avifauna through temporal avoidance strategies, by simply avoiding intense construction activities during spring and summer. During operation, the residual impacts associated with sensory disturbance should drop to a Low significance.</li> </ul>	

**Indirect Impacts**

No impacts anticipated.

**2.5.4. Implications for Project Implementation**

The main expected impacts of the proposed infrastructure will include the following:

- » Habitat loss, degradation and fragmentation.
- » Collision and electrocution.
- » Direct loss of SCC nests.
- » Sensory disturbance and extirpation of SCC.
- » Effects on resident SCC breeding populations.

Mitigation measures as described in this report can be implemented to reduce the significance of the risk. However, there is still a possibility of impacts. Most importantly, project activities must avoid all areas of Very High, High and, where possible, Moderate avifaunal sensitivity. Despite the implementation of the mitigation measures, there will still always be a collision and electrocution risk associated with a solar plant. This is because the large dam will always attract flocks of waterfowl. Although dust, noise and human activity during construction is unavoidable, much can be done to reduce the effect of these sensory disturbance impacts on avifauna through temporal avoidance strategies, by simply avoiding intense construction activities during spring and summer. This impact will only slightly add (ca. 20 ha) to the cumulative loss of habitat in the core breeding range of the South African resident population of Yellow-throated Sandgrouse due to mining and industry related developments. This impact may be reversed if the project area is rehabilitated following decommissioning to re-instate open black turf thornveld.

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

## **2.6. Assessment of Impacts on Soils and Agricultural Potential**

Potential impacts on soil and agricultural potential associated with the project are summarised below (refer to **Appendix D3** for more details).

### **2.6.1. Results of the Soils and Agricultural Impact Assessment**

The soil and agricultural properties and sensitivities of the project were the subject of the SAA conducted. The project area falls within Land Type Ea70. The immediate area around the project area also consists of this land type, with Land Types Fb147 and Ae64 approximately 5km south-west and 5km south-east of the project area.

The SAA found that the project area comprises two natural soil forms, both with vertic topsoil, namely the Mkuze and Rustenburg soil forms. The Mkuze soil form makes up the northern and western sections of the project area (i.e., 11ha) and has a soil depth of 1.5m or deeper. The Rustenburg soil form makes up the southern and eastern section of the project area (i.e., 8.7ha) and ranges in depth from 0.7m to 1.5m. The largest portion of the project area (i.e., 11ha) has land with Moderate (Class 08) land capability, which is suitable for rainfed crop production. 8.7ha of the project area has land with Low – Moderate (Class 07) land capability; and 0.3ha of Very low (Class 02) land capability. Although the area with Moderate land capability has suitability for rainfed crop production, it was never previously used for grain crops production or pasture.

Approximately 11ha of the project area has Moderate agricultural sensitivity and 9ha has Low agricultural sensitivity (refer to **Figure 9**).



Figure 9: Sensitivity rating for the Northam solar PV facility project area

## 2.6.2. Description of Soils and Agricultural Impacts

The most significant impacts of the project on soil and agricultural productivity will occur during the construction phase when the vegetation is removed; and the soil surface is prepared for the delivery of materials and erection of the infrastructure. During the operational phase, the risk remains that soil will be polluted by the waste generated during the operational phase or in the case of a spill incident. During the decommissioning phase, soil will be prone to erosion when the infrastructure is removed from the soil surface.

## 2.6.3. Impact of clayish soil on underground cables and foundations

A detailed geotechnical assessment, including trial pits and Dynamic Cone Penetration (DCP) tests, was conducted at the project area to gain a better understanding of the impact that the ground conditions will have on plant foundations and electrical requirements. Based on the findings of the assessment, pre-drilled piles will be required to found the PV structures in the competent material below the clay at a depth of 1.6m to 2m. All cabling will be watertight with cable sleeves used where appropriate. These measures will ensure that impacts on the clayish soil present within the project area and surrounds on underground cabling and foundations are kept to a minimum.

## 2.6.4. Impact tables summarising the significance of impacts on soils and agriculture

### Direct Impacts

#### Construction Phase

<b>Nature: Soil erosion</b>		
All areas where vegetation is removed from the soil surface, in preparation for the infrastructure construction, will result in exposed soil surfaces prone to erosion. Both wind and water erosion are a risk, as the project area falls within a region that experiences thunderstorms in the summer months and sometimes strong winds during the dry winter months, especially August and September.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Medium-term (3)	Medium-term (3)
<b>Magnitude</b>	Moderate (6)	Low (4)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Medium (30)</b>	<b>Low (16)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Irreplaceable loss of resources?</b>	Yes	No
<b>Can impacts be mitigated?</b>	Yes	N/A
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>» Land clearance must only be undertaken immediately prior to construction activities and only within the project area.</li> <li>» Unnecessary land clearance must be avoided.</li> <li>» Level any remaining soil removed from excavation pits (where the PV modules will be mounted) that remained on the surface, instead of allowing small stockpiles of soil to remain.</li> <li>» Where possible, conduct the construction activities outside of the rainy season.</li> <li>» Stormwater channels must be designed to minimise soil erosion risk resulting from surface water runoff.</li> </ul>		

**Residual Impacts:**

- » The residual impact from the construction and operation of the project on the susceptibility to erosion is considered low.

**Nature: Soil Compaction**

The clearing and levelling of land for construction of the infrastructure will result in soil compaction. In the area where the access roads and substation will be constructed, topsoil will be removed; and the remaining soil material will be deliberately compacted, to ensure a stable surface prior to construction.

	Without mitigation	With mitigation
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Medium-term (3)	Medium-term (3)
<b>Magnitude</b>	Moderate (6)	Low (4)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Medium (30)</b>	<b>Low (16)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Irreplaceable loss of resources?</b>	Yes	No
<b>Can impacts be mitigated?</b>	Yes	N/A

**Mitigation:**

- » Vehicles and equipment must travel within demarcated areas and not outside of the construction footprint.
- » Unnecessary land clearance must be avoided.
- » Materials must be off-loaded and stored in designated laydown areas.
- » Where possible, conduct the construction activities outside of the rainy season.
- » Vehicles and equipment must park in designated parking areas.

**Residual Impacts:**

- » The residual impact from the construction and operation of the project on soil compaction is considered low.

**Nature: Soil pollution**

The following construction activities can result in the chemical pollution of the soil:

1. Petroleum hydrocarbon (present in oil and diesel) spills by machinery and vehicles during earthworks and the removal of vegetation as part of site preparation.
2. Spills from vehicles transporting workers, equipment, and construction material to and from the construction site.
3. The accidental spills from temporary chemical toilets used by construction workers.
4. The generation of domestic waste by construction workers.
5. Spills from fuel storage tanks during construction.
6. Pollution from concrete mixing.
7. Pollution from road-building materials.
8. Any construction material remaining within the construction area once construction is completed.

