




**UPGRADE ENERGY (PTY) LTD**

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**FINAL BASIC ASSESSMENT REPORT  
(FBAR) FOR THE PROPOSED  
DEVELOPMENT OF THE LEEUMAX SOLAR  
PHOTOVOLTAIC (PV) ENERGY FACILITY  
AND ASSOCIATED INFRASTRUCTURE  
NEAR LEEUDORINGSTAD IN THE NORTH  
WEST PROVINCE, SOUTH AFRICA**

**Final Basic Assessment Report**

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<b>Date:</b>	April 2023
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## **KEY PROJECT INFORMATION**

### **PROJECT DESCRIPTION**

The site area to be developed is approximately 15 ha in extent. It is anticipated that the Solar PV energy facility will include PV fields (arrays) comprising of multiple PV panels. In summary, the proposed SEF development will include the following components:

- The proposed solar PV plant will include PV fields (arrays) comprising multiple PV modules;
- PV panels will be single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology;
- Each PV module will be approximately 2274mm ( $\approx 2.3$ m) long and 1134mm ( $\approx 1.1$ m) wide and mounted on supporting structures above ground;
- The foundations will most likely be either concrete or rammed piles;
- Generation capacity of up to approximately 15MW<sub>ac</sub>
- One (1) new 33/132kV on-site substation (facility substation) occupying an area of up to approximately 0.2003ha (2 003m<sup>2</sup>);
- One (1) guard house approximately 0.0876 ha (876m<sup>2</sup>) in size;
- One (1) temporary building zone 0.2944 ha (2 944m<sup>2</sup>);
- Site and internal access roads, up to 4m wide, will provide access to the PV arrays. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary;
- Galvanized steel fencing with electrification approximately 2.1m in height;
- Existing boreholes will be used where possible. Water will potentially be stored in water storage tanks;

### **TECHNICAL DETAIL SUMMARY**

Component	Description / Dimensions
Location of site (centre point)	Latitude: 27°12'24.03" S Longitude: 26°18'2.64" E
Site area	Approximately 15 ha
Technology	<ul style="list-style-type: none"><li>▪ The proposed solar PV plant will include PV fields (arrays) comprising multiple PV modules.</li><li>▪ PV panel mountings. PV panels will be single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology.</li><li>▪ Each PV module will be approximately 2274mm (<math>\approx 2.3</math> m) long and 1134 mm (<math>\approx 1.1</math> m) wide and mounted on supporting structures above ground. At this stage it is anticipated that the structures will be mono-facial modules. The final design details will become available during the detailed design phase of the proposed development, prior to the start of construction.</li><li>▪ The foundations will most likely be either concrete or rammed piles. The final foundation design will be determined at the detailed design phase of the proposed development.</li></ul>
SG codes	TOHP0000000004400037

Component	Description / Dimensions
Generation Capacity of Solar PV Plant	Maximum of up to $\pm 15$ MW ac
Capacity of Switching Substation	More than 33 kV but less than 275 kV. Exact capacity of the proposed on-site switching substation will be determined and confirmed at a later stage.
Dimensions of PV Panels	<ul style="list-style-type: none"> <li>Width: up to <math>\pm 2274</math> mm (<math>\approx 2.3</math> m)</li> <li>Length: up to <math>\pm 1134</math> mm (<math>\approx 1.1</math> m)</li> </ul>
On-site Switching Substation	<ul style="list-style-type: none"> <li>One (1) new on-site switching substation with a capacity of more than 33 but less than 275 kV.</li> <li>Total footprint: up to <math>\pm 0.2003</math> ha (2 003 m<sup>2</sup>).</li> <li>To contain transformers for voltage, step up from medium voltage to high voltage. DC power from the PV modules will be converted into AC power in the inverters and the voltage will be stepped up to medium voltage in the inverter transformers.</li> </ul>
Guard House	One (1) permanent guard house of $\pm 0.0876$ ha (876 m <sup>2</sup> ).
Temporary Building Zone	One (1) temporary building zone of $\pm 0.2944$ ha (2 944 m <sup>2</sup> ).
Area Occupied by Buildings	Up to $\pm 1.3807$ ha (13 807 m <sup>2</sup> )
Width of Existing Internal Gravel Roads	<ul style="list-style-type: none"> <li>Up to <math>\pm 4</math> m;</li> <li>Existing internal gravel site roads will be used wherever possible. However, where required, new internal gravel roads may be constructed.</li> </ul>
Length of existing internal roads (to be potentially upgraded)	<ul style="list-style-type: none"> <li>Up to <math>\pm 1.57</math> km</li> </ul>
Site Access	Access to the proposed development will be via an existing gravel road which connects to the tarred R502 road.
Proximity to grid connection	<ul style="list-style-type: none"> <li>Grid connection is to the 132/11kV Leeudoringstad Solar Plant Substation, which has been authorised as part of a separate BA process; and</li> <li>The 132/11kV Leeudoringstad Solar Plant Substation is located within the proposed Leeumax Solar PV Plant application site (namely Portion 37 of the Farm Leeuwbosch No. 44).</li> <li>Medium voltage cabling (anticipated to be <math>\pm 0.8</math> m x 0.6 m wide at this stage) will link the various PV arrays to the switching substation, as well as the Leeudoringstad Solar Plant Substation. These cables will be laid underground, wherever technically feasible.</li> </ul>
Height of fencing	<ul style="list-style-type: none"> <li><math>\pm 2.1</math> m high</li> <li>Fencing will surround the entire proposed solar PV plant.</li> </ul>
Type of fencing	Galvanised steel with electrification on top.
Area covered by fencing	The area that will be fenced is that of the proposed development site which covers approximately 15 hectares.



Component	Description / Dimensions
Boreholes and storage tanks	<ul style="list-style-type: none"> <li>It is anticipated that existing boreholes will be utilised;</li> <li>Water will potentially be stored in temporary water storage tanks.</li> </ul>

## **COORDINATES**

LEEUMAX SEF: APPLICATION SITE		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
1	27°12'18.76"S	26°17'51.68"E
2	27°12'18.87"S	26°17'57.62"E
3	27°12'14.32"S	26°18'1.71"E
4	27°12'20.43"S	26°18'3.57"E
5	27°12'22.00"S	26°18'8.17"E
6	27°12'24.45"S	26°18'9.71"E
7	27°12'34.83"S	26°17'58.96"E
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
POINT	SOUTH	EAST
8	27°12'24.91"S	26°18'1.14"E

LEEUMAX SEF: SUBTATION AND ASSOCIATED INFRASTRUCTURE LOCATION		
COORDINATES AT CENTRE POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
33kV Switching Station	27°12'15.08"S	26°18'22.83"E
Temporary Building Zone	27°12'15.19"S	26°18'3.43"E
Guard House	27°12'13.71"S	26°18'2.79"E
Substation (already approved)	27°12'14.18"S	26°18'25.58"E

# UPGRADE ENERGY (PTY) LTD

## PROPOSED DEVELOPMENT OF LEEUMAX SOLAR PV ENERGY FACILITY, AND ASSOCIATED INFRASTRUCTURE NEAR LEEUDORINGSTAD IN THE NORTH WEST PROVINCE, SOUTH AFRICA

### EXECUTIVE SUMMARY

#### INTRODUCTION

Upgrade Energy (Pty) Ltd (hereafter referred to as Upgrade Energy) proposes the development of a Solar Photovoltaic (PV) plant and associated infrastructures on a site located approximately 6km north-east of the town of Leeudoringstad in the Maquassi Hills Local Municipality, within the Dr Kenneth Kaunda District Municipality in the North West Province.

SiVEST Environmental Division has been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Basic Assessment (BA) process for the proposed development of the Leeumax Solar PV Plant and associated infrastructure. The proposed project requires an Environmental Authorisation (EA) from the North West Department of Economic Development, Environment, Conservation and Tourism (NW DEDECT). The BA for the proposed project will be conducted in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) promulgated in terms of Chapter 5 of the National Environmental Management Act, Act No. 107 of 1998 (NEMA) [as amended].

The proposed development will comprise several arrays of PV panels, and associated infrastructure. The associated infrastructure would include, but not be limited to, additional internal access roads, one (1) switching substation, one (1) permanent guard house and one (1) temporary building zone. The total capacity of the Solar PV plant will have a contracted capacity of up to +/-15MWac and will be known as the Leeumax Solar PV Facility. Leeumax Solar PV forms part of a larger cluster of projects and sits adjacent to the Leeuwbosch 1 and 2 Solar PV Facilities. The various projects are as follows:

**Table 1: Leeuwbosch PV Facilities status and reference numbers**

Project	Status	Reference number
Proposed Leeumax Solar PV.	Subject of this application.	TBC
Leeuwbosch 1 Solar PV Facility	Approved	(Ref No: NWP/EIA/42/2021)
Leeuwbosch 2 Solar PV Facility	Approved	(Ref No: NWP/EIA/45/2021)
Leeudoringstad Solar PV Substation	Approved	(Ref No: NWP/EIA/43/2021)

The energy generated by the SEF will be evacuated via a 132 kV powerline which is being assessed as a separate application (Currently undergoing a Public participation Process as part of a proposed Registration process).

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- PV panels will be single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology;
- Each PV module will be approximately 2274mm (≈2.3m) long and 1134mm (≈1.1m) wide and mounted on supporting structures above ground;
- The foundations will most likely be either concrete or rammed piles;
- Generation capacity of up to +/-15MWac
- One (1) new 33/132kV on-site substation (facility substation) occupying an area of up to approximately 0.2003ha (2 003m<sup>2</sup>);
- One (1) guard house approximately 0.0876 ha (876m<sup>2</sup>) in size;
- One (1) temporary building zone 0.2944 ha (2 944m<sup>2</sup>);
- Site and internal access roads, up to 4m wide, will provide access to the PV arrays. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary;
- Galvanized steel fencing with electrification approximately 2.1m in height;
- Existing boreholes will be used where possible. Water will potentially be stored in water storage tanks;

## APPLICABILITY OF NEMA EIA REGULATIONS, 2014 (AS AMENDED IN 2017)

The amended EIA Regulations promulgated under Section 24(5) of the NEMA, Act 107 of 1998 and published in Government Notice No. R. 326 list activities which may not commence without environmental authorization from the Competent Authority. The proposed activity is identified in terms of Government Notice No. R. 327, 325 and 324 for activities which must follow a Basic Assessment Process. The project will trigger the following listed activities provided in the table below:

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
<b>Relevant Basic Assessment Activities as set out in Listing Notice 1</b>		
1	<b>GN R. 327 Item 1:</b> The development of facilities or infrastructure for the generation of electricity from a renewable resource where—  (i) the electricity output is more than 10 megawatts but less than 20 megawatts	The proposed development will entail the construction of a solar photovoltaic (PV) plant within the proposed application site which will have a capacity of up to approximately 15MWac. The proposed solar PV plant development will occupy an area in excess of 1 hectare (ha). In addition, the proposed solar PV plant development will be located outside an urban area.
11 (i)	<b>GN R. 327 Item 11:</b> The development of facilities or infrastructure for the transmission and distribution of electricity—  (i) outside urban areas or industrial	The application involves the construction of an on-site IPP substation within the proposed application site which will be located outside an urban area. The proposed switching substation will have a capacity of more than 33 but less than

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	complexes with a capacity of more than 33 but less than 275 kilovolts.	275 kilovolts (kV). The proposed application also involves the construction of medium voltage cabling to link the various PV arrays to the proposed switching substation, as well as the Leeudoringstad Solar Plant Substation.
27	<b>GN R. 327 Item 27:</b> The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—  (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The proposed application will include the clearance of an area of 1ha or more, but less than 20ha of indigenous vegetation within the proposed application site. The extent of the clearance is approximately 15ha.
28 (ii)	<b>GN R. 327 Item 28:</b> Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:  (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	The proposed site is currently used and zoned for agricultural purposes. The proposed development will result in an area of agricultural land greater than 1ha being transformed to industrial / commercial use for the proposed facility.  Consent has however been received from DALRRD and the Maquassi Hills Local Municipality to establish a solar panel farm on the property.

## SPECIALIST STUDIES

The following specialist assessments were conducted as part of the BA process in order to identify and assess the issues associated with the proposed development:

- Desktop Geotechnical Assessment
- Surface Water Impact Assessment
- Terrestrial Biodiversity Impact Assessment
- Agriculture and Soils Impact Assessment (desktop)
- Avifaunal Impact Assessment
- Social Impact Assessment (desktop)
- Heritage Impact Assessment
- Palaeontological Impact Assessment
- Visual Impact Assessment

These studies were undertaken to inform the impact assessment of the proposed SEF development. The table below summarises the specialist findings for the entire proposed development both pre and post mitigation.

Specialist Study	Findings	Recommendations
Agricultural and Soils	<p>Soil information was obtained for the solar PV plant and associated infrastructure proposed on Portion 37 of the Farm Leeuwbosch No. 44 near the town of Leeudoringstad in the North West Province. The data source was existing 1:250 000 scale land type information and indicates that the soils are mostly shallow, with much rock.</p> <p>The construction of the solar PV plant and associated infrastructure at the chosen site will have minimal impact on the loss of agricultural land, due to the small percentage of high potential agricultural land indicated by the Land Type survey information.</p> <p>The potential impact on the loss of agricultural land will be low, and there is not expected to be any significant soil erosion hazard, if standard mitigation measures are followed. Cumulative soil-related impacts are also expected to be low.</p>	<p>As far as the soils are concerned, as long as the proposed mitigation measures are adhered to, there should not be any significant cumulative impacts occurring, as any impact on agricultural potential will be contained to the specific site itself.</p>
Geotechnical	<p>The study area is underlain by the Allanridge Formation part of the Ventersdorp Supergroup, which comprises amygdaloidal lava.</p> <p>The Ventersdorp Supergroup is predominantly an accumulation of andesitic to basaltic lavas with related pyroclastic rocks.. The desktop study indicates no fatal flaws from a preliminary and geological and geotechnical assessment. The impact of the development from a geotechnical perspective will be restricted to the removal and displacement of soil, boulders and bedrock.</p>	<p>No fatal flaws from a geotechnical perspective were identified. The impact of the Solar PV Facility was found to be "Negative low impact". The anticipated impact will have negligible negative effects and will require little to no mitigation. The site from a desktop level geotechnical study is considered suitable for the proposed PV Plant.</p> <p>It recommended that a detailed geotechnical investigation be undertaken during the detailed design phase of the project. The detailed geotechnical investigation must entail the following:</p> <ul style="list-style-type: none"> <li>• Profiling and sampling exploratory trial pits to determine founding conditions for the PV modules, substation and pylons. Also to determine the subgrade conditions for internal roads and a materials investigation (if required);</li> <li>• Thermal resistivity and electrical resistivity geophysical testing for electrical design and ground earthing requirements.</li> <li>• Groundwater sampling of existing boreholes to establish a baseline of the groundwater quality for construction</li> </ul>

Specialist Study	Findings	Recommendations
		<p>purposes;</p> <ul style="list-style-type: none"> <li>• Dynamic Probe Super Heavy (DPSH) tests and rotary core drilling may be required depending on the soil profiles and imposed loads of the structures.</li> </ul>
Avifaunal	<p>The proposed SEF will have several potential impacts on priority avifauna. These impacts are the following:</p> <ul style="list-style-type: none"> <li>• Displacement of priority species due to disturbance associated with the construction and de-commissioning of the PV plant and associated infrastructure.</li> <li>• Displacement of priority species due to habitat transformation associated with the PV plant and associated infrastructure.</li> <li>• Mortality of priority species due to electrocution on the medium voltage internal reticulation network.</li> <li>• Entrapment of large-bodied birds in the double perimeter fence.</li> <li>• Displacement of priority species due to disturbance associated with de-commissioning of the PV plant and associated infrastructure.</li> <li>• Cumulative impact of displacement due to construction and habitat transformation, collisions with solar panels and entrapment in fences</li> </ul>	<p>The proposed Leeumax Solar PV Plant will have a medium pre-mitigation negative impact on priority avifauna, which in most instances, can be reduced to low with appropriate mitigation. The development is supported provided the mitigation measures listed in this report is strictly implemented. No fatal flaws were discovered in the course of the investigations.</p> <p>The cumulative impact of the facility on priority avifauna within a 35km radius around the proposed development (considering all current impacts on avifauna) is assessed to be low post mitigation, mainly due to the small size of the proposed development.</p>
Heritage – Archaeological	<p>The overall impact of the Leeumax facility, on the heritage resources identified during this report, is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.</p>	<p>The following is recommended:</p> <ul style="list-style-type: none"> <li>• For sites LD07, LD09, LD10, LD11 LD12: <ul style="list-style-type: none"> <li>○ It is recommended that further consultation with local communities on the previous inhabitants of these areas be initiated to determine the possibility of infant burials. In the event that such burial is confirmed a grave relocation process must be initiated.</li> </ul> </li> <li>• It is further recommended that an archaeologist monitor the earth moving activities during construction.</li> <li>• Site LD13 if any changes to the structures for the establishment of the watering point is envisaged permission under section 34 of the NHRA from the</li> </ul>

Specialist Study	Findings	Recommendations
		<p>Provincial Heritage Authority must be obtained. This application for alteration or destruction must be accompanied by site sketches and photographs as compiled by a heritage specialist.</p> <p>In the event that heritage resources are discovered during site clearance, construction activities must stop in the vicinity, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures.</p> <p>The overall impact of the Leeumax facility, on the heritage resources identified during this report, is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.</p>
Heritage – Paleontological	<p>The proposed development is underlain by the Allanridge Formation (Ventersdorp Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Allanridge Formation is LOW (Almond and Pether 2008, SAHRIS website).</p> <p>It is therefore considered that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological heritage of the area. Hence, the construction of the development may be authorised in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources</p>	<p>If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol must be implemented by the Environmental Control Officer (ECO) in charge of these developments. These discoveries ought to be protected (if possible, in situ) and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: <a href="http://www.sahra.org.za">www.sahra.org.za</a>) so that correct mitigation (recording and collection) can be carry out by a paleontologist.</p> <p>No mitigation measures are required.</p>
Social	<p>The proposed construction of the Leeumax PV will be associated with multiple capital expenditures. Such expenses typically include the transportation and construction of PV modules, the connection of electricity and grids, foundations, civil engineering, and the construction of supporting structures. If goods and services are procured locally, that is, within South Africa, this will increase the production of the respective industries. This will in turn have a positive impact on the national economy and the economies of the</p>	<p>Regarding the impacts which will arise from the proposed development, it is anticipated that there will be no major direct or indirect concerns. The proposed solar PV plant will sterilise approximately 20ha of agricultural land currently used for commercial livestock farming,. Due to the nature of the activities taking place on the farms adjacent to the planned development, it is not expected to cause major disruptions during both construction and operational phase on the farms and their respective farmhouses.</p>

Specialist Study	Findings	Recommendations
	<p>municipalities where inputs are procured. It is anticipated that the proposed development will include an approximate R130 million in investments. Some of this is expected to be spent in South Africa, which will resultantly stimulate the national economy, although for a temporary period of about twelve months during the construction of the Solar PV.</p> <p>The construction of the proposed solar PV plant and associated infrastructure will require the temporary employment of construction workers, foremen, and engineers on site. It is anticipated that approximately 25 employment opportunities will be created during the construction phase. Considering the current skills profile of the local municipality, a good portion of these jobs are likely to be filled by people from the local communities. This project will thus contribute to increasing employment opportunities in the local municipality for a temporary period. Employment of the individuals, albeit temporary, will increase their household income, improve their standard of living, and benefit their families.</p> <p>The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation. Therefore, the visual or noise effects that may result from the development of the PV system are not expected to adversely affect the farming activities and their respective farmhouses observed in the region.</p>	<p>Furthermore, all potential impacts considered had no fatal flaws identified across all potential impacts considered.</p>
Wetland	<p>The Leeumax site project does not show wetlands within the boundary of the proposed footprint; however, one (1) wetland (HGM 3) was found within the 500m regulated area. The wetland was located south of the project area approximately 185m away. The wetland is also buffered by the main road. The impact assessment concluded that the wetland will not be impacted by the proposed project and that the impact was rated as Low or no perceived impact.</p>	<p>It is recommended that an alien invasive management programme is implemented</p> <p>It is the opinion of the Specialist that the proposed development may proceed and that a GA will be sufficient, this is based on the above findings and recommendations.</p>
Visual	<p>No visually sensitive receptors were identified within the study area. This is most</p>	<p>It is the specialist's opinion that the visual impacts associated with the proposed</p>



Specialist Study	Findings	Recommendations
	<p>likely due to the fact that the study area is not typically valued or utilised for its tourism significance. Additionally, the R502 and R504 regional roads, which traverse the visual assessment zone, are used almost exclusively as local access roads and do not form part of any scenic tourist routes and are not specifically valued or utilised for their scenic or tourism potential.</p> <p>A total of thirty-two (32) potentially sensitive receptors were however identified, all of which appear to be existing farmsteads. These farmsteads are regarded as potentially sensitive visual receptors as they are located within a mostly rural setting and the proposed development will likely alter natural vistas experienced from these locations, although the residents' sentiments toward the proposed development are unknown. The receptor impact rating conducted in respect of these potentially sensitive receptors found that none of these potentially sensitive receptors are expected to experience high levels of visual impact from the proposed SPEFs. Twenty-six (26) receptors are however expected to experience moderate levels of visual impact, while the remaining six (6) receptors are only expected to experience low levels of impact from the proposed SPEF.</p> <p>The overall impact rating revealed that the SPEF is expected to have a (negative) low visual impact rating during both construction and decommissioning phases.</p> <p>From a visual perspective therefore, the proposed SPEF is deemed acceptable and the Environmental Authorization (EA) should be granted. SLR is of the opinion that the visual impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented</p>	<p>Leeumax SEF and associated infrastructure are of moderate significance. Given the relative absence of sensitive receptors and the significant degree of human transformation and landscape degradation in areas close to the Leeumax SPEF application site, the project is deemed acceptable from a visual impact perspective and the EA should be granted for the BA application. The specialist is of the opinion that the visual impacts associated with the construction, operation and decommissioning phases of the project can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.</p>
Terrestrial	In general, the site is considered to have potentially high sensitivity or biodiversity value, based on the location of the site within	Use existing road infrastructure for access roads. Avoid construction of infrastructure within sensitive habitats. Minimise vegetation

Specialist Study	Findings	Recommendations
	<p>a listed ecosystem as well as being within an Ecological Support Area.</p> <p>The project study area consists of natural grassland habitat, and degraded areas associated with previous cultivation. The site is within an area where the remaining natural habitat has been assessed as having high conservation value. Existing impacts on natural habitat are related to possible previous cultivation on site. The extent of previous cultivation can be determined from the combination of local species composition and patterns from aerial imagery. The proposed project will therefore have some effects on areas of natural habitat that may possibly have important biodiversity value.</p> <p>The vegetation on site is part of a threatened ecosystem and has been assessed as being of high conservation value due to rates of transformation. The regional vegetation type that occurs on site, Vaal-Vet Sandy Grassland, is listed as Endangered in the National Ecosystem List, is part of an area earmarked for future National Park expansion and is part of a Provincial Ecological Support Area. Any remaining natural habitat on site therefore has high terrestrial biodiversity value.</p> <p>The most significant impact associated with the project is due to clearing of indigenous natural vegetation. This impact was evaluated as having a significance of MEDIUM after mitigation. All other assessed impacts had a significance of LOW after mitigation. One potential impact with the most significant risk in the absence of any management is due to the potential spread and growth of alien invasive plant species, which is facilitated by disturbance.</p> <p>On the basis of the relatively limited extent that will be disturbed, and the general absence of any species of concern, the proposed development can be authorised.</p>	<p>clearing and disturbance to footprint areas only. Compile a rehabilitation programme and rehabilitate disturbed areas. Compile and implement Alien Invasive Management Plan. Limit access to sensitive areas during construction. Undertake monitoring to evaluate whether further measures are required.</p> <p>No additional clearing of vegetation should take place without a proper assessment of the environmental impacts and authorization from relevant authorities. If any additional infrastructure needs to be constructed, for example overhead powerlines, communication cables, etc., then these must be located next to existing infrastructure, and clustered to avoid dispersed impacts. No driving of vehicles off-road. Implement Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas. Access to sensitive areas outside of development footprint should not be permitted during operation. Surface runoff and erosion must be properly controlled and any issues addressed as quickly as possible.</p> <p>Implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control. Undertake regular monitoring to detect alien invasions early so that they can be controlled. Post-decommissioning monitoring should continue for an appropriate length of time to ensure that future problems are avoided. Do NOT use any alien plants during any rehabilitation that may be required.</p>

## DETAILS OF ALTERNATIVES CONSIDERED

No activity alternatives are being considered. Renewable Energy development in South Africa is highly desirable from a social, environmental and development point of view. Solar energy installations are more suitable for the site because of the good solar resource.

The proposed layout has been assessed by the specialists in their respective specialist studies. All constraints identified to date have been taken into account and the layout has been refined to avoid all no-go areas.

## PUBLIC PARTICIPATION PROCESS TO BE UNDERTAKEN FOR THE EIA PHASE

The Public Participation Process has been undertaken in line with Chapter 6 of the EIA Regulations 2014 (as amended 2017).

- Issuing of the notifications and initial landowner consultation (circulated to all I&APs in November 2022 respectively as part of the Draft Basic Assessment Report (proof to be included in Final Basic Assessment Report).
- Placement of site notices in English and Afrikaans (as per regulations) were placed along the entrance road to the application site and around the site itself on **11 -13 November 2022** (proof included in the Basic Assessment Report).
- Notification letters sent via E-mail or sms (if cell phone number / email is available, it is assuming the I&AP have an email or cell phone).
- Public notification of the BA process was advertised along with the SEF project, in a local newspaper (**namely Stellalander Newspaper**) on **17 November 2022**, as required according to Regulation 41(2) (c) of the EIA Regulations (2014), as amended. Proof to be included in the Final Basic Assessment Report.

Copies of the Draft Basic Assessment Report were located and available for review at the following locations:

- Maquassi Hills Library, 56 Smuts Street, Leeudoringstad, North West.
- Kgakala Library, 415 Tladi Street, Leeudoringstad, North West

Interested and affected persons (I&AP's) were afforded a thirty (30) day comment period from the date of availability of the Draft BA Report (DBAR) to provide comment on the DBAR. An I&AP register is attached to this report. A summary of the comments received during the public participation process is documented in the Comments and Responses Report attached to this report.

## ENVIRONMENTAL IMPACT STATEMENT

The specialist assessments were conducted to address the potential impacts relating to the proposed development of the Leeumax Solar PV in order to ascertain the level of each identified impact, as well as mitigation measures which may be required. The results of the specialist assessments have indicated that the project contains no fatal flaws that should prevent the proposed project from proceeding. In light of this, it is the EAP's reasoned opinion that authorisation be granted and that the layout being proposed as part of this BA process also be authorised (provided there are no concerns raised during the public participation process).

A layout of the development and the environmental sensitivities is included below:

The **aquatic specialist** concluded that no wetlands will not be impacted by the proposed project and that the impact was rated as Low or no perceived impact. It is recommended that an alien invasive management programme is implemented. It is the opinion of the Specialist that the proposed development may proceed and that a GA will be sufficient, this is based on the above findings and recommendations.

The **terrestrial specialist** confirmed the site is considered to have potentially high sensitivity or biodiversity value, based on the location of the site within a listed ecosystem as well as being within an Ecological Support Area. The most significant impact associated with the project is due to clearing of indigenous natural vegetation. This impact was evaluated as having a significance of MEDIUM after mitigation. All other assessed impacts had a significance of LOW after mitigation. One potential impact with the most significant risk in the absence of any management is due to the potential spread and growth of alien invasive plant species, which is facilitated by disturbance. On the basis of the relatively limited extent that will be disturbed, and the general absence of any species of concern, the proposed development can be authorised.

The **agricultural specialist** confirmed that the development of the solar PV plant and associated infrastructure at the chosen site will have minimal impact on the loss of agricultural land, due to the small percentage of high potential agricultural land indicated by the Land Type survey information.

The **avifaunal specialist** confirmed the proposed Leeumax Solar PV Plant will have a medium pre-mitigation negative impact on priority avifauna, which in most instances, can be reduced to low with appropriate mitigation. The development is supported provided the mitigation measures listed in this report is strictly implemented. No fatal flaws were discovered in the course of the investigations.

In terms of social impacts, the **social specialist** concluded that it is anticipated that there will be no major direct or indirect concerns. Furthermore, all potential impacts considered had no fatal flaws identified across all potential impacts considered.

The **heritage specialist** confirmed that the overall impact of the Leeumax facility, on the heritage resources identified is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.

The **palaeontological specialist** confirmed that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological heritage of the area. Hence, the construction of the development may be authorised in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

The **visual specialist** confirmed that the visual impacts associated with the proposed Leeumax SEF and associated infrastructure are of moderate significance. Given the relative absence of sensitive receptors and the significant degree of human transformation and landscape degradation in areas close to the site area, the project is deemed acceptable from a visual impact perspective and the EA should be granted for the BA application. The specialist is of the opinion that the visual impacts associated with the construction, operation and decommissioning phases of the project can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

The main findings of the specialist studies are included in **Section 16**.

A summary of the positive and negative impacts associated with the proposed project is included below.