	Without mitigation	With mitigation
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Short-term (2)	Short-term (2)
<b>Magnitude</b>	Moderate (6)	Low (4)
<b>Probability</b>	Low (4)	Improbable (2)
<b>Significance</b>	<b>Medium (36)</b>	<b>Low (14)</b>
<b>Status (positive or negative)</b>	Negative	Negative

<b>Reversibility</b>	Low	Low
<b>Irreplaceable loss of resources?</b>	Yes	No
<b>Can impacts be mitigated?</b>	Yes	N/A
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>» Maintenance must be undertaken regularly on all vehicles and construction/maintenance machinery, to prevent hydrocarbon spills.</li> <li>» Any waste generated during construction must be stored into designated containers and removed from the site by the construction teams.</li> <li>» Any left-over construction materials must be removed from site.</li> <li>» The construction site must be monitored by the ECO, to detect any early signs of fuel and oil spills and waste dumping.</li> <li>» Ensure battery transport and installation by accredited staff / contractors.</li> <li>» Compile (and adhere to) a procedure for the safe handling of battery cells during transport and installation.</li> </ul>		
<b>Residual Impacts:</b>		
<ul style="list-style-type: none"> <li>» The residual impact from the construction and operation of the proposed project will be low to negligible.</li> </ul>		

## Operational Phase

<b>Nature: Soil erosion</b>		
The areas where vegetation was cleared during construction will remain at risk of soil erosion, especially during a rainfall event when runoff from the cleared surfaces will increase the risk of soil erosion in the areas directly surrounding the project infrastructure.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Medium-term (3)	Medium-term (3)
<b>Magnitude</b>	Moderate (6)	Low (4)
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Significance</b>	<b>Medium (30)</b>	<b>Low (16)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Irreplaceable loss of resources?</b>	Yes	No
<b>Can impacts be mitigated?</b>	Yes	N/A
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>» The area around the project area, including the internal access roads, must regularly be monitored to detect early signs of soil erosion onset.</li> <li>» If soil erosion is detected, the area must be stabilised by using geo-textiles and facilitated re-vegetation.</li> </ul>		
<b>Residual Impacts:</b>		
<ul style="list-style-type: none"> <li>» The residual impact from the operation of the solar PV facility on the susceptibility to erosion is considered low.</li> </ul>		

<b>Nature: Soil pollution</b>		
During the operational phase, potential spills and leaks from maintenance vehicles and equipment and waste generation on site, can result in soil pollution. Also, any spillages around the workshop area or damaged infrastructure, such as inverters and transformers, can be a source of soil pollution.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Short-term (2)	Short-term (2)
<b>Magnitude</b>	Moderate (6)	Low (4)
<b>Probability</b>	Low (4)	Improbable (2)



<b>Significance</b>	<b>Medium (36)</b>	<b>Low (14)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Irreplaceable loss of resources?</b>	Yes	No
<b>Can impacts be mitigated?</b>	Yes	N/A
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>» Maintenance must be undertaken regularly on all vehicles and maintenance machinery, to prevent hydrocarbon spills.</li> <li>» No domestic and other waste must be left at the site and must be transported with the maintenance vehicles to an authorised waste dumping area.</li> <li>» Regularly monitor areas alongside the roads, parking area and workshop for any signs of oil, grease and fuel spillage or the presence of waste.</li> </ul>		
<b>Residual Impacts:</b>		
<ul style="list-style-type: none"> <li>» The residual impact from the operation of the proposed project will be low to negligible.</li> </ul>		

### **Decommissioning Phase**

The decommissioning phase will have the same impacts as the construction phase i.e., soil erosion, soil compaction and soil pollution. It is anticipated that the risk of soil erosion will especially remain until the vegetation growth has re-established in the area where the project infrastructure will be decommissioned.

### **Indirect Impacts**

No impacts anticipated.

### **2.6.5. Implications for Project Implementation**

The soil forms present within the project area consist of vertic profiles with high clay content and shrink-swell properties, with a few rock outcrops visible on the surface in the south-eastern part. There is no livestock or game farming practiced on the land nor evidence of recent rainfed crop production. No irrigation infrastructure, such as centre pivots or drip irrigation, are present within the project area and irrigated agriculture is currently not practiced. The land capability of the project area is mainly Moderate (Class 08) for the deep Mkuze soils and Low-Moderate (Class 07) for the shallower Rustenburg soils. The rock outcrops have Very low (Class 02) land capability. The grazing capacity (according to DALRRD, 2018), is 7ha/LSU, indicating that the project area of 20ha has forage to feed between 2 and 3 head of cattle. The project area is not part of a larger farming unit, with either livestock and/or crop production, and will therefore not affect the viability of an established farming operation.

It is anticipated that the project's construction and operation will have impacts that range from medium to low. Through the consistent implementation of the recommended mitigation measures, most of the impacts can be reduced to low. Considering that the project infrastructure components will be placed close to each other and to existing mining infrastructure, such as the Smelter, reasonable measures have been taken to avoid or minimize fragmentation and disturbance of agricultural activities, provided that the mitigation measures provided are implemented.

It is the specialist's opinion that the proposed project be considered favourably, provided that the mitigation measures are followed to prevent soil erosion and soil pollution and minimise impacts on the veld quality in the project area. The project infrastructure should also remain within the project area that will be fenced off.

## **2.7. Assessment of Impacts on Heritage Resources**

Impacts on heritage resources may occur due to loss of archaeological and palaeontological resources during construction activities associated with the project. Potential impacts; the relative significance of the impacts; and the recommended mitigation measures are summarised below (refer to **Appendix D4**).