Impact	Pre-mitigation	Post-mitigation
<b>PLANNING</b>		
<b>Socio-economic</b>		
Availability of sufficient local construction materials for the PV Plant	Negative Medium	Positive Medium
<b>CONSTRUCTION</b>		
<b>Impacts to Biophysical Systems</b>		
<b>Avifaunal</b>		
Displacement of priority species due to disturbance (noise and movement) associated with the construction of the PV plant and associated infrastructure	Negative Medium	Negative Medium
<b>Agriculture</b>		
Loss of agricultural land	Negative Medium	Negative Medium
Soil erosion (wind or water) caused by surface disturbance	Negative Medium	Negative Low
<b>Terrestrial Ecology</b>		
Loss, degradation or fragmentation of vegetation through direct clearing.	Negative Medium	Negative Medium
<b>Geotech</b>		
Displacement of natural earth material and overlying vegetation. 1) Increase in soil and wind erosion due to clearing of vegetation. 2) Construction and earthmoving vehicles may displace soil during operations. 3) Creation of drainage paths along access tracks. 4) Potential oil spillages from heavy plant. 5) Excessive dust.	Negative Low	Negative Low
<b>Aquatic/ Freshwater</b>		
Loss of wetland areas through direct impact or indirect impacts of erosion or sedimentation).	Negative Low	Negative Low
Hydrocarbon spills and compaction within wetland zones.	Negative Low	Negative Low
Sewerage spills within wetlands or drainage lines feeding wetlands	Negative Low	Negative Low
Spills of stored hazardous material into wetlands or drainage lines feeding wetlands	Negative Low	Negative Low
The introduction of alien vegetation into disturbed areas disrupting natural wetland vegetation composition or alteration of water transpiration from soils.	Negative Low	Negative Low
The change in flow dynamics to and through wetlands potentially altering wetland types or potentially causing erosion from increased surface runoff.	Negative Low	Negative Low
<b>Impacts to Socio-Economic Component</b>		
<b>Socio-economic</b>		
Increase in production of the national and local economies due to project capital expenditure.	Positive Low	Positive Low
The creation of new direct and indirect opportunities related to the construction and operation of the proposed solar plant and facilities	Positive Low	Positive Low
<b>Heritage</b>		
Site clearance and vegetation stripping	Negative Low	Negative Low
<b>Visual</b>		
<ul style="list-style-type: none"> <li>Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction.</li> <li>Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.</li> <li>Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers.</li> </ul>	Negative Low	Negative Low

Impact	Pre-mitigation	Post-mitigation
<ul style="list-style-type: none"> <li>Surface disturbance during construction would expose bare soil (scarring) which could visually contrast with the surrounding environment.</li> <li>Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.</li> </ul>		
<b>OPERATIONAL</b>		
<b>Impacts to Biophysical Systems</b>		
<b>Aquatic / Freshwater</b>		
The change in flow dynamics to and through wetlands potentially altering wetland types or potentially causing erosion from increased surface runoff.	Negative Low	Negative Low
Hydrocarbon spills and compaction within wetland zones.	Negative Low	Negative Low
Loss of wetland areas through direct impact or indirect impacts of erosion or sedimentation.	Negative Low	Negative Low
<b>Agricultural - compliance statement – none identified</b>		
Loss of agricultural land	Negative Medium	Negative Medium
Soil erosion (wind or water) caused by surface disturbance	High	Negative Low
<b>Terrestrial Ecology</b>		
Establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors.	Negative Medium	Negative Low
<b>Avifaunal</b>		
Displacement of priority species due to habitat transformation associated with construction of the PV plant and associated infrastructure	Negative Medium	Negative Low
Entrapment of large-bodied birds in the double perimeter fence	Negative Low	Negative Low
<b>Geotech</b>		
Displacement of natural earth material. 1) Increase in soil erosion due to concentrated flow received off hardstand areas. 2) Potential oil spillages from maintenance vehicles. 3) Sedimentation of non-perennial features caused by soil erosion.	Negative Low	Negative Low
<b>Impacts to Socio-Economic Component</b>		
<b>Socio-economic</b>		
The plant will increase the size of the local utility sector and stimulate economic production through multiplier effects.	Positive Low	Positive Low
Creation of jobs to support the operation and maintenance of the plant	Positive Low	Positive Low
The generated electricity will improve the security of electricity in the local municipality and increase the government's revenue and service delivery	Positive Low	N/A
<b>Heritage (Palaeontology) – none identified</b>		
<b>Visual</b>		
The PV arrays may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. The proposed solar PV facility will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts. Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. The night time visual environment will be altered as a result of operational and security lighting at the proposed PV facility.	Negative Medium	Negative Medium

Impact	Pre-mitigation	Post-mitigation
<b>DECOMMISSIONING</b>		
<b>Impacts to Biophysical Systems</b>		
<b>Agriculture</b>		
Loss of agricultural land	Negative Medium	Negative Medium
Soil erosion (wind or water) caused by surface disturbance	Negative Medium	Negative Low
<b>Aquatic– none identified</b>		
<b>Avifaunal</b>		
Displacement of priority species due to disturbance associated with decommissioning of the PV plant and associated infrastructure	Negative Low	Negative Low
Entrapment of large-bodied birds in the double perimeter fence	Negative Low	Negative Low
<b>Terrestrial Ecology</b>		
Loss and disturbance of natural vegetation due to the removal of infrastructure and need for working sites	Negative Low	Negative Low
Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors	Negative Medium	Negative Low
<b>Geotech</b>		
Decommissioning of the structure will disturb the geological environment. 1) Increase in soil and wind erosion due to clearance of structures. 2) Construction and earthmoving vehicles will displace the soil. 3) Creation of drainage paths. 4) Potential oil spillages from vehicles. 5) Excessive sediments in non-perennial features.	Negative Medium	Negative Medium
<b>Impacts to Socio-Economic Component</b>		
<b>Socio-economic</b>		
Land demarcated for the solar PV plant will be sterilized and all current activities taking place on said land will be discontinued.	Negative Low	Positive Low
<b>Heritage – None Identified</b>		
<b>Visual</b>		
<ul style="list-style-type: none"> <li>Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts.</li> <li>Decommissioning activities may be perceived as an unwelcome visual intrusion.</li> <li>Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers.</li> <li>Surface disturbance during decommissioning would expose bare soil (scarring) which could visually surrounding environment.</li> <li>Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.</li> </ul>	Negative Low	Negative Low
<b>CUMULATIVE</b>		
<b>Impacts to Biophysical Systems</b>		
<b>Aquatic / Freshwater – None Identified</b>		
<b>Terrestrial Ecology</b>		
Loss, degradation or fragmentation of vegetation through direct clearing	Negative Medium	Negative Low
General increase in the spread and invasion of new habitats by alien invasive plant species	Negative Medium	Negative Low
<b>Agricultural</b>		
Proposed project can contribute to overall loss of soil health and productivity	Negative High	Negative Low



Impact	Pre-mitigation	Post-mitigation
<b>Avifaunal</b>		
Cumulative impact of displacement due to construction and habitat transformation, collisions with solar panels and entrapment in fences	Negative Medium	Negative Low
<b>Impacts to Socio-Economic Component</b>		
<b>Socio-economic</b>		
<ul style="list-style-type: none"> <li>Stimulation of the economy and increased production</li> <li>Creation of employment and business opportunities</li> <li>Increased household income and standard of living</li> <li>Adoption of clean, renewable energy and benefits in terms of global warming and climate change.</li> </ul>	Positive Low	Positive Low
<b>Heritage</b>		
Site clearance and vegetation stripping	Negative Low	Negative Low
<b>Visual</b>		
<ul style="list-style-type: none"> <li>Additional renewable energy developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts.</li> <li>Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings.</li> <li>Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes.</li> <li>The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.</li> </ul>	Negative Medium	Negative Medium

It is trusted that the FBAR provides adequate information for the competent authority to make an informed decision regarding the proposed development.

# UPGRADE ENERGY (PTY) LTD

## PROPOSED DEVELOPMENT OF LEEUMAX SOLAR PV ENERGY FACILITY, AND ASSOCIATED INFRASTRUCTURE NEAR LEEUDORINGSTAD IN THE NORTH WEST PROVINCE, SOUTH AFRICA

### FINAL BASIC ASSESSMENT REPORT

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# UPGRADE ENERGY (PTY) LTD

## PROPOSED DEVELOPMENT OF LEEUMAX SOLAR PV ENERGY FACILITY, AND ASSOCIATED INFRASTRUCTURE NEAR LEEUDORINGSTAD IN THE NORTH WEST PROVINCE, SOUTH AFRICA

### FINAL BASIC ASSESSMENT REPORT

#### 1. INTRODUCTION AND BACKGROUND

Upgrade Energy (Pty) Ltd (hereafter referred to as Upgrade Energy) proposes the development of a Solar Photovoltaic (PV) plant and associated infrastructures on a site located approximately 6km north-east of the town of Leeudoringstad in the Maquassi Hills Local Municipality, within the Dr Kenneth Kaunda District Municipality in the North West Province (**Figure 1**).

SiVEST Environmental Division has been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Basic Assessment (BA) process for the proposed development of the Leeumax Solar PV Plant and associated infrastructure. The proposed project requires an Environmental Authorisation (EA) from the North West Department of Economic Development, Environment, Conservation and Tourism (NW DEDECT). The BA for the proposed project will be conducted in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) promulgated in terms of Chapter 5 of the National Environmental Management Act, Act No. 107 of 1998 (NEMA) [as amended].

The proposed development will comprise several arrays of PV panels, and associated infrastructure. The associated infrastructure would include, but not be limited to, additional internal access roads, one (1) switching substation, one (1) permanent guard house and one (1) temporary building zone. The total capacity of the Solar PV plant will have a contracted capacity of up to +/- 15MWac and will be known as the Leeumax Solar PV Facility.

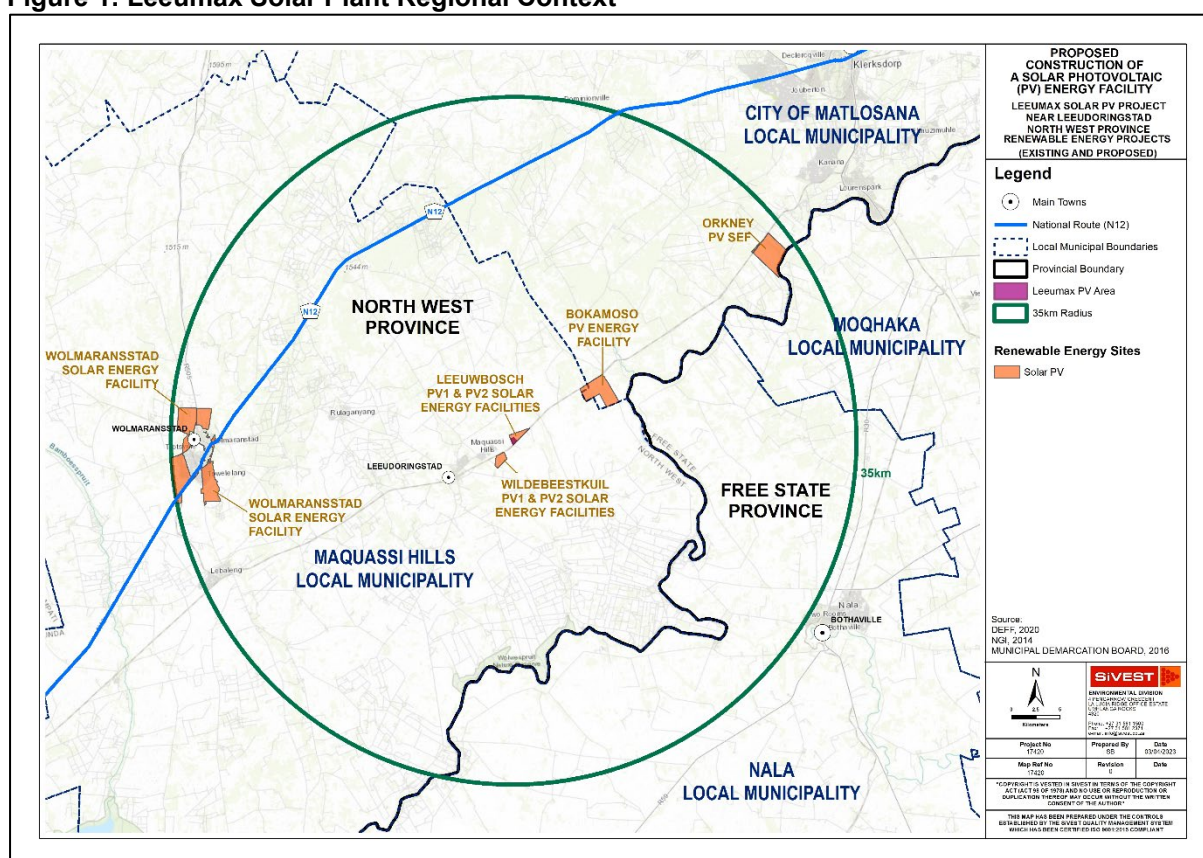
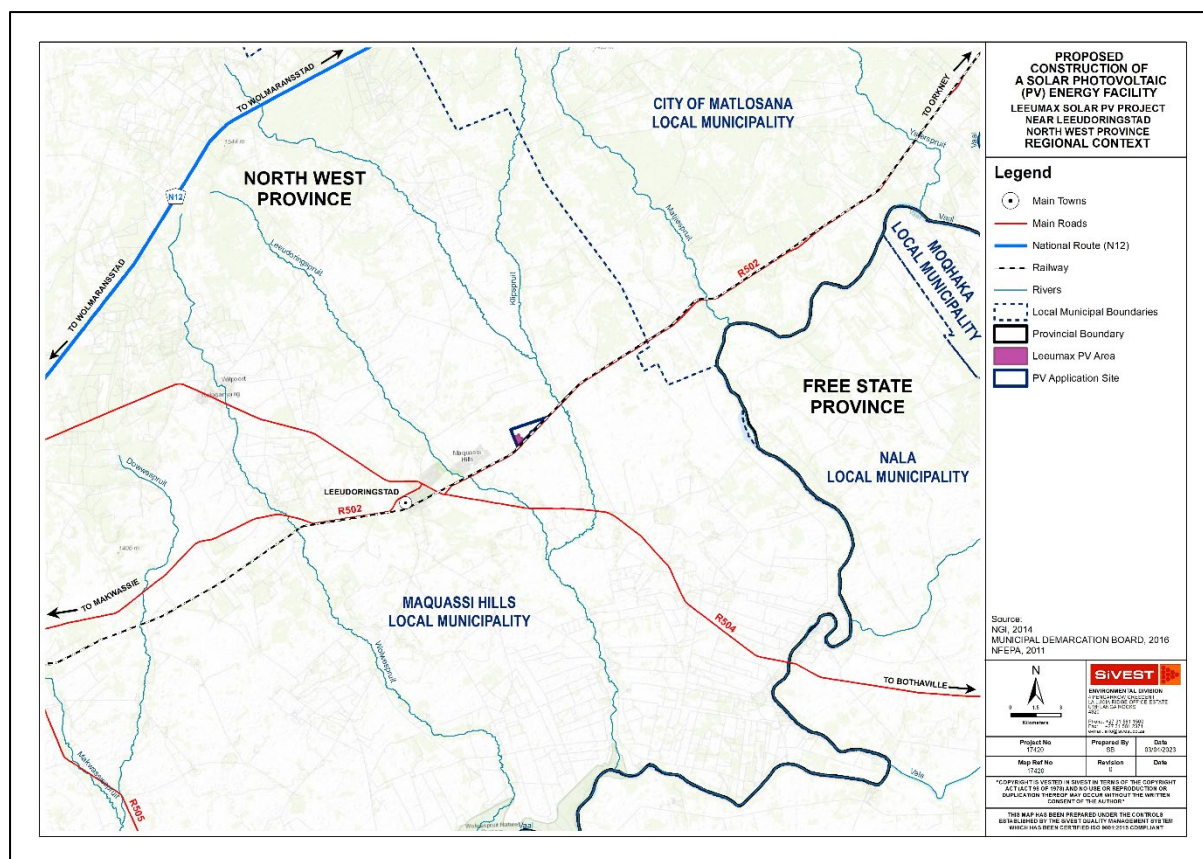
The Leeumax Solar PV forms part of a larger cluster of projects and sits adjacent to the Leeuwbosch 1 and 2 Solar PV Facilities. The various projects are as follows:

**Table 2: Leeuwbosch PV Facilities status and reference numbers**

Project	Status	Reference number
Proposed Leeumax PV.	Subject of this application	TBC
Leeuwbosch 1 Solar PV Facility	Approved	(Ref No: NWP/EIA/42/2021)
Leeuwbosch 2 Solar PV Facility	Approved	(Ref No: NWP/EIA/45/2021)
Leeudoringstad Solar PV Substation	Approved	(Ref No: NWP/EIA/43/2021)

The energy generated by the SEF will be evacuated via a 132 kV powerline which is being assessed as a separate application (Currently undergoing a Public participation Process as part of a proposed Registration process).





## 1.1 Content Requirements for a Basic Assessment Report

A Basic Assessment Report must contain the information that is necessary for the competent authority to consider and come to a decision on the application and must include a proper understanding of the process, informing all preferred alternatives, the scope of the assessment, an assessment of the significant impacts, findings of the specialists and proposed mitigation measures, and the consultation process followed through the BA process. The content requirements for a Basic Assessment Report (as provided in Appendix 1 of the EIA Regulations 2014, as amended), as well as details of which section of the report fulfils these requirements, are shown in Table 32 below.

**Table 3: Content requirements for a Basic Assessment Report**

2014 EIA Regulations, as amended.	Requirements for Basic Assessment Reports	Location in this Basic Assessment Report
Appendix 1, Section 3 (1)	A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include—	Refer to relevant reference sections below:
Appendix 1, Section 3 (a)	Details of – (i) The EAP who prepared the report; and (ii) The expertise of the EAP, including a curriculum vitae.	Section 4
Appendix 1, Section 3 (b)	The location of the activity, including – (i) The 21-digit Surveyor General code of each cadastral land parcel; (ii) Where available, the physical address and farm name; (iii) Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties	Section 5
Appendix 1, Section 3 (c)	A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale,  or, if it is –  (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Section 5
Appendix 1, Section 3 (d)	A description of the scope of the proposed activity, including – (i) All listed and specified activities triggered and being applied for; and (ii) A description of the activities to be undertaken, including associated structures and infrastructure.	Section 6
Appendix 1, Section 3 (e)	A description of the policy and legislative context within which the development is proposed including- (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this	Section 10 and 11

2014 EIA Regulations, as amended.	Requirements for Basic Assessment Reports	Location in this Basic Assessment Report
	activity and have been considered in the preparation of the report; and (ii) How the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	
Appendix 1, Section 3 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 12
Appendix 1, Section 3 (g)	a motivation for the preferred site, activity and technology alternative;	Section 13
Appendix 1, Section 3 (h)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including-	Section 13
	(i) Details of all alternatives considered;	Section 13
	(ii) Details of the Public Participation Process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 13
	(iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	TBC in Final BAR
	(iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 8 and 9
	(v) The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts- (aa) Can be reversed; (bb) May cause irreplaceable loss of resources; and (cc) Can be avoided, managed, or mitigated.	Section 14
	(vi) The methodology used in deterring and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Appendix 7
	(vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographic, physical, biological, social, economic, heritage and cultural aspects;	Section 15
	(viii) The possible mitigation measures that could be applied and level of residual risk;	Section 15
	(ix) The outcome of the site selection matrix;	Section 14
	(x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and;	Not Applicable
	(xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity.	Section 14
Appendix 1, Section 3 (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location	Appendix 7 and



2014 EIA Regulations, as amended.	Requirements for Basic Assessment Reports	Location in this Basic Assessment Report
	through the life of the activity, including- (i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	Section 15
Appendix 1, Section 3 (j)	An assessment of each identified potentially significant impact and risk, including- (i) Cumulative impacts; (ii) The nature, significance and consequences of the impact and risk; (iii) The extent and duration of the impact and risk; (iv) The probability of the impact and risk occurring; (v) The degree to which the impact and risk can be reversed; (vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) The degree to which the impact and risk can be avoided, managed or mitigated.	Section 14
Appendix 1, Section 3 (k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report.	Section 16
Appendix 1, Section 3 (l)	An environmental impact statement which contains- (i) A summary of the key findings of the environmental impact assessment; (ii) A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	Section 17
Appendix 1, Section 3 (m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMP.	Refer attached in Appendix 8
Appendix 1, Section 3 (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	Section 19
Appendix 1, Section 3 (o)	A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 20
Appendix 1, Section 3 (p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Section 17 and Section 21
Appendix 1,	Where the proposed activity does not include operational aspects,	Section 21

2014 EIA Regulations, as amended.	Requirements for Basic Assessment Reports	Location in this Basic Assessment Report
Section 3 (q)	the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised.	
Appendix 1, Section 3 (r)	An undertaking under oath or affirmation by the EAP in relation to- (i) The correctness of the information provided in the report; (ii) The inclusion of the comments and inputs from stakeholders and interested and affected parties; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	Section 22
Appendix 1, Section 3 (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	Not Applicable at this stage
Appendix 1, Section 3 (t)	any specific information required by the Competent Authority.	Section 23
Appendix 1, Section 3 (u)	Any other matter required in terms of section 24(4) (a) and (b) of the Act.	None
Appendix 1 Section 3 (2)	Where a government notice gazetted by the Minister provides for the basic assessment process to be followed, the requirements as indicated in such a notice will apply.	Noted and applied with

## 2. PROJECT TITLE

Proposed Development of the Leeumax Solar Photovoltaic (PV) Plant and Associated Infrastructure near Leeudoringstad in the North West Province.

## 3. DETAILS OF APPLICANT

### 3.1 Name and contact details of the Applicant

Name and contact details of Applicant is provided on **Table 3** below:

**Table 4: Name and contact details of the applicant**

<b>Business Name of Applicant</b>	Upgrade Energy (Pty) Ltd
<b>Physical Address</b>	8 Farm Road, Fishhaven, Western Cape, 7200
<b>Postal Address</b>	P.O. Box 1171, Umhlanga Rocks
<b>Postal Code</b>	4320
<b>Telephone</b>	082 465 9825
<b>Fax</b>	086 600 8622
<b>Email</b>	emil@megatrade.co.za

## 4. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS

### 4.1 Name and contact details of the Environmental Consultant

The table below provides the name and contact details of the Environmental Consultant who prepared this report:

**Table 5: Name and contact details of the Environmental Consultant who prepared the report**

<b>Business Name of EAP</b>	SiVEST SA (PTY) Ltd
<b>EAP</b>	Michelle Guy
<b>Physical Address</b>	4 Pencarrow Crescent, La Lucia Ridge Office Estate
<b>Postal Address</b>	PO Box 1899, Umhlanga Rocks
<b>Postal Code</b>	4320
<b>Telephone</b>	031 581 1577
<b>Email</b>	<a href="mailto:michelleg@sivest.co.za">michelleg@sivest.co.za</a>

### 4.2 Names and expertise of the Environmental Assessment Practitioner (EAP)

The table below provides the names of the EAP's who prepared this report:

**Table 6: Names and details of the expertise of the EAP's involved in preparing this report**

<b>Name of representative of the EAP</b>	<b>Educational Qualifications</b>	<b>Professional Affiliations</b>	<b>Experience (years)</b>
Michelle Nevette ( <i>Cert.Sci.Nat.</i> )	MEnvMgt. (Environmental Management)	SACNASP Registration No. 120356 EAPASA Registration No. 2019/1560 IAIAsa	19
Michelle Guy ( <i>Pr.Sci.Nat</i> )	MSc Environmental Science	SACNASP Registration No. 126338 EAPASA Registration No. 2019/868 IAIA	10

CV's of SiVEST personnel and the EAP declaration are attached in **Appendix 1**.

### 4.3 Names and expertise of the specialists

Specialist studies have been conducted in terms of the Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(A) and (H) and 44 of the NEMA when applying for EA, as well as the EIA Regulations, 2014 (as amended). The table (**Table 6**) below provides the names of the specialists involved in the project:

**Table 7: Names of specialists involved in the project**

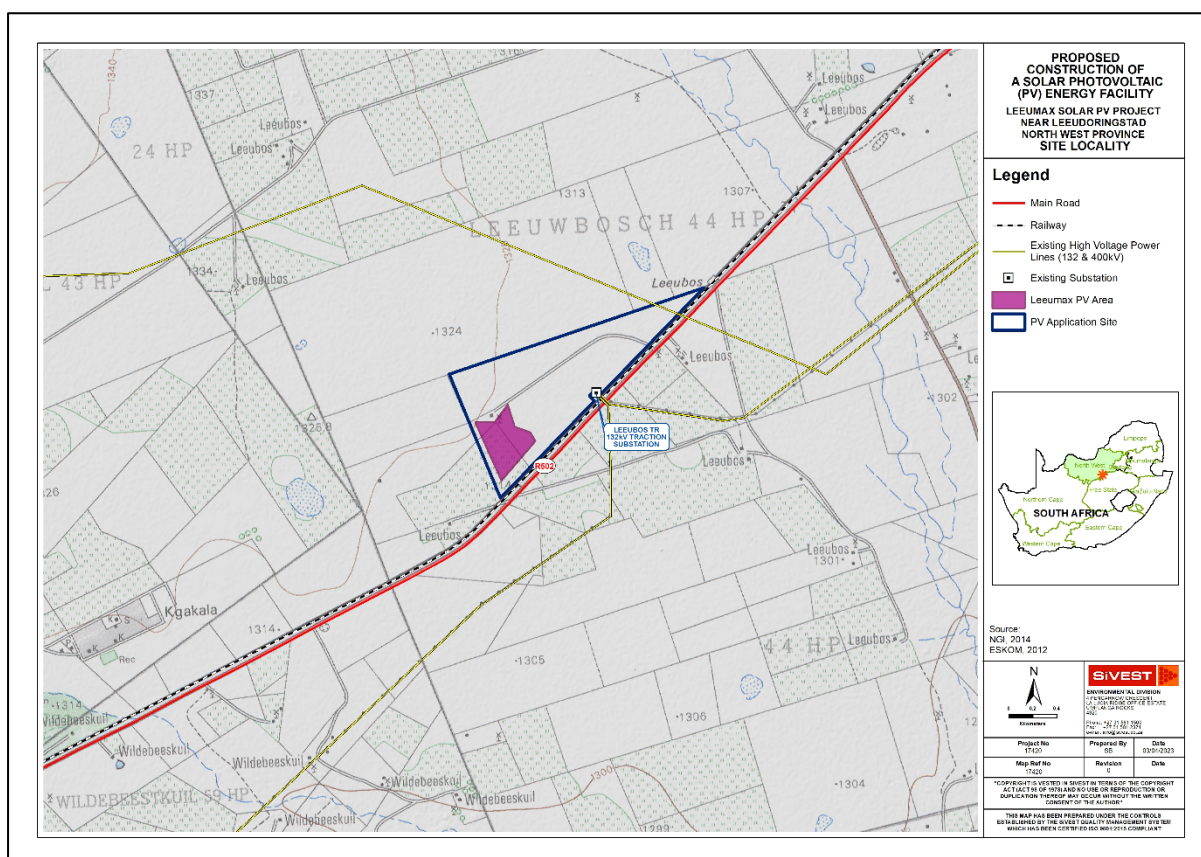
<b>Company</b>	<b>Name of representative of the specialist</b>	<b>Specialist</b>	<b>Educational Qualifications</b>	<b>Experience (years)</b>
SLR Consulting (South Africa) (Pty) Ltd	Kerry Schwartz	Visual Impact Assessment	BA (Geography) GTc GISc 1187	25
Johann Lanz Consulting	Johann Lanz	Agriculture and Soils Assessment	M.Sc. (Environmental Geochemistry)	24
Chris Van Rooyen Consulting	Chris van Rooyen	Avifaunal Impact Assessment	BA LLB	22
	Albert Froneman		MSc Conservation	22
Banzai Environmental (Pty) Ltd	Elize Butler	Palaeontological Impact Assessment	MSc (cum laude) Zoology specialising in Palaeontology  Palaeontological Society of South Africa	25
PGS Heritage (Pty) Ltd	Wouter Fourie	Heritage Impact Assessment	Professional Archaeologist registered ASAPA, CRM accreditation (ASAPA) Professional Heritage Practitioner (APHP- Western Cape).	21
Eco Assist Environmental Consulting	Wayne Jackson	Wetland Assessment	BSc Soil Science & Hydrology South African Council for Natural Scientific Professionals (SACNASP) reg No. 119037	13
Urban-Econ Development Economist	Ruan Oberholzer	Socio-Economic Impact Assessment	BTRP (Hons); MSc (Real Estate)	16
	Nthabiseng Makhoali		BCom Hons (Transport Economics), BCom (Economics & International Trade)	3
JG Afrika (Pty) Ltd	Keval Sigh	Desktop Geotechnical Assessment	MSc (Engineering Geology)	10
David Hoare Consulting (Pty) Ltd	David Hoare	Terrestrial Biodiversity	SACNASP (Pr Sci. Nat)	25

## 5. LOCATION OF THE ACTIVITY

The proposed project site is located approximately 6km north-east of the town of Leeudoringstad in the Maquassi Hills Local Municipality, which falls within the Dr Kenneth Kaunda District Municipality in the North West Province of South Africa (**Figure 3**). The total area of the property which was assessed by the respective specialists as part of the current and previous BA process is approximately 124.691 hectares (ha) in extent.

The application site for the proposed project incorporates the following farm portion / property:

- Farm Leeuwbosch No. 44 Portion



**Figure 3: Site Locality**

### 5.1 21 Digit Surveyor General Codes and Farm names of the site

21 Digit Surveyor General Code and farm name of the site is available in the below.

**Table 8: 21 Summary of property / farm portion**

21-DIGIT SURVEYOR GENERAL (SG) CODE	FARM DESCRIPTION
T0HP00000000004400037	Portion 37 of the Farm Leeuwbosch No. 44

### 5.2 Coordinates of the site

The coordinates for the project site is as follows:



**Table 9: Site coordinates**

LEEUMAX SEF: APPLICATION SITE		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
1	27°12'18.76"S	26°17'51.68"E
2	27°12'18.87"S	26°17'57.62"E
3	27°12'14.32"S	26°18'1.71"E
4	27°12'20.43"S	26°18'3.57"E
5	27°12'22.00"S	26°18'8.17"E
6	27°12'24.45"S	26°18'9.71"E
7	27°12'34.83"S	26°17'58.96"E
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
POINT	SOUTH	EAST
8	27°12'24.91"S	26°18'1.14"E

**Table 10: SEF Coordinates – Substations and associated infrastructure**

LEEUMAX SEF: SUBSTATION AND ASSOCIATED INFRASTRUCTURE LOCATION		
COORDINATES AT CENTRE POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
33kV Switching Station	27°12'15.08"S	26°18'22.83"E
Temporary Building Zone	27°12'15.19"S	26°18'3.43"E
Guard House	27°12'13.71"S	26°18'2.79"E
Substation (already approved)	27°12'14.18"S	26°18'25.58"E

## 6. ACTIVITY INFORMATION

### 6.1 Project Description

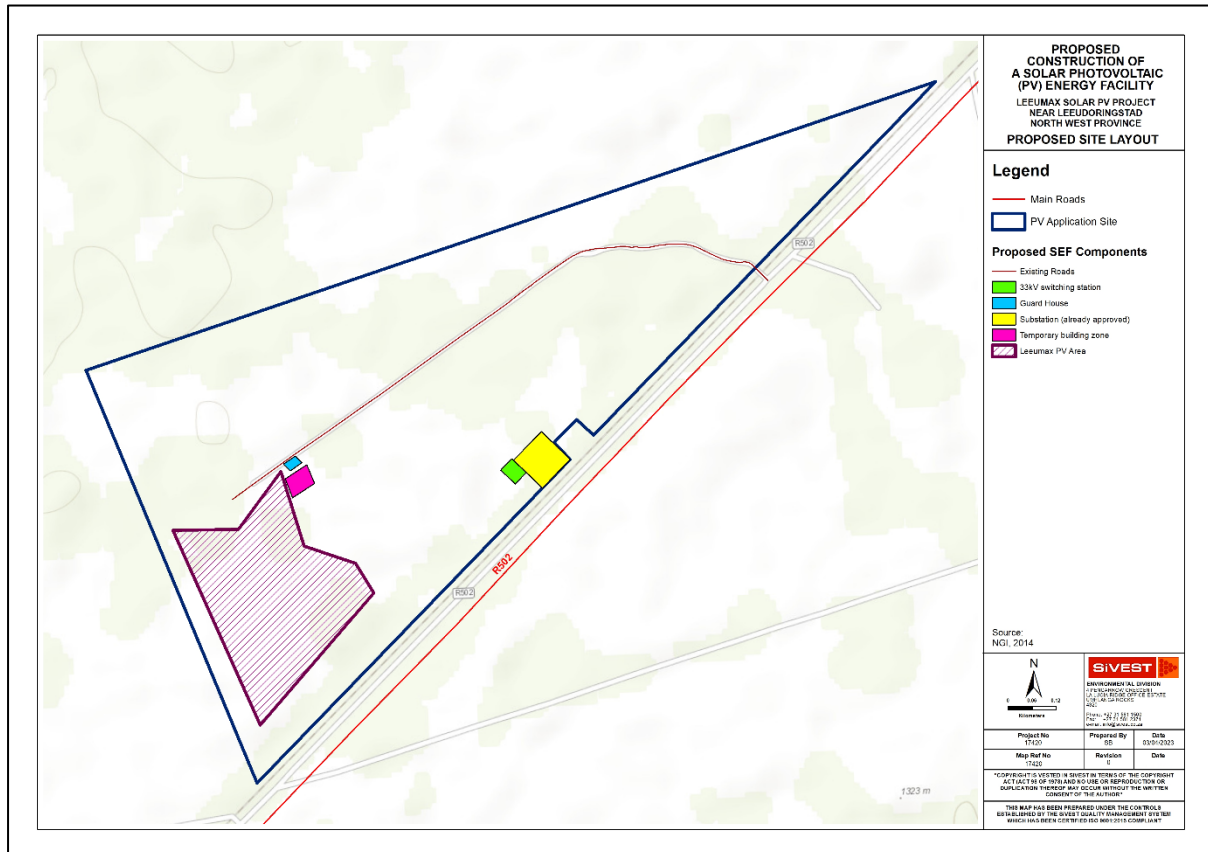
#### 6.1.1 SEF and Associated Infrastructure