### **2.7.1. Results of the Heritage Impact Assessment**

#### Archaeology and Heritage Resources

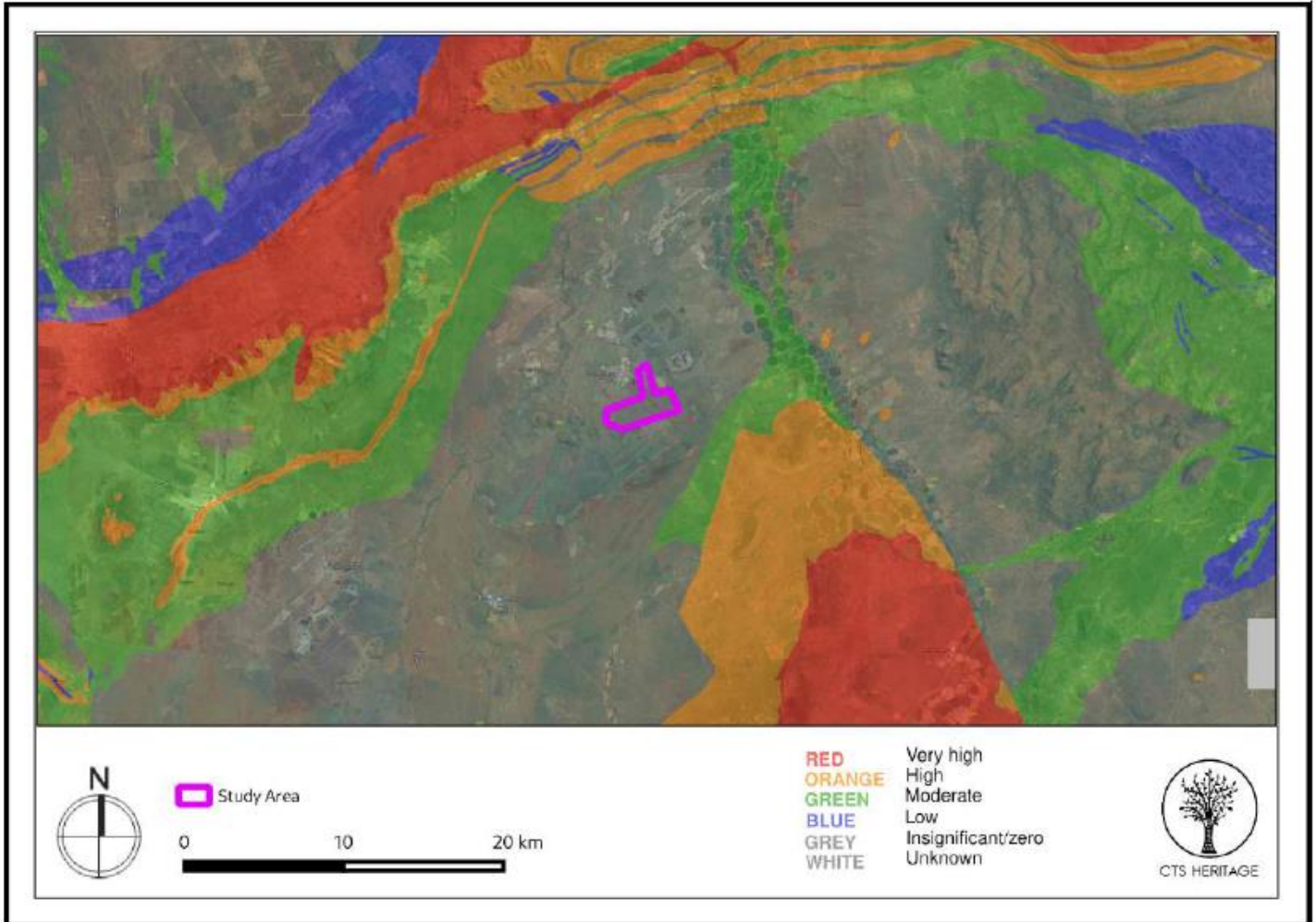
A survey of the broader study area was conducted on foot and by vehicle, with a high clearance to move through the tracks along the fence lines that are maintained as fire breaks. During the survey, no heritage sites of significance were identified within the project area.

Two main site complexes (stone walling), previously recorded by Van Vollenhoven (2013), were identified within the broader study area, namely, Northam Site 4 Complex and Northam Site 5 Complex, both of which have a high heritage significance and a heritage rating of IIIA. **Figure 10** provides a locality map of the heritage resources identified within the broader study area.



**Figure 10:** Map of heritage resources identified during the field assessment, relative to the broader study area  
*Palaeontology*

According to the SAHRIS Palaeosensitivity Map (**Figure 11**), the study area (including the project area) is underlain by sediments that have zero palaeontological sensitivity. As such, no palaeontological resources will be impacted by the project and no further specialist palaeontological assessment is recommended.



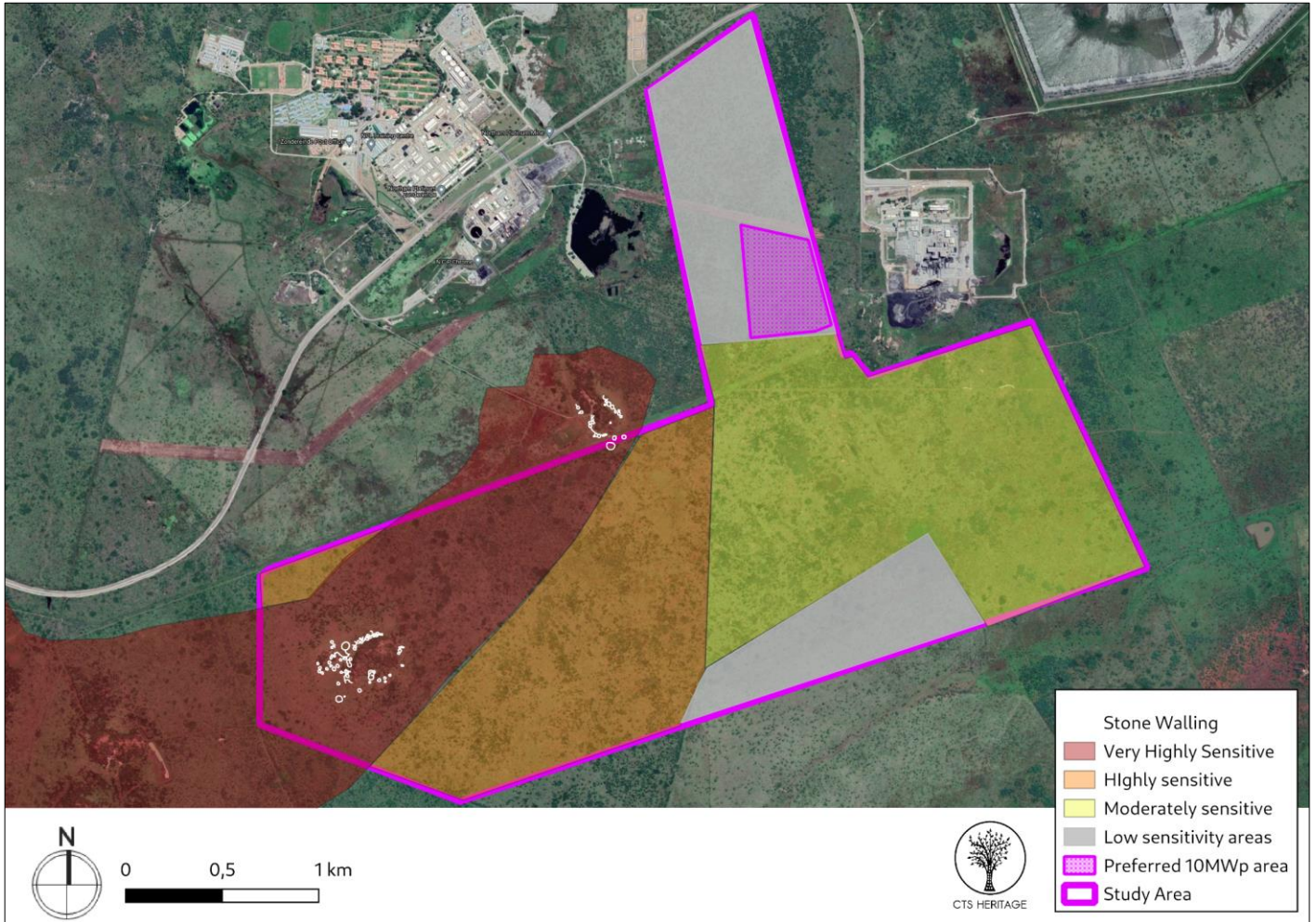
**Figure 12:** Palaeontological sensitivity of the area surrounding the broader study area

Zones of low to very high heritage sensitivity were identified within the broader study area (refer to **Figure 13**).

The project area is located within an area of low sensitivity.

Development of the project in the areas shaded in orange (high archaeological and cultural landscape sensitivity) is undesirable, as it would spread the development envelope of the industrial area much wider than it needs to be in the context of the high significance zone demarcated in red. The area shaded in red (very high archaeological and cultural landscape sensitivity) should be avoided entirely by the project, as the two Late Iron Age sites (Sites 4 and 5) lie within a stretch with archaeological material found in areas connecting these outcrops and associated archaeological exposures.





**Figure 13:** Map of heritage resources identified during the field assessment, relative to the project and study areas and associated archaeological sensitivity.

**2.7.2. Description of Impact on Heritage Resources**

Potential impacts to archaeological and palaeontological resources would occur during the construction phase, in the form of direct impacts.

**2.7.3. Impact tables summarising the significance of impacts on heritage resources**

**Direct Impacts**

**Construction Phase**

<b>Nature: It is possible that buried archaeological resources may be impacted in the project area</b>		
Two significant LIA sites that form part of a larger LIA complex are located within the broader study area but will not be impacted if the project is located in the project area.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Low (1)	Low (1)

<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	High (8)	Moderate (6)
<b>Probability</b>	Very improbable (1)	Very improbable (1)
<b>Significance</b>	<b>Low (11)</b>	<b>Low (11)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Irreplaceable loss of resources?</b>	Not likely	Not likely
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>» The project must be limited to the areas marked as low or moderate sensitivity and the areas marked as very high and high archaeological sensitivity must be avoided by all development activities.</li> <li>» Should any previously unrecorded archaeological resources or possible burials be identified during the construction activities, work must cease in the immediate vicinity of the find; and SAHRA must be contacted regarding an appropriate way forward.</li> </ul>		
<b>Residual Impacts:</b>		
» None		

<b>Nature: It is possible that buried palaeontological resources may be impacted by the project in the project area</b>		
According to the SAHRIS Palaeosensitivity Map, the project area proposed for development of the PV facility is underlain by sediments that have zero palaeontological sensitivity. As such, no palaeontological resources will be impacted by the project.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Extent</b>	Low (1)	Low (1)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Magnitude</b>	Low (1)	Low (1)
<b>Probability</b>	Very improbable (1)	Very improbable (1)
<b>Significance</b>	<b>Low (11)</b>	<b>Low (11)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Irreplaceable loss of resources?</b>	Not likely	Not likely
<b>Can impacts be mitigated?</b>	No	
<b>Mitigation:</b>		
» Should any previously unrecorded palaeontological resources be identified during construction activities, work must cease in the immediate vicinity of the find, and SAHRA must be contacted regarding an appropriate way forward.		
<b>Residual Impacts:</b>		
» None		

### **Indirect Impacts**

No impacts anticipated.

#### **2.7.4. Implications for Project Implementation**

The project area is identified as having low archaeological sensitivity. No impact to significant heritage resources is anticipated, provided that the project is located within the areas identified as having low or moderate archaeological sensitivity.

The field assessment of the broader study area undertaken to inform the placement of the PV facility has revealed that there is a large section of the broader study area that has significant archaeological resources, and, as such, a high archaeological sensitivity. Although these significant archaeological resources have been previously identified by Van Vollenhoven (2013) and Van der Walt (2019), little proactive conservation interventions seem to have taken place.

Provided that the project is within the areas identified as having low or moderate archaeological sensitivity, no impact to significant archaeological resources is anticipated. The palaeontological sensitivity of the broader study area is rated as very low and as such, no impacts to palaeontological heritage resources are anticipated.

There is no objection to the development of the project and its associated infrastructure on condition that:

- » The project is within the areas with low or moderate archaeological sensitivity.
- » The areas marked as having high archaeological sensitivity are avoided and no development activities associated with the project take place within these areas.
- » Should any previously unrecorded archaeological resources or possible burials be identified during the construction activities, work must cease in the immediate vicinity of the find; and SAHRA must be contacted regarding an appropriate way forward.

## **2.8. Assessment of Cumulative Impacts**

The project may have effects (positive and negative) on natural resources; the social environment; and people living in the project area. The preceding impact assessment sections have reported on the assessment of impacts associated with the project largely in isolation (from other similar developments).

This section assesses the potential for the impacts associated with the project to become more significant when considered in combination with other known or proposed solar power generation developments in the area. This assessment is based on information currently available and considers impacts from similar solar power generation developments in the vicinity of the project. The following potential cumulative impacts are considered on:

- » Ecology processes (including fauna and flora).
- » Avifauna.
- » Freshwater resources (i.e., wetlands).
- » Soil and agricultural potential.
- » Heritage resources (including archaeology and palaeontology).