The site area to be developed is approximately 15 ha in extent. It is anticipated that the Solar PV energy facility will include PV fields (arrays) comprising of multiple PV panels. In summary, the proposed SEF development will include the following components:

- The proposed solar PV plant will include PV fields (arrays) comprising multiple PV modules;
- PV panels will be single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology;
- Each PV module will be approximately 2274mm (≈2.3m) long and 1134mm (≈1.1m) wide and mounted on supporting structures above ground;
- The foundations will most likely be either concrete or rammed piles;
- Generation capacity of up to +/-15MWac
- One (1) new 33/132kV on-site substation (facility substation) occupying an area of up to approximately 0.2003ha (2 003m<sup>2</sup>);
- One (1) guard house approximately 0.0876 ha (876m<sup>2</sup>) in size;
- One (1) temporary building zone 0.2944 ha (2 944m<sup>2</sup>);

- Site and internal access roads, up to 4m wide, will provide access to the PV arrays. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary;
- Galvanized steel fencing with electrification approximately 2.1m in height;
- Existing boreholes will be used where possible. Water will potentially be stored in water storage tanks;

The Proposed Layout is reflected below in **Figure 3** and attached in **Appendix 3**. Photographs of the site are included in **Appendix 4**.



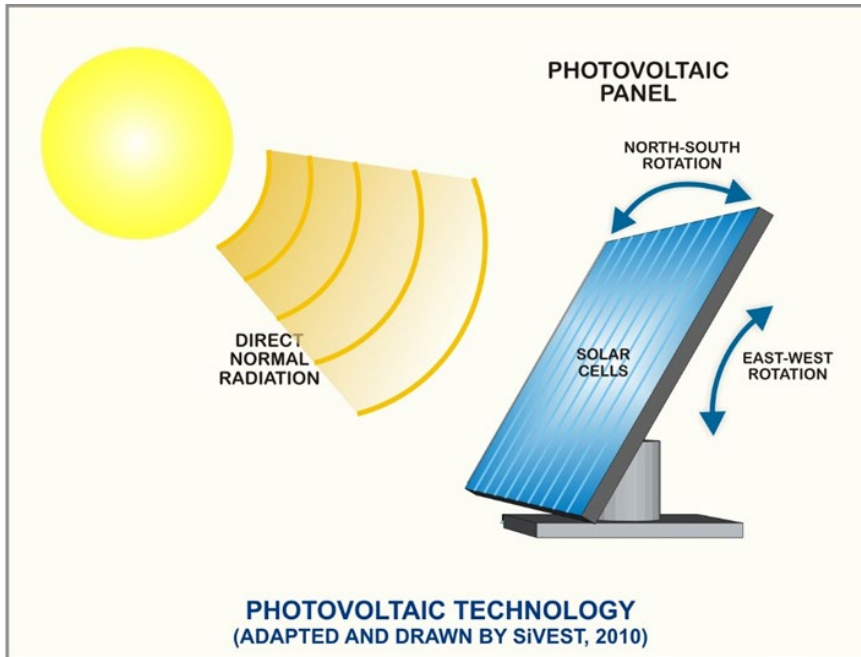
**Figure 4: Proposed Layout**

The solar PV panels and all other project infrastructure will be placed strategically within the development area based on environmental constraints

### 6.1.2 Main components of a Solar PV Facility

Solar PV panels are usually arranged in rows consisting of a number of PV modules.

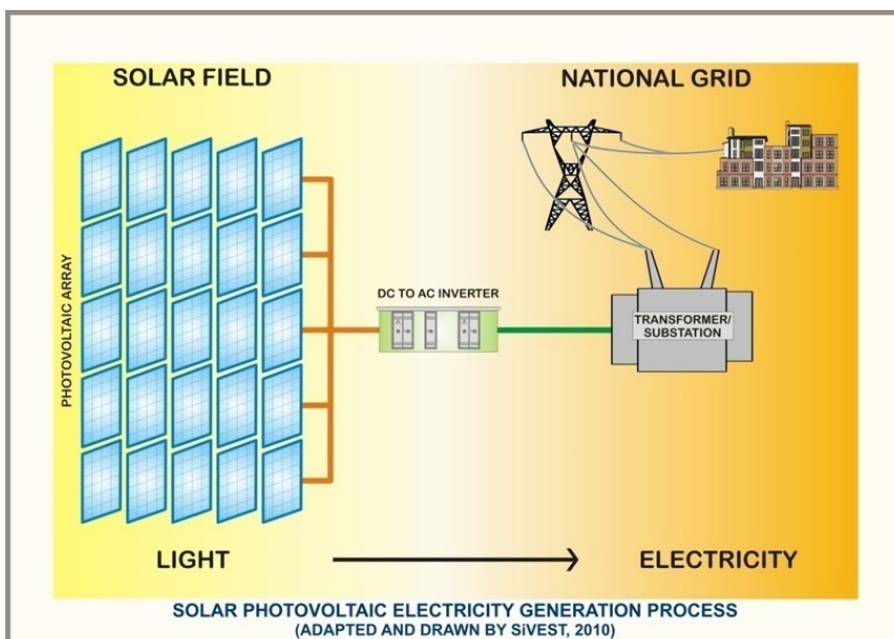
Please refer to **Figure 5** below for the typical components of a solar panel.



**Figure 5: Typical components of a solar PV panel**

The solar arrays are usually connected in strings, which are in turn connected to inverters. DC power from the panels will be converted into AC power in the inverters and the voltage will be typically stepped up to a medium voltage in the transformers. Medium voltage cabling will link the solar PV energy facility to the grid connection infrastructure (132kV overhead power line and 33/132kV on-site substation). The medium voltage cables will be run underground (wherever technically feasible) in the facility before being fed to the on-site and/or collector substation, where the voltage will typically be stepped up.

The solar PV electricity generation process is illustrated in **Figure 6** below.



**Figure 6: Solar PV electricity generation process**

### 6.1.3 Solar PV arrays

The proposed solar PV plant will include PV fields (arrays) comprising multiple PV modules. PV panels will be single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology. Each PV module will be approximately 2274mm ( $\approx 2.3\text{m}$ ) long and 1134mm ( $\approx 1.1\text{m}$ ) wide and mounted on supporting structures above ground. At this stage it is anticipated that the structures will be mono-facial modules. The final design details will become available during the detailed design phase of the proposed development, prior to the start of construction. The foundations will most likely be either concrete or rammed piles. The final foundation design will be determined at the detailed design phase of the proposed development.

### 6.1.4 Switching Substation

The proposed development will include the construction of one (1) new on-site switching substation with a capacity of more than 33kV but less than 275kV. The switching substation will occupy an area of up to approximately 0.2ha. The switching substation will contain transformer(s) for voltage step-up from medium voltage to high voltage. DC power from the modules will be converted into AC power in the inverters and the voltage will be stepped up to medium voltage in the inverter transformers. Medium voltage cabling (anticipated to be approx. 0.8m x 0.6m wide at this stage) will link the various PV arrays to the switching substation, as well as the Leeudoringstad Solar Plant Substation. These cables will be laid underground, wherever technically feasible.

### 6.1.5 Other Infrastructure

One (1) permanent guard house, occupying a site of approximately 0.0876ha (i.e. 876m<sup>2</sup>). Fencing will surround the entire proposed solar PV plant. At this stage it is anticipated that the fencing will be approximately 2.1m high and will be made of galvanised steel with electrification on top. In addition, fencing is anticipated to cover an area of up to approximately 18ha.

### 6.1.6 Temporary Infrastructure

To obtain water from available local sources, existing boreholes will be utilised. Water will potentially be stored in temporary water storage tanks. The necessary approvals from the Department of Water and Sanitation (DWS) will be applied for separately (should this be required). One (1) temporary building zone (construction laydown area) which will occupy a site of up to approximately 0.2944ha (i.e., 2 944m<sup>2</sup>).

### 6.1.7 Access Roads

Access to the proposed facility will be via an existing approved gravel road which connects to the tarred R502 road. There are two existing access points. Both have gates to the property and have existing access road tracks. These will be upgraded and formalised to allow delivery of material as part of the project. Transnet and the North-West Department of Public Works and Roads will be consulted with as required.

Existing internal gravel access roads will be used to access the PV arrays as well as the switching substation. New internal gravel roads of up to approximately 4m wide may however be constructed, where necessary.

### 6.1.8 Technical Detail Summary

A summary of the project technical details is provided in **Table 10** below.

**Table 11: Technical Detail Summary**

Component	Description / Dimensions
Location of site (centre point)	Latitude: 27°12'24.03" S Longitude: 26°18'2.64" E
Site area	Approximately 15 ha
Technology	<ul style="list-style-type: none"> <li>The proposed solar PV plant will include PV fields (arrays) comprising multiple PV modules.</li> <li>PV panel mountings. PV panels will be single axis tracking mounting, and the modules will be either crystalline silicon or thin film technology.</li> <li>Each PV module will be approximately 2274mm (≈2.3 m) long and 1134 mm (≈1.1 m) wide and mounted on supporting structures above ground. At this stage it is anticipated that the structures will be mono-facial modules. The final design details will become available during the detailed design phase of the proposed development, prior to the start of construction.</li> <li>The foundations will most likely be either concrete or rammed piles. The final foundation design will be determined at the detailed design phase of the proposed development.</li> </ul>
SG codes	T0HP00000000004400037
Generation Capacity of Solar PV Plant	Maximum of up to ± 15MW ac
Capacity of Switching Substation	More than 33 kV but less than 275 kV. Exact capacity of the proposed on-site switching substation will be determined and confirmed at a later stage.
Dimensions of PV Panels	<ul style="list-style-type: none"> <li>Width: up to ± 2274mm (≈2.3m)</li> <li>Length: up to ± 1134mm (≈1.1m)</li> </ul>
On-site Switching Substation	<ul style="list-style-type: none"> <li>One (1) new on-site switching substation with a capacity of more than 33 but less than 275 kV.</li> <li>Total footprint: up to ± 0.2003 ha (2 003 m<sup>2</sup>).</li> <li>To contain transformers for voltage, step up from medium voltage to high voltage. DC power from the PV modules will be converted into AC power in the inverters and the voltage will be stepped up to medium voltage in the inverter transformers.</li> </ul>
Guard House	One (1) permanent guard house of ± 0.0876ha (876 m <sup>2</sup> ).
Temporary Building Zone	One (1) temporary building zone of ± 0.2944ha (2 944 m <sup>2</sup> ).

Component	Description / Dimensions
Area Occupied by Buildings	Up to $\pm 1.3807$ ha ( $13\,807\text{ m}^2$ )
Width of Existing Internal Gravel Roads	<ul style="list-style-type: none"> <li>Up to <math>\pm 4</math> m;</li> <li>Existing internal gravel site roads will be used wherever possible. However, where required, new internal gravel roads may be constructed.</li> </ul>
Length of existing internal roads (to be potentially upgraded)	<ul style="list-style-type: none"> <li>Up to <math>\pm 1.57</math> km</li> </ul>
Site Access	Access to the proposed development will be via an existing gravel road which connects to the tarred R502 road.
Proximity to grid connection	<ul style="list-style-type: none"> <li>Grid connection is to the 132/11kV Leeudoringstad Solar Plant Substation, which has been authorised as part of a separate BA process; and</li> <li>The 132/11kV Leeudoringstad Solar Plant Substation is located within the proposed Leeumax Solar PV Plant application site (namely Portion 37 of the Farm Leeuwbosch No. 44).</li> <li>Medium voltage cabling (anticipated to be <math>\pm 0.8\text{m} \times 0.6\text{m}</math> wide at this stage) will link the various PV arrays to the switching substation, as well as the Leeudoringstad Solar Plant Substation. These cables will be laid underground, wherever technically feasible.</li> </ul>
Height of fencing	<ul style="list-style-type: none"> <li><math>\pm 2.1</math> m high</li> <li>Fencing will surround the entire proposed solar PV plant.</li> </ul>
Type of fencing	Galvanised steel with electrification on top.
Area covered by fencing	The area that will be fenced is that of the proposed development site which covers approximately 15 hectares.
Boreholes and storage tanks	<ul style="list-style-type: none"> <li>It is anticipated that existing boreholes will be utilised;</li> <li>Water will potentially be stored in temporary water storage tanks.</li> </ul>

## 6.2 NEMA Listed Activities

The amended EIA Regulations promulgated under Section 24(5) of the NEMA, Act 107 of 1998 and published in Government Notice No. R. 326 list activities which may not commence without environmental authorization from the Competent Authority. The proposed activity is identified in terms of Government Notice No. R. 327, 325 and 324 for activities which must follow a Basic Assessment Process. The project will trigger the following listed activities provided in the table (**Table 11**) below:



**Table 12: Listed activities in terms of NEMA: EIA Regulations 2014 (as amended in 2017), applicable to the proposed project**

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
<b>Relevant Basic Assessment Activities as set out in Listing Notice 1</b>		
1	<p><b>GN R. 327 Item 1:</b> The development of facilities or infrastructure for the generation of electricity from a renewable resource where—</p> <p>(ii) the electricity output is more than 10 megawatts but less than 20 megawatts</p>	The proposed development will entail the construction of a solar photovoltaic (PV) plant within the proposed application site which will have a capacity of up to approximately 15MWac. The proposed solar PV plant development will occupy an area in excess of 1 hectare (ha). In addition, the proposed solar PV plant development will be located outside an urban area.
11 (i)	<p><b>GN R. 327 Item 11:</b> The development of facilities or infrastructure for the transmission and distribution of electricity—</p> <p>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.</p>	<p>The application involves the construction of an on-site IPP substation within the proposed application site which will be located outside an urban area. The proposed switching substation will have a capacity of more than 33 but less than 275 kilovolts (kV).</p> <p>The proposed application also involves the construction of medium voltage cabling to link the various PV arrays to the proposed switching substation, as well as the Leeudoringstad Solar Plant Substation.</p>
27	<p><b>GN R. 327 Item 27:</b> The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—</p> <p>(i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>	The proposed application will include the clearance of an area of 1ha or more, but less than 20ha of indigenous vegetation within the proposed application site. The extent of the clearance is approximately 15ha.
28 (ii)	<p><b>GN R. 327 Item 28:</b> Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:</p> <p>(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;</p>	<p>The proposed site is currently used and zoned for agricultural purposes. The proposed development will result in an area of agricultural land greater than 1ha being transformed to industrial / commercial use for the proposed facility.</p> <p>Consent has however been received from DALRRD and the Maquassi Hills Local Municipality to establish a solar panel farm on the property.</p>

## 7. NATIONAL WEB BASED ENVIRONMENTAL SCREENING TOOL

The National Web based Environmental Screening Tool is a geographically based web-enabled application which allows a proponent intending to submit an application for environmental authorisation in terms of the EIA Regulations 2014, as amended to screen their proposed site for any environmental sensitivity.