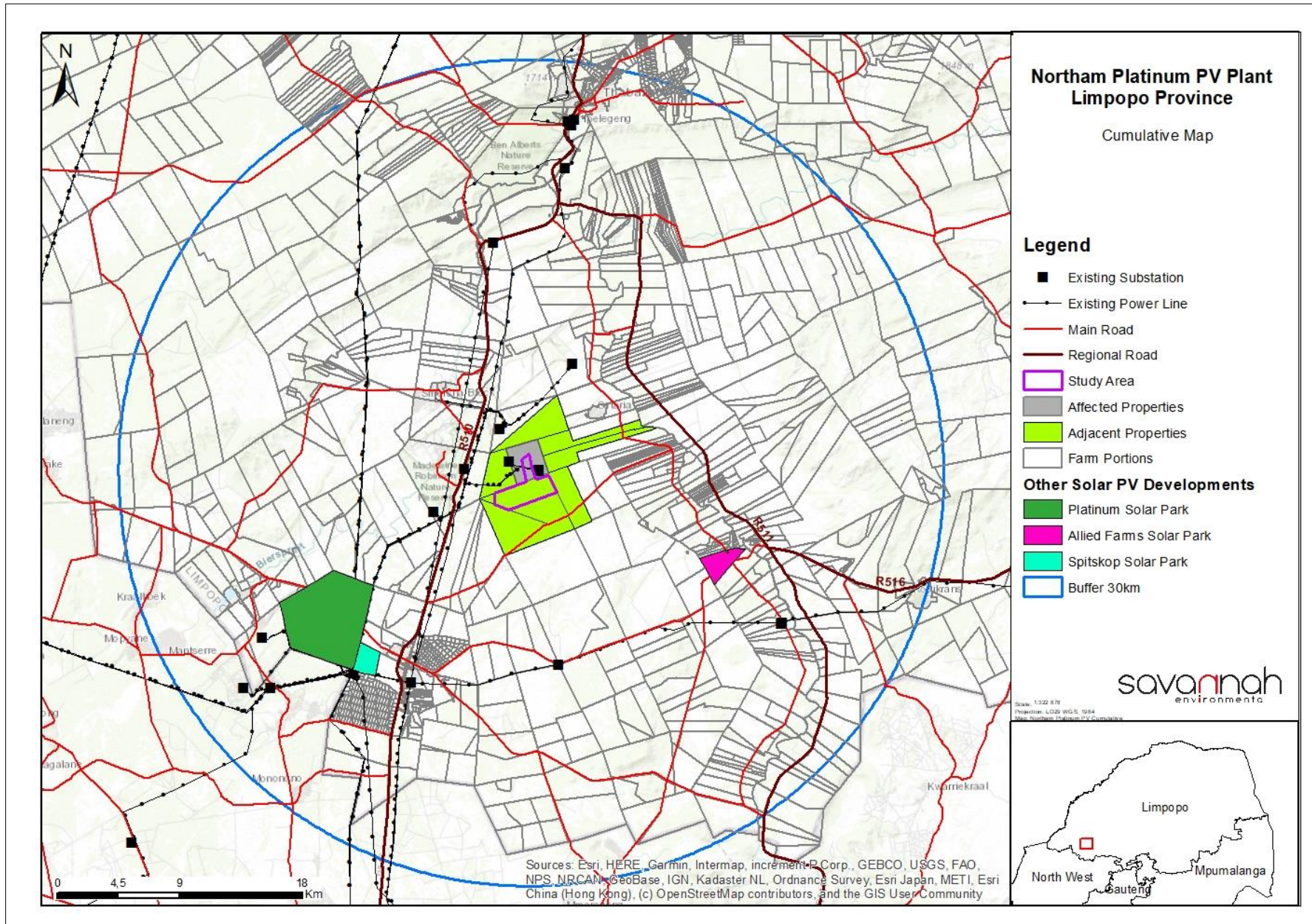
**Figure 14** indicates the location of the project in relation to all known solar power generation developments located within a radius of 30km. These developments were identified using DFFE screening tool report; and information available in the public domain at the time of this assessment.

It should be noted that not all the solar facilities presently under consideration by various developers will be built for operation. Not all proposed developments will be granted the relevant permits by the relevant authorities (DFFE, DOE, NERSA) due to the following reasons:

- » There may be limitations to the capacity of the existing or future Eskom grid.

- » Not all applications will receive a positive EA.
- » Where projects are to be developed as part of the national energy mix, stringent requirements must be met by applicants in terms of the REIPPP Programme and a highly competitive process that only selects the most competitive projects.
- » Not all proposed PV facilities will be able to reduce the associated negative impacts to acceptable levels or mitigate the impacts to acceptable levels (fatally flawed).
- » Not all proposed facilities will eventually be granted a generation license by NERSA and sign a Power Purchase Agreement with Eskom.
- » Not all developers will be successful in securing financial support to advance their projects further.





**Figure 14:** Cumulative map indicating the location of other solar energy developments within 30km of the study area

### 2.8.1. Cumulative Impact on Terrestrial Biodiversity

The following cumulative ecological impact was determined for the project:

<b>Impact Nature: Cumulative habitat loss within the region</b>		
The project will contribute to cumulative habitat loss within ESAs and thereby impact the ecological processes in the region.		
	<b>Overall impact of the proposed development considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Low (2)	Moderate (3)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Low (4)	Moderate (6)
<b>Probability</b>	Probable (3)	Highly probable (4)
<b>Significance</b>	<b>Medium (30)</b>	<b>Medium (52)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Moderate	Low
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated</b>	To some degree, but most of the impact results from the presence of the various facilities which cannot be well mitigated.	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>» Disturbance of sensitive habitats, such as the rocky koppie and rocky outcrops, within the broader study area should be avoided, if possible. or disturbance must be minimized and mitigated.</li> <li>» Ensure that a rehabilitation plan and AIP management plan be compiled for each development and are effectively implemented.</li> </ul>		

### 2.8.2. Cumulative Impact on Wetlands

Cumulative impacts on wetlands are assessed in context of the extent of the project area; other developments in the area; and general wetland loss and transformation resulting from other activities in the area. The expected post-mitigation risk significance is expected to be low; and the overall cumulative impact is therefore expected to be low.

### 2.8.3. Cumulative Impact on Avifauna

Only one potential cumulative impact on avifauna was identified during study, namely, the cumulative loss of SCC of avifauna in the area, particularly Yellow-throated Sandgrouse. This impact may be reversed if the project area is rehabilitated following decommissioning to reinstate open black turf thornveld.

<b>Nature: Cumulative loss of Species of Conservation Concern (SCC) avifauna in the area</b>		
Effects on resident SCC breeding populations		
	<b>Overall impact of the proposed development considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Low (2)	Very low (1)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Medium (30)</b>	<b>Low (27)</b>

<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Moderate	High
<b>Irreplaceable loss of resources?</b>	Yes	No
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>		
» Rehabilitate or manage all non-development areas within the project area, to support a far more open black turf thornveld through appropriate fire and grazing veld management strategies.		
» Rehabilitate the project area following decommissioning to re-instate open black turf thornveld.		

#### 2.8.4. Cumulative Impact on Soils and Agricultural Potential

The project will be located within a 30km radius of three solar developments that are already granted EA. The cumulative impacts of the project in addition to the authorised solar developments are rated and discussed below:

<b>Nature: Increase in areas susceptible to soil erosion</b>		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Local (1)	Regional (2)
<b>Duration</b>	Medium-term (3)	Medium-term (3)
<b>Magnitude</b>	Moderate (6)	Moderate (6)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Medium (30)</b>	<b>Medium (33)</b>
<b>Status (positive/negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	Yes	No
<b>Mitigation:</b>		
» Each of the projects should adhere to the highest standards for soil erosion prevention and management.		

<b>Nature: Increase in areas susceptible to soil compaction</b>		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Local (1)	Regional (2)
<b>Duration</b>	Medium-term (3)	Medium-term (3)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Improbable (2)	Probable (3)
<b>Significance</b>	<b>Low (16)</b>	<b>Low (27)</b>
<b>Status (positive/negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	Yes	Yes
<b>Mitigation:</b>		
» Each of the projects should adhere to the highest standards for soil compaction prevention and management.		

<b>Nature: Increase in areas susceptible to soil pollution</b>		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Local (1)	Regional (2)
<b>Duration</b>	Short-term (2)	Short-term (2)
<b>Magnitude</b>	Moderate (6)	Moderate (6)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Low (27)</b>	<b>Medium (30)</b>
<b>Status (positive/negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	Yes	No
<b>Mitigation:</b>		
» Each of the projects should adhere to the highest standards for soil pollution prevention and management.		

### 2.8.5. Cumulative Impact on Heritage Resources (including archaeology and palaeontology)

The study area has been previously impacted by the development of the Zondereinde Mine. As such, it is not anticipated that the project will have a negative cumulative impact on the broader landscape, which is already dominated by mining infrastructure and agriculture. In terms of renewable development activities which can have an industrial feel, it is recommended that such infrastructure be grouped or clustered to avoid sprawl across natural landscapes.

New developments proposed within the study area have the potential to have a negative impact on the significant archaeological resources identified within this area. These cumulative impacts can be mitigated through the development of a Conservation Plan for the Late Iron Age (LIA) site complex, which will outline the relevant roles and responsibilities of SAHRA and the landowners in terms of ongoing management and conservation of these significant sites.

<b>Nature: Cumulative Impact to the sense of place and known archaeological resources</b>		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Low (1)	Low (1)
<b>Duration</b>	Medium (3)	High (4)
<b>Magnitude</b>	Low (4)	Medium (5)
<b>Probability</b>	Low (2)	High (3)
<b>Significance</b>	<b>Low (16)</b>	<b>Medium (30)</b>
<b>Status (positive or negative)</b>	Neutral	Neutral
<b>Reversibility</b>	High	Low
<b>Irreplaceable loss of resources?</b>	Unlikely	Possible
<b>Can impacts be mitigated?</b>	N/A	
<b>Mitigation:</b>		
» A Conservation Plan is developed for the LIA site complex which will outline the relevant roles and responsibilities of SAHRA and the landowners in terms of ongoing management and conservation of these significant sites. This Conservation Plan must be appended to a Heritage Agreement signed between the landowners and SAHRA in terms of section 42 of the NHRA.		

### 2.8.6. Conclusions Regarding Cumulative Impacts

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

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

A summary of the cumulative impacts is included in **Table 4** below.

**Table 4:** Summary of the cumulative impact significance of the Northam solar PV facility

Specialist assessment	Overall significance of impact of the proposed project considered in isolation	Cumulative significance of impact of the project and other projects in the area
Biodiversity (including flora and fauna)	Medium	Medium
Wetlands	Low	Low
Avifauna	Medium	Low
Agriculture potential and soil	Medium	Medium
	Low	Low
	Low	Medium
Heritage	Low	Medium

### 3. ENVIRONMENTAL IMPACT STATEMENT

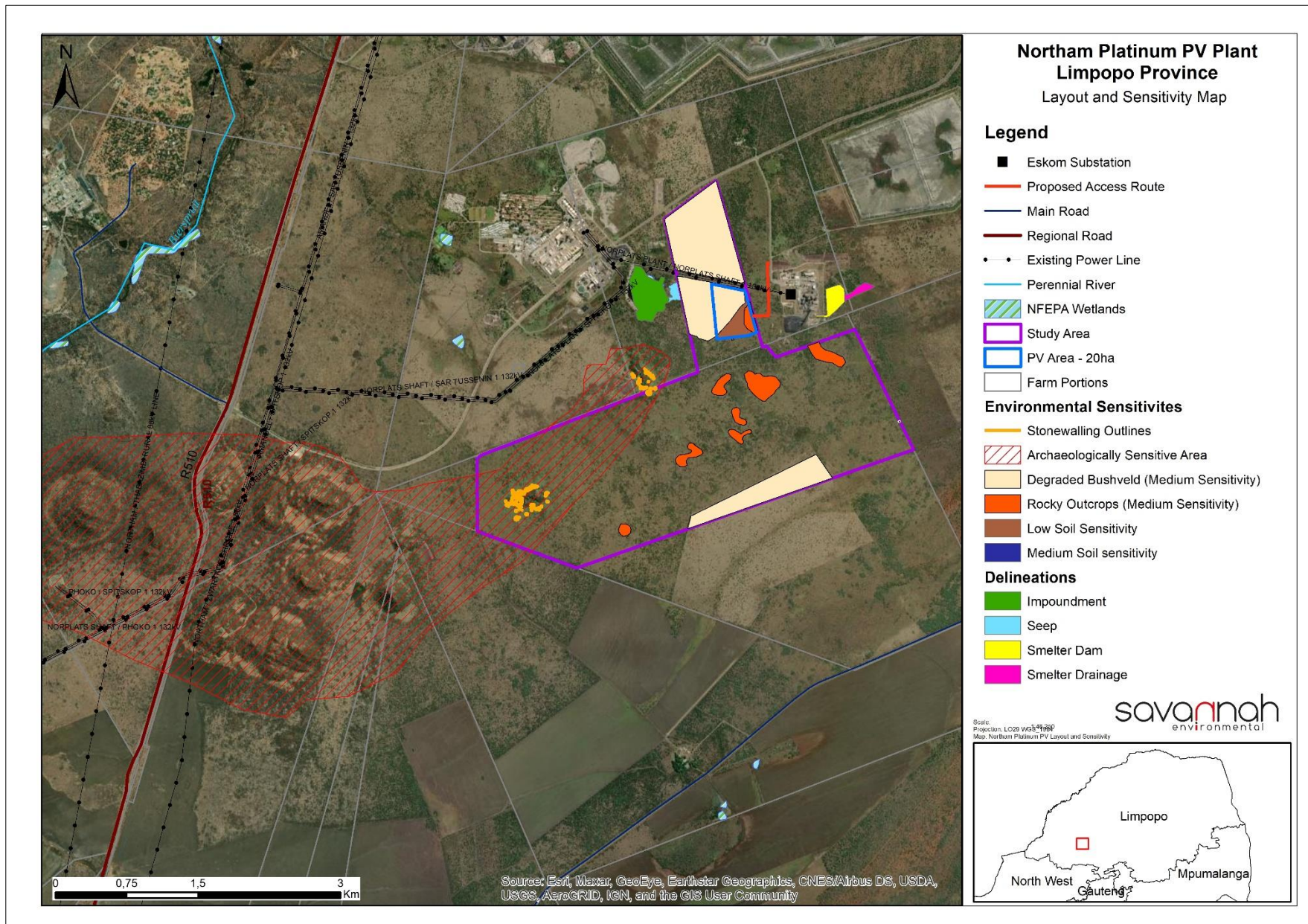
Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