According to the DFFE Screening Tool Report (attached in **Appendix 8**), the following themes described in the table (**Table 12**) below are applicable to the proposed development:

**Table 13: Site Sensitivity Verification**

Theme	Sensitivity	Comment
Agriculture Theme	Medium Sensitivity	<p>The Agricultural Compliance Statement is included in <b>Appendix 6</b> of the Draft Basic Assessment Report.</p> <p>Agricultural Specialist Comment: Based on the available soil information and the considered interpretation thereof (as per the original report), the site is generally of low sensitivity for agriculture.</p>
Animal Species Theme	Low Sensitivity	<p>The Terrestrial Ecological Report is included in <b>Appendix 6</b> of the Draft Basic Assessment Report.</p> <p>Terrestrial Specialist Comment: The site consists of a combination of Grassland and Secondary Grassland (old fields). The site has been assessed as having low sensitivity in terms of the Animal Species Theme. There are no animal species flagged for the site. Further research indicates that there are no animal species of concern or protected animal species that are likely to occur on site or be reliant on the site. The proposed development will not affect any animal species of concern. The development is therefore supported.</p> <p>Avifaunal Specialist Comment: The application site and immediate environment is classified as Low sensitivity for terrestrial animals according to the Terrestrial Animal Species Theme. However, based on the available SABAP2 data and the Site Sensitivity Verification survey conducted in August 2020 the application site contains confirmed records of species of conservation concern (SCC), namely, Secretary birds <i>Sagittarius serpentarius</i> (Globally and Regionally Endangered). Therefore, a classification of High sensitivity for the application site is recommended.</p>
Aquatic Biodiversity Theme	Low Sensitivity	<p>The Aquatic Report is included in <b>Appendix 6</b> of the Draft Basic Assessment Report.</p> <p>The site verification assessment shows that no wetlands are at risk from the proposed development.</p> <p>The proposed Leeumax Solar PV site does not show wetlands within the boundary of the proposed footprint; however, one (1)</p>



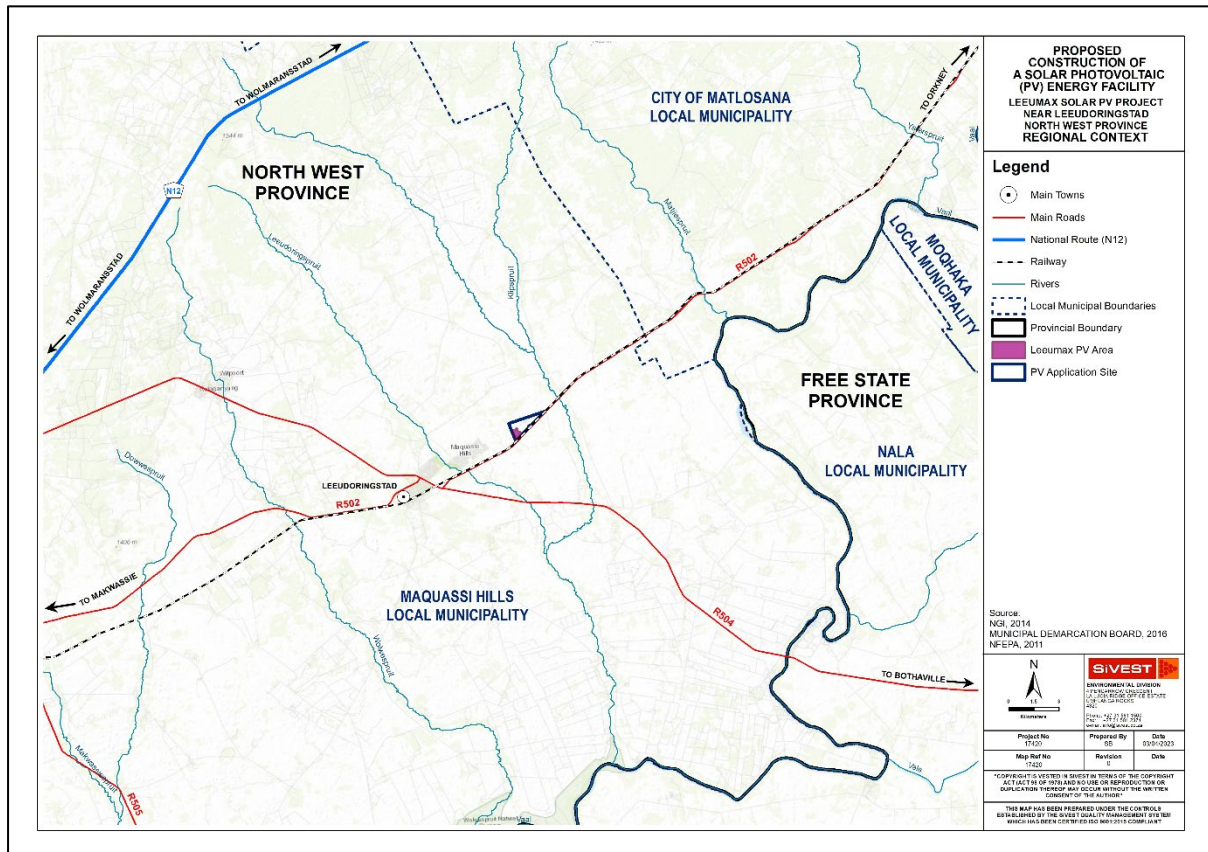
Theme	Sensitivity	Comment
		wetland (HGM 3) was found within the 500m regulated area. The wetland was located south of the project area approximately 185m away. The wetland is also buffered by the main road. The impact assessment concluded that the wetland will not be impacted by the proposed development and that the impact was rated as Low or no perceived impact.
Archaeological and Cultural Heritage Theme	Low Sensitivity	<p>The Heritage Report is included in <b>Appendix 6</b> of the Draft Basic Assessment Report.</p> <p>The overall impact of the proposed Leeumax PV Facility, on the heritage resources identified during this report, is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.</p>
Avian Theme	High Sensitivity	<p>The Avifaunal Report is included in <b>Appendix 6</b> of the Draft Basic Assessment Report.</p> <p>Based on the available SABAP2 data and the Site Sensitivity Verification survey conducted in August 2020 the application site contains confirmed records of species of conservation concern (SCC), namely, Secretary birds <i>Sagittarius serpentarius</i> (Globally and Regionally Endangered). Therefore, a classification of High sensitivity for the application site is recommended.</p>
Civil Aviation (Solar PV) Theme	Low Sensitivity	The closest airport is the Klerksdorp Airport which is approximately 50.8km away.
Defence Theme	Low Sensitivity	The entire site has a low sensitivity in terms of the defence theme. No further specialist study required.
Landscape (Solar) Theme	Medium Sensitivity	<p>The Visual Assessment is included in <b>Appendix 6</b> of the Draft Basic Assessment Report.</p> <p>The identification of areas of “Medium” landscape sensitivity in this instance is related to the proximity of the site to Kgakala Township. Although there is a relatively high concentration of receptors in the Kgakala, Township, these receptors are not expected to be sensitive to the visual impact of the proposed development due to the existing visual degradation within these areas.</p> <p>The findings of the sensitivity assessment in the VIA have been verified.</p>
Palaeontology Theme	Medium Sensitivity	<p>The Palaeontology Report is included in <b>Appendix 6</b> of the Draft Basic Assessment Report.</p> <p>The proposed development is underlain by the Allanridge Formation (Ventersdorp Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Allanridge Formation is LOW (Almond and Pether 2008, SAHRIS website). It is therefore considered that the proposed development</p>

Theme	Sensitivity	Comment
		is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological heritage of the area. Hence, the construction of the development may be authorised in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.
Plant Species Theme	Medium Sensitivity	<p>The Terrestrial Ecological Report is included <b>Appendix 6</b> of the Draft Basic Assessment Report.</p> <p>Large parts of the site consist of secondary grassland within previously cultivated areas. There are remnants of the original natural grassland vegetation in the area.</p> <p>One sensitive plant species is flagged for the site, but it was not found there. For all other plant SCC, based on the available habitat, it is considered unlikely that any occur there. The site is therefore confirmed to have low sensitivity for the plant species theme. The proposed development is therefore supported.</p>
RFI Theme	Medium Sensitivity	The screening tool described the study area as medium. The cluster does not fall within the Square Kilometre Array (SKA) Karoo Central Radio Astronomy Advantage Area buffer. The SARAO has completed a preliminary risk assessment with regard to the electromagnetic emissions for the solar energy facility and its possible impact on the Square Kilometre Array radio telescopes. Based on the location of this project, SARAO confirm that the project is too far to be of any risk to the SKA telescopes
Terrestrial Biodiversity Theme	Very High Sensitivity	<p>The Terrestrial Ecological Report is included <b>Appendix 6</b> of the Draft Basic Assessment Report.</p> <p>In general, the site is considered to have potentially high sensitivity or biodiversity value, based on the location of the site within a listed ecosystem as well as being within an Ecological Support Area.</p> <p>The vegetation on site is part of a threatened ecosystem and has been assessed as being of high conservation value due to rates of transformation. The regional vegetation type that occurs on site, Vaal-Vet Sandy Grassland, is listed as Endangered in the National Ecosystem List, is part of an area earmarked for future National Park expansion and is part of a Provincial Ecological Support Area. Any remaining natural habitat on site therefore has high terrestrial biodiversity value.</p>

## 8. DESCRIPTION OF THE RECEIVING ENVIRONMENT

### 8.1 Geographical

The proposed site is approximately 6km north-east of the town of Leeudoringstad in the Maquassi Hills Local Municipality, which falls within the Dr Kenneth Kaunda District Municipality in the North West Province of South Africa (**Figure 7**).



**Figure 7: Location of Leeumax PV site**

### 8.2 Land Use

According to the South African National Land Cover dataset (GeoTerra Image 2018), much of the assessment area is characterised by natural vegetation which is dominated by natural grassland (**Figure 8**). There are however significant patches of land classified as 'cultivated land' throughout the study area, although much of this land appears to be fallow grasslands. Hence livestock farming is the dominant agricultural activity in the study area, although livestock densities appear to be relatively low.

Farm properties in the study area tend to be relatively large resulting in a low density of rural settlement. Built form is largely characterised by scattered farmsteads and ancillary farm buildings, gravel access roads, telephone lines, fences and the remnants of disused workers' dwellings. Other human influence is visible in the area in the form of road, rail and electricity infrastructure. This includes the R502 regional road adjacent to the site (along the southern boundary of the application site) and the R504 regional road which traverses the south-western. In addition, an operational railway line runs directly adjacent to the R502 and several high voltage power lines feed into the

Leeubosh TR 132kV Traction Substation situated on the boundary of the application site. The tall steel structures of the Traction Substation, as well as the tall steel towers of the power lines are visible in the landscape.

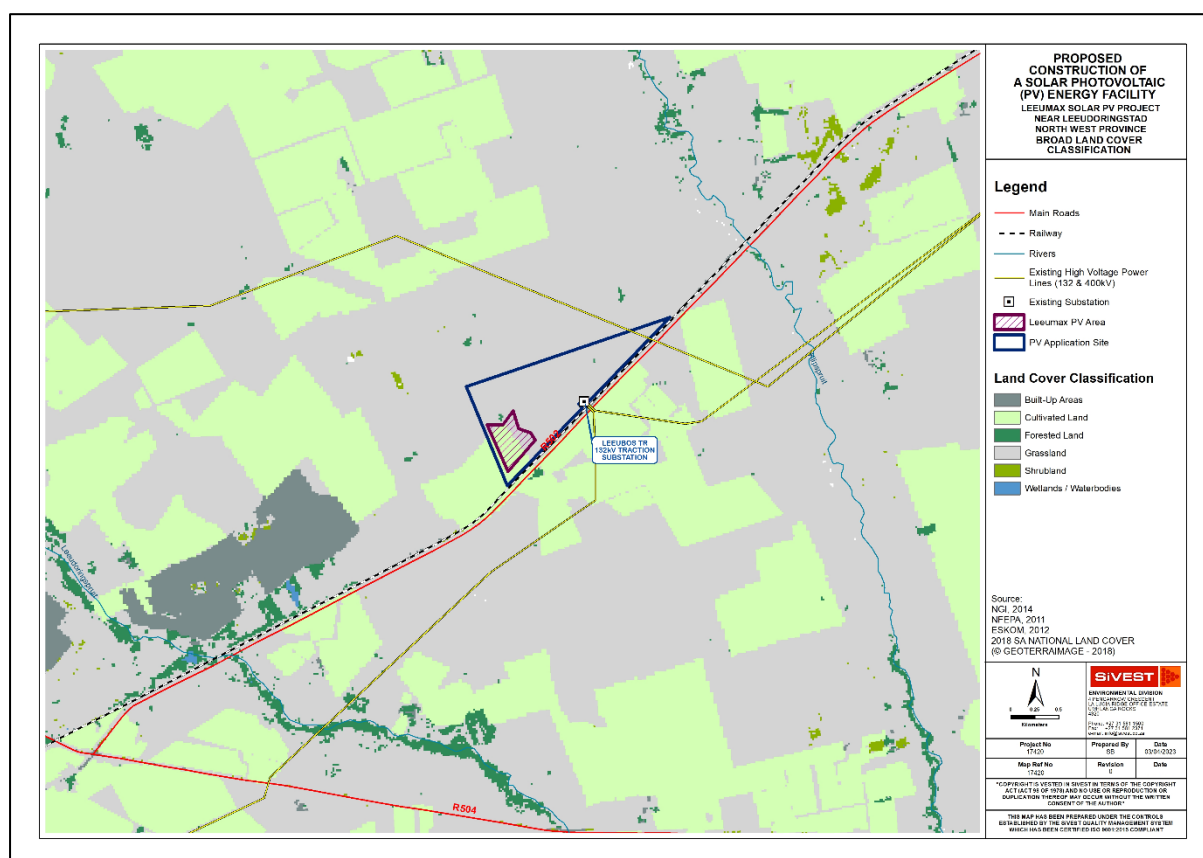


Figure 8: Land Cover Classification

### 8.3 Climate

The study area is characterized by a dry climate with a 'BSk' classification according to the Köppen-Geiger climate classification. Leeudoringstad receives a mean annual precipitation of 588mm. All areas with less than 400mm rainfall are considered to be arid and all areas with more than 600mm are moist. The study area can therefore be considered to be intermediate. The average lowest rainfall is received in July (6mm) and the highest in January (103mm), which is a seasonally variation of 97mm. Winter frost is common and severe and occurs on average 37 days per year.

The average maximum midday temperature for Leeudoringstad ranges from 23.2°C in January to 9.5°C in July, which is a seasonal variation of 13.7°C.

The average monthly distribution of rainfall and temperature is shown in the table (Table 13) below.