#### **Alternative A: Preferred Site**

A technically viable study area for the project was proposed by NHM and assessed as part of the BA process. The environmental assessment of the study area (including the project area) was undertaken by independent specialists and their findings have informed the results of this BA Report.

The specialist findings have indicated that there are no identified environmental fatal flaws associated with the implementation of the project. NHM has proposed a technically viable layout for the project and associated infrastructure, which has been assessed as part of the independent specialist studies. High sensitivity freshwater features (i.e., wetlands), which are regarded as no-go areas, were identified around the broader study area. In addition, very high sensitivity heritage features (i.e., stonewalling complexes) were identified within the broader study area but outside the 20ha project area. The project area and facility layout avoid these areas of high sensitivity. The proposed layout is therefore considered the most appropriate from an environmental perspective and acceptable within all fields of specialist study undertaken for the project. All impacts associated with the proposed layout can be mitigated to acceptable levels through implementing the recommended mitigation measures. The layout map included as **Figure 15** is considered the preferred facility layout for the project.





**Figure 15:** Sensitive environmental features identified within the project area and broader study area, overlain on the project layout

In addition, through the assessment undertaken in this BA Report, the following can be concluded regarding the key environmental considerations, in terms of the International Finance Corporation) IFC Project Developers Guide, for the project:

- » *Construction phase impacts* (i.e., OHS; temporary air emissions from dust and vehicle emissions; noise related to excavation, construction, and vehicle transit; solid waste generation and wastewater generation from temporary building sites) will be local in extent and of a low magnitude. The significance of impacts associated with the construction phase will be of a low rating post-mitigation due to the proximity of the site to the Zondereinde Mine and Smelter.
- » *Water usage* (i.e., the cumulative water use requirements) will be kept to a minimum during construction and operation of the project. Appropriate water demand and conservation measures will be implemented.
- » *Landscape and visual impacts* (i.e., the visibility of the solar panels within the wider landscape and associated impacts on landscape designations, character types and surrounding communities) will be of low significance, as the project area is situated between the Zondereinde Mine and Smelter.
- » Matters relating to the land (i.e., the affected property) will be of low significance, as NHM is the owner of the affected property. There will be no involuntary land acquisition / resettlement associated with this project.
- » *Ecology and natural resources* (i.e., habitat loss/fragmentation; impacts on designated areas; and disturbance or displacement of protected or vulnerable species) will be impacted on by the project. The layout of the facility has been designed to avoid areas of high sensitivity, thereby reducing impacts on these resources.
- » *Cultural heritage* (i.e., impacts on possible buried archaeological and palaeontological resources and the cultural landscape) is of low impact significance; and no heritage resources of significance are associated with the project area. However, two heritage resources of high significance were identified within the broader study area, and it is recommended that the project avoid these sites.
- » *Transport and access* (i.e., impacts of transportation of materials and personnel) related to the project will be appropriately managed; and use existing access roads during construction and operation.
- » *Consultation and disclosure* (i.e., consulting with key authorities, statutory bodies, affected communities and other relevant stakeholders) was undertaken for the project; and documented for inclusion in the assessment of the project. All identified stakeholders and I&APs have been afforded the opportunity to participate in a meaningful way to the BA for the project.
- » An *EMPr* has been compiled to ensure that mitigation measures, as identified by the specialist studies undertaken, are implemented as the project develops (refer to **Appendix F** of this BAR Report).

Therefore, through assessment of the project within the project area, it can be concluded that the project is environmentally acceptable (subject to implementation of the recommended mitigation measures).

**Alternative B: N/A**

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**Alternative C: N/A**

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### **No-go alternative (compulsory)**

The 'do-nothing' alternative (i.e., no-go alternative) is the option of not constructing the Northam solar PV facility. Should this alternative be selected, there would be no environmental impacts on the site due to the construction and operation activities of the project.

NHM is proposing the establishment of a solar energy facility within the Zondereinde mining area, to reduce total carbon emissions and diversifying electricity supply to the Zondereinde Mine (exclusive user of the power). Should the facility not be constructed, NHM's reliance on fossil fuel-based power as a sole source of power to the plants will continue and the demand on Eskom's electricity supply will continue to increase.

Failure to establish an exclusive power supply source for the Zondereinde Mine would also result in a constant demand of power to be supplied from Eskom, adding pressure on the grid infrastructure in the region (and would require the additional consumption of fossil fuels to achieve the same level of electrical supply to the Mine). The electricity demand in South Africa is placing increasing pressure on the country's existing power generation capacity. There is therefore a need for additional electricity generation options to be developed throughout the country.

The support for renewable energy policy is guided by the need to address climate change. South Africa has a very attractive range of renewable resources, particularly solar and wind. Renewable applications are in fact the least-cost energy service in most cases, particularly when social and environmental costs are considered. The generation of electricity from renewable energy in South Africa offers several socio-economic and environmental benefits, including:

- » **Exploitation of our significant renewable energy resource:** At present, valuable national resources, including biomass by-products, solar radiation and wind power, remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio.
- » **Pollution reduction:** The releases of by-products through the burning of fossil fuels for electricity generation have a particularly hazardous impact on human health and contribute to ecosystem degradation.
- » **Climate friendly development:** The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through reducing greenhouse gas (GHG) emissions. South Africa is estimated to be responsible for ~1% of global GHG emissions and currently ranked 9th worldwide in terms of per capita CO<sub>2</sub> emissions.
- » **Employment creation:** The sale, development, installation, maintenance, and management of renewable energy facilities have significant potential for job creation in South Africa.
- » **Acceptability to society:** Renewable energy offers various tangible benefits to society, including reduced pollution concerns; improved human and ecosystem health; and climate friendly development.
- » **Support to a new industry sector:** The development of renewable energy offers the opportunity to establish a new industry within the South African economy.

Environmental costs identified for the project include:

- » Potential impact on buried archaeological and palaeontological resources due to construction activities.
- » Habitat loss, fragmentation, and the degradation of surrounding habitat.
- » Disturbance and displacement of fauna during the construction and maintenance phases.
- » Direct fauna mortality during the construction phase.

- » Direct disturbance / degradation / loss of wetland soils or vegetation due to the construction of the solar PV facility.
- » Increased erosion and sedimentation in wetland areas.
- » Potential for increased contamination of wetland systems.
- » Collision and electrocution of birds.
- » Direct loss of nests for avifauna SCC.
- » Soil erosion, compaction and pollution.

The costs associated with the project are anticipated to occur at a site-specific level. The significance can be largely reduced through the application of appropriate mitigation measures; and the appropriate placement of infrastructure within area of lower sensitivity identified on site. The project's benefits are expected to occur at a larger scale (i.e., national, regional, and local level); and partially offset the localised environmental costs of the project.

From the specialist studies undertaken, no environmental fatal flaws were identified to be associated with the project. All impacts associated with the project can be mitigated to acceptable levels. The 'do-nothing' alternative will not assist NHM in addressing issues such as diversifying their electricity supply at the Zondereinde Mine and reducing the total carbon emissions from the operations. As detailed above, the benefits associated with the project outweigh the costs; and the project is therefore considered sustainable. The costs of the 'do-nothing' alternative are expected to outweigh the benefits and therefore, this alternative is not preferred and not proposed to be implemented for the project.

## SECTION E: RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?

YES

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment):

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the department in respect of the application:

Considering the findings of the independent specialist studies; impacts identified, project area, which avoids all identified no-go/highly sensitive environmental features within the study area; and the potential to further minimise the impacts to acceptable levels through mitigation, it is the reasoned opinion of the EAP that the project is acceptable within the landscape and can reasonably be authorised. The preferred facility layout is illustrated in **Figure 15**. The period for which the EA is required to remain valid is 10 years from the date of authorisation, with a period of 5 years for the design, planning, construction and commissioning of the activity to be concluded.

The authorisation for the project would include the following key infrastructure and components:

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

The following key conditions would be required to be included within an EA issued for the project:

- » All mitigation measures detailed within this BA Report and the specialist reports contained within **Appendices D1 to D4** are to be implemented.
- » The EMPr, as contained within **Appendix F** of this BA Report, should form part of the contract with the contractors appointed to construct and maintain project, to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all lifecycle phases of

project is considered key in achieving the appropriate environmental management standards as detailed for this project.

- » The high sensitivity wetlands and their associated buffer areas should be regarded as no-go areas for all construction activities.
- » The proposed layout must be located within the identified project area. The final layout must be submitted to LDEDET for review and approval following detailed design.
- » A pre-construction walk-through of the final project area for SCC that would be affected and can be translocated must be undertaken prior to the commencement of the construction phase.
- » Before construction commences, individuals of listed plant species within the project area that would be affected must be counted, marked and translocated, where deemed necessary, by the ecologist conducting the pre-construction walk-through survey. Permits from the relevant national and provincial authorities must be obtained before the individuals are disturbed.
- » The necessary water use authorisation must be obtained from the DHSWS for impacts to a freshwater feature prior to construction.
- » The final project area must be kept as small as possible and consider all sensitive environmental features not considered to be suitable for development (as identified by the respective specialists).
- » Alien invasive species management at the site should take place according to the Alien Invasive Management Plan.

Is an EMPr attached?

The EMPr must be attached as Appendix F.

YES	
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## SECTION G: DECLARATION BY THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

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I, **Jo-Anne Thomas** declare that I –

- (a) act as the independent environmental practitioner in this application;
- (b) do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- (c) do not have and will not have a vested interest in the proposed activity proceeding;
- (d) have no, and will not engage in, conflicting interests in the undertaking of the activity;
- (e) undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the Environmental Impact Assessment Regulations, 2006;
- (f) will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- (g) will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the Department in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the Department may be attached to the report without further amendment to the report;
- (h) will keep a register of all interested and affected parties that participated in a public participation process; and
- (i) will provide the Department with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not.



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**Signature of the Environmental Assessment Practitioner:**

Savannah Environmental (Pty) Ltd

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**Name of company:**

25 August 2021

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**Date:**

## **APPENDIX A: SITE PLANS**

**APPENDIX A1:  
LOCALITY MAP**

**APPENDIX A2:  
LAYOUT MAP**



**APPENDIX A3:  
COMBINED LAYOUT AND SENSITIVITY MAP**

**APPENDIX A4:  
CUMULATIVE MAP**

**APPENDIX B:  
SITE PHOTOGRAPHS**

**APPENDIX C:  
FACILITY ILLUSTRATION**

**APPENDIX D:  
SPECIALIST REPORTS**

**APPENDIX D1:  
BIODIVERSITY AND WETLAND BASELINE IMPACT ASSESSMENT**

**APPENDIX D2:  
AVIFAUNA BASELINE IMPACT ASSESSMETNT REPORT**

**APPENDIX D3:  
AGRICULTURAL IMPACT STATEMENT**



**APPENDIX D4:  
HERITAGE IMPACT ASSESSMENT**

**APPENDIX E:  
RECORD OF PUBLIC PARTICIPATION PROCESS**

**APPENDIX F:  
ENVIRONMENTAL MANAGEMENT PROGRAMME**

**APPENDIX G:  
OTHER**

**APPENDIX G1:  
PROJECT CONSULTING TEAM CVs**

**APPENDIX G2:  
SPECIALIST DECLARATIONS**

**APPENDIX G3:  
DFFE SCREENING TOOL REPORT**