Table 14: Summary of climate conditions, Leeudoringstad (information extracted from "Climate-Data.org")

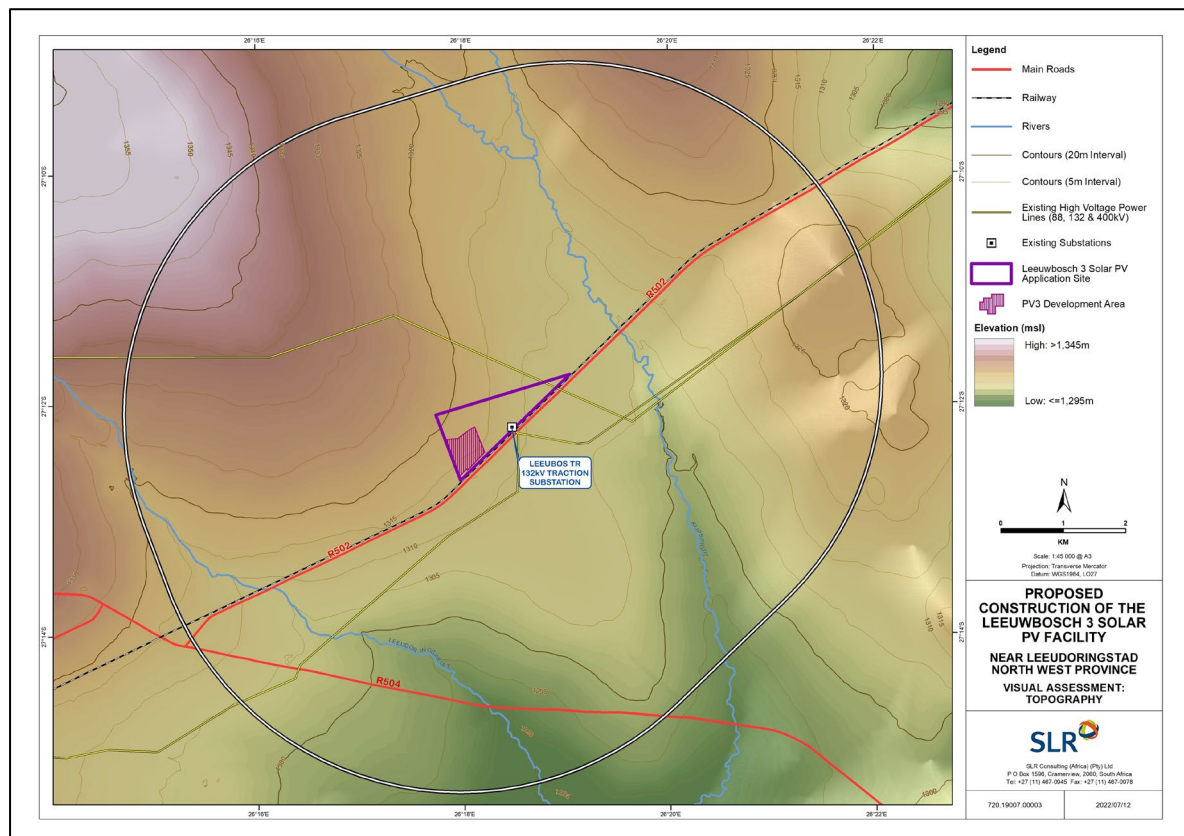
Months	Average Rainfall (mm)	Temperature (°C)		
		Maximum	Minimum	Average
January	103	30.2	16.3	23.2
February	93	28.6	15.8	22.2



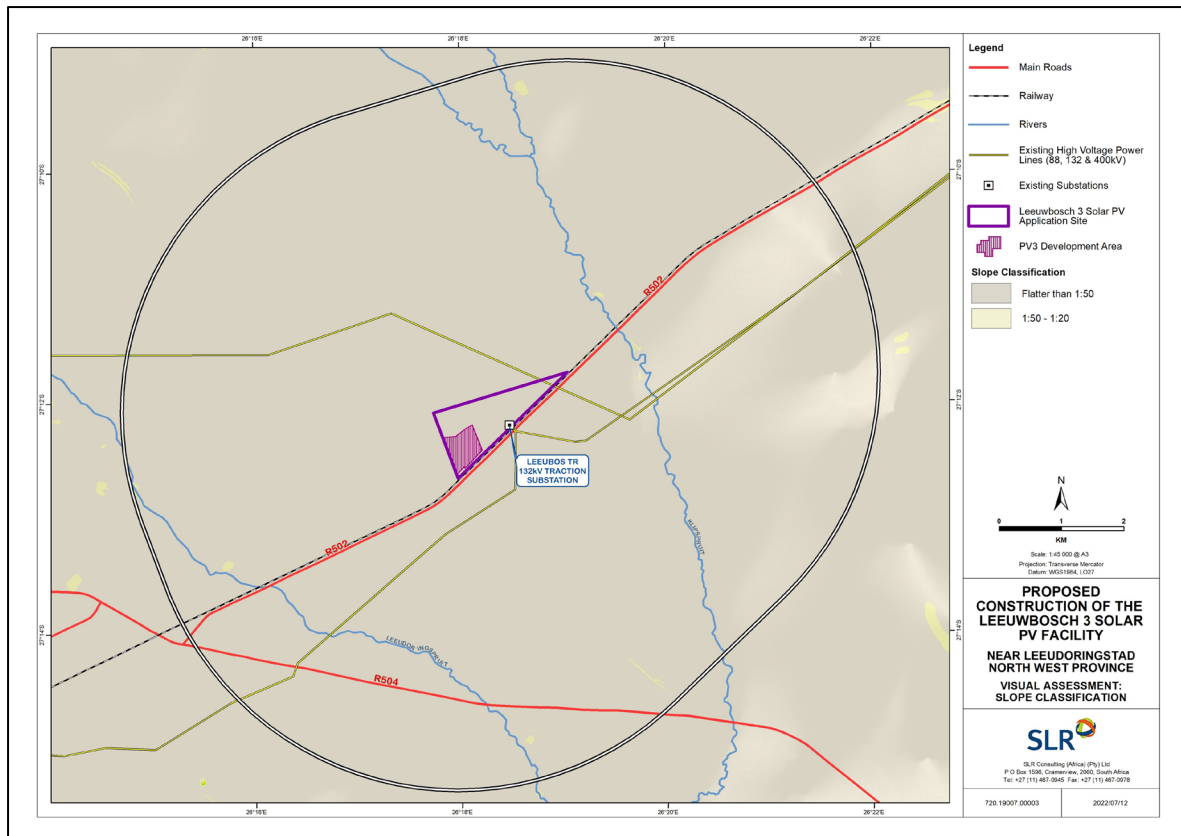
Months	Average Rainfall (mm)	Temperature (°C)		
		Maximum	Minimum	Average
March	80	27	13.7	20.3
April	50	24.4	9.5	16.9
May	23	21.4	5	13.2
June	8	18.2	1.2	9.7
July	6	18.3	0.7	9.5
August	10	21.4	2.9	12.1
September	16	24.9	7.4	16.1
October	51	27.8	11.3	19.5
November	67	28.5	13.6	21
December	81	29.3	15.2	22.4

## 8.4 Topography

The topography within and in the immediate vicinity of the proposed application site is characterised by a mainly flat to gently undulating landscape, sloping down in a south-easterly direction. In addition, the topography in the wider area is largely characterised by level plains with little noticeable relief and very gradual slopes. The topography and slopes in the project area are showing in **Figure 9** and **Figure 10** below.



**Figure 9: Topography**



**Figure 10: Degree of slope in region of study area**

## 8.5 Desktop Geotechnical

A Geotechnical Assessment was compiled by JG Afrika in April 2022. The baseline geotechnical status of the application is described in detail below.

According to the 1: 250 000 Geological Map of Kroonstad (2726 C) compiled by the Council for Geoscience, the study area is underlain by the Allanridge Formation which forms part of the Ventersdorp Supergroup, which comprises amygaloidal lava. The Ventersdorp Supergroup is predominantly an accumulation of andesitic to basaltic lavas with related pyroclastic rocks (Brink, 1979).

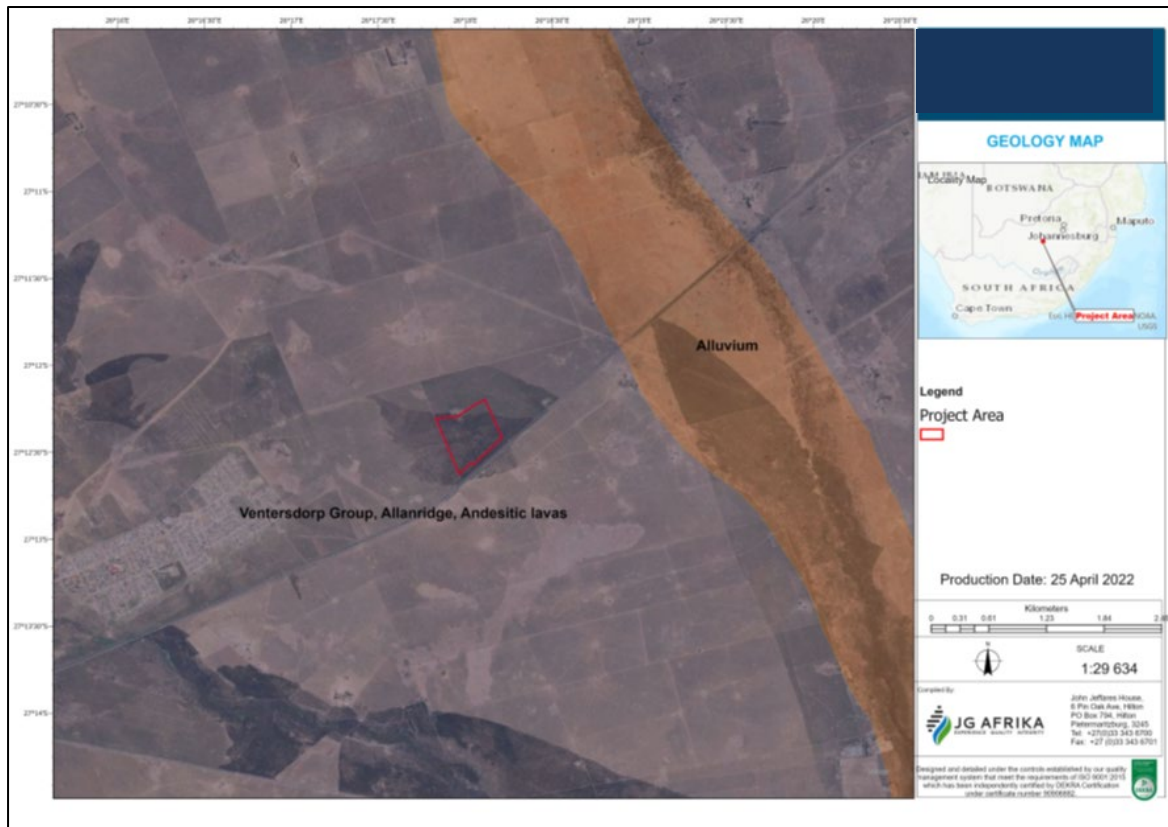
No structural lineaments in the form of dykes or faults were observed during the review of Geological Maps and aerial photography. A map of the geology of the area is included in **Figure 11**.

The occurrence of the Ventersdorp Supergroup within South Africa falls within three distinct climatic zones. The PV Plant study site is located within an area classed as a sub-humid dry zone, in which the soils are potentially expansive. In this climate zone where residual soils have developed; the profiles are not deeper than 12m depth.

The impact of the proposed development from a geotechnical perspective will be restricted to the removal and displacement of soil, boulders, and bedrock. The levelling of areas to create building platforms will also result in the displacement and exposure of subsoils. The potential impact of the development on the terrain and geological environment, will be the increased potential for soil erosion, caused by construction activities and the removal of vegetation. Areas of concentrated surface flow conditions can be anticipated at PV Plants, resulting in gradual erosion of unconsolidated

soil, during the operational life of the facility. This can result in the creation of preferential drainage features, unless remediated through proper engineering design (i.e. stormwater drainage).

Based on the impact assessment matrix undertaken for this project, from a geotechnical perspective the impact of 15MW Leeumax Solar PV Plant was found to be “Negative low impact – The anticipated impact will have negligible negative effects and will require little to no mitigation.”



**Figure 11: Geological Map of Kroonstad (2726 C) compiled by the Council for Geoscience**

## 8.6 Wetlands

The Wetland Assessment was undertaken by Eco-Assist Environmental Consultants (report dated 29 July 2022).

The project area is located in the C25A quaternary catchment. The study site falls within the Middle Vaal Water Management Area (WMA). The project area is situated on the crest landscape position on a south-east facing slope. The slope is fairly flat.

### 8.6.1 Findings

#### Desktop Investigation

From the National Freshwater Ecosystem Priority Areas (NFEPA) (2011) database, no wetlands or watercourses were identified directly on the study site (. Additionally, no wetlands were found to be within 500m of the study site. However, the Leeudoringspruit was found to be within approximately 150m south from the southern corner of the study site boundary.

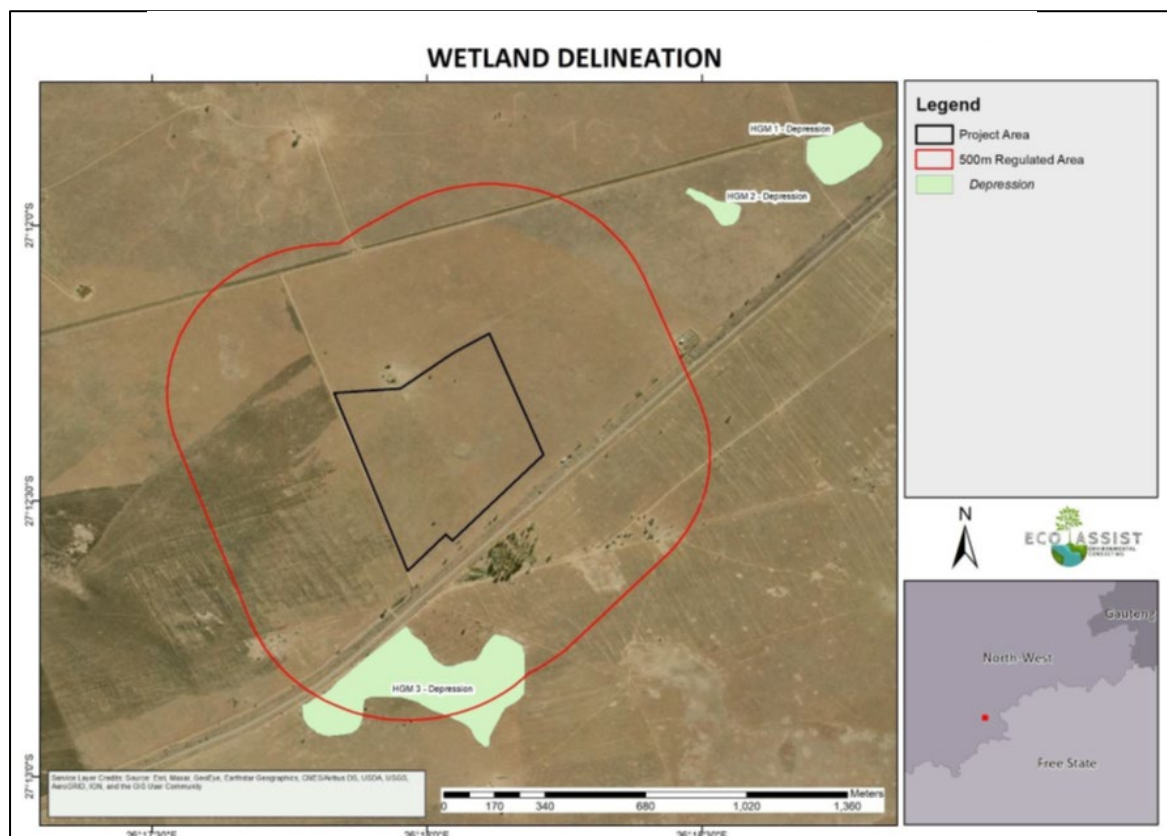
### In-field Investigation

The wetland delineation survey was conducted on the 23rd of July 2022, within the dry season. A hand-held auger and a GPS phone were used to log all information in the field. The wetlands within the 500m regulated area were identified in some areas and delineated in accordance with the DWAF (2005) guidelines. The wetland delineation identified three (3) depression wetland units and were categorised into 3 HGM units based on the similarities and impacts within these wetlands:

**Table 15: Wetlands and their HGM Classifications for the proposed project area**

Wetland Type	HGM Unit	Risk
Depression	HGM 1	No
Depression	HGM 2	No
Depression	HGM 3	No

Only HGM 3 was located within the 500m regulated area, however this wetland is approximately 185m away from the proposed project infrastructure and is buffered by the main road. Even with a strict buffer zone the proposed infrastructure will not have any impacts on this wetland. Based on the above no Wetland Health or Functional assessment is necessary.



**Figure 12: Wetland delineations for the proposed project area**

### **8.6.2 Recommendations**

It is recommended that an alien invasive management programme is implemented to minimise threats to sensitive receptors (sub-surface flow paths) and wetland functioning.



### 8.6.3 Conclusion

The Leeumax Solar PV project area does not show wetlands within the boundary of the proposed footprint; however, one (1) wetland (HGM 3) was found within the 500m regulated area. The wetland was located south of the project area approximately 185m away. The wetland is also buffered by the main road. The risk assessment concluded that the wetland will not be impacted by the proposed project and that the impact was rated as Low or no perceived impact.

It is the opinion of the Specialist that the proposed development may proceed.

## 8.7 Avifaunal

### 8.7.1 Important Bird Areas

There are no Important Bird Areas (IBAs) within a 30km radius around the proposed Leeumax site. It is therefore highly unlikely that the proposed development will have a negative impact on any IBAs.

### 8.7.2 Drainage Lines

The application site does not contain any drainage lines. One medium-sized, ephemeral drainage line, namely the Klipspruit, runs approximately 3km east of the project site, and a smaller one, namely the Leeuspruit, runs approximately 2.8km south-west of the site. Drainage lines are important corridors of waterbird movement, and the woodland along the banks are a refuge for woodland species.

### 8.7.3 Wetlands and Pans

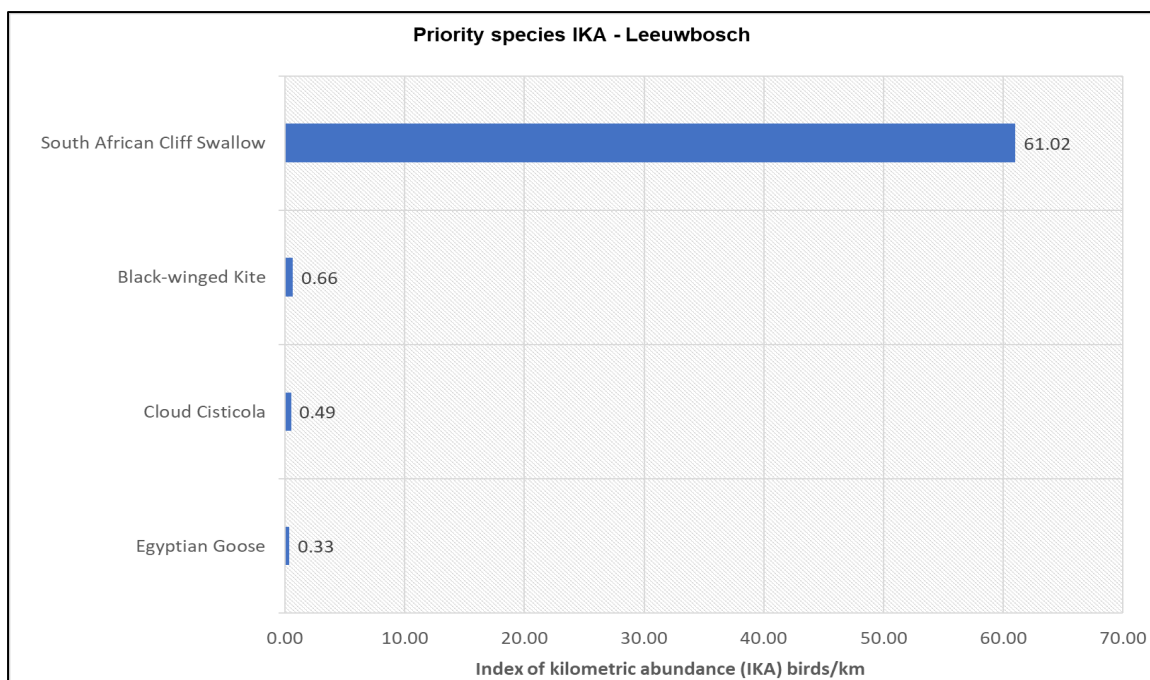
The immediate surroundings contain a few small wetlands which are located in natural depressions in the grassland, and consist of periodically flooded grassland, two areas which are located outside of the application site. When these areas hold water (which is only likely after sustained rainfall events), it may temporarily attract a variety waterbirds. However, due to their small size and ephemeral nature, it is unlikely to be a major attractant to priority species, and they are heavily utilized by cattle for grazing.

### 8.7.4 Avifauna on Site

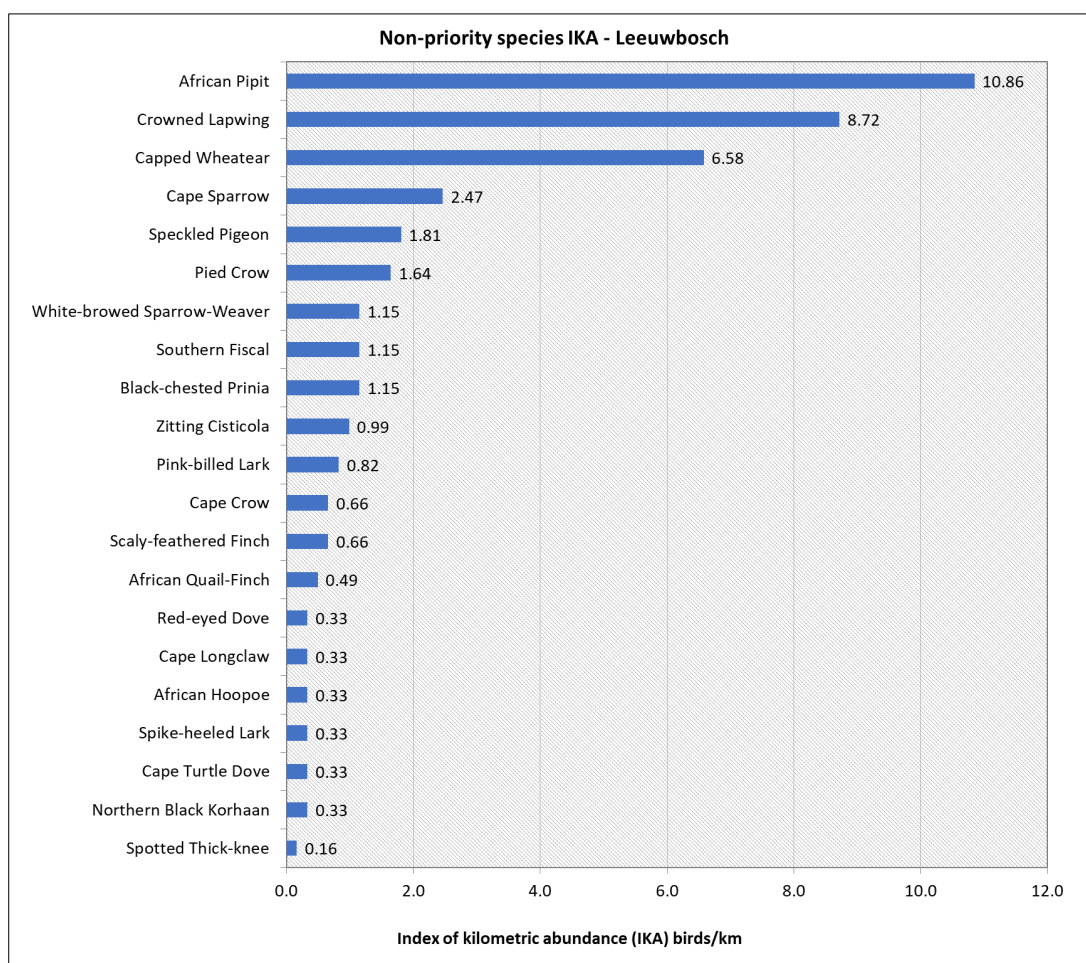
The SABAP2 data indicates that a total of 161 bird species could potentially occur within the project site and immediate surroundings. Of these, 50 species are classified as priority species and 5 of these are South African Red Data species.

### 8.7.5 On-site Surveys

The abundance of avifauna recorded during the transect counts are displayed below.



**Figure 13: Index of kilometric abundance (IKA) for all priority species recorded by means of walk transects during the surveys in the study area, conducted in August 2020**



**Figure 14: Index of kilometric abundance (IKA) for all non-priority species recorded by means of walk transects during the surveys, conducted in August 2020**

### 8.7.6 Conclusion

The proposed Leeumax PV will have a medium negative impact on priority avifauna, which can be reduced to low with appropriate mitigation. The development is supported provided the mitigation measures listed in this report is strictly implemented. No fatal flaws were discovered in the course of the investigations.

The cumulative impact of the facility on priority avifauna within a 35km radius around the proposed development (considering all current impacts on avifauna) is assessed to be low, mainly due to the small size of the proposed development.

## 8.8 Terrestrial Ecology

### 8.8.1 Site Conditions

The site is currently natural grassland that is used for grazing. There is no infrastructure on site, except for a small reservoir on the northern edge of the proposed project site.

### 8.8.2 Description of Terrestrial Environment

There is one (1) regional vegetation type occurring on-site, namely Vaal-Vet Sandy Grassland. There are small patches of Highveld Salt Pans in nearby areas but not within the study area. The vegetation types that occur on-site is described below.

#### Vaal-Vet Sandy Grassland

This vegetation type occurs in the North-West and Free State Provinces in the area south of Lichtenburg and Ventersdorp, stretching southwards to Klerksdorp, Leeudoringstad, Bothaville and to the Brandfort area north of Bloemfontein. It occurs on plains-dominated landscapes with some scattered, slightly irregular undulating plains and hills.

The vegetation is mainly a low-tussock grassland with an abundant karroid element (Mucina *et al.*, 2006). The dominance of *Themeda triandra* is an important feature of this vegetation type. Locally low cover of *Themeda triandra* and the associated increase in *Elionurus muticus*, *Cymbopogon pospischilii* and *Aristida congesta* is attributed to heavy grazing and/or erratic rainfall.

Important taxa include the grasses, *Antheophora pubescens* (d), *Aristida congesta* (d), *Chloris virgata* (d), *Cymbopogon caesus* (d), *Cynodon dactylon* (d), *Digitaria argyrograpta* (d), *Elionurus muticus* (d), *Eragrostis chloromelas* (d), *E. lehmanniana* (d), *E. plana* (d), *E. trichophora* (d), *Heteropogon contortus* (d), *Panicum gilvum* (d), *Setaria sphacelata* (d), *Themeda triandra* (d), *Tragus berteronianus* (d), *Brachiaria serrata*, *Cymbopogon pospischilii*, *Digitaria eriantha*, *Eragrostis curvula*, *E. obtusa*, *E. superba*, *Panicum coloratum*, *Pogonarthria squarrosa*, *Trichoneura grandiglumis* and *Triraphis andropogonoides*, the herbs, *Stachys spathulata* (d), *Barleria macrostegia*, *Berkheya onopordifolia* var. *onopordifolia*, *Chamaesyce inaequilatera*, *Geigeria aspera* var. *aspera*, *Helichrysum caespitium*, *Hermannia depressa*, *Hibiscus pusillus*, *Monsonia burkeana*, *Rhynchosia adenodes*, *Selago densiflora*, *Vernonia oligocephala*, the geophytic herbs, *Bulbine narcissifolia* and *Ledebouria marginata*, the succulent Herb, *Tripteris aghillana* var. *integrifolia*, the low shrubs, *Felicia muricata* (d), *Pentzia globosa* (d), *Anthospermum rigidum* subsp. *pumilum*, *Helichrysum dregeanum*, *H. paronychioides* and *Ziziphus zeyheriana*.

According to scientific literature (Driver et al., 2005; Mucina et al., 2006) Vaal-Vet Sandy Grassland is listed as Endangered.

## Biodiversity Conservation Plans

The North-West Province Biodiversity Conservation Assessment (obtained from bgis.sanbi.org) provides maps that show Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), corridors and hills. This shows that the entire site and surrounding areas falls within an Ecological Support Area 1..

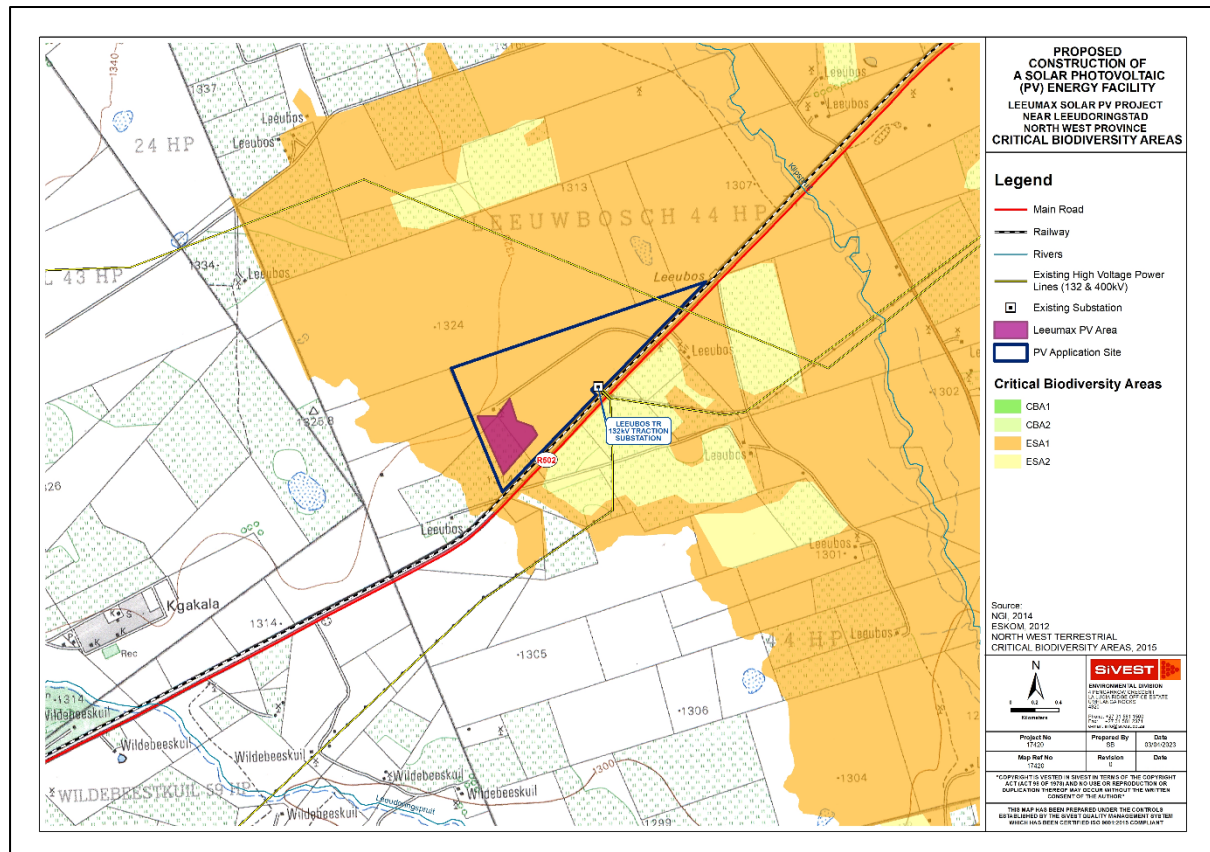


Figure 15: CBA map for the Leeumax site

## Habitats on site

Natural habitats on site match the landcover map for the area (Figure 8). The majority of the solar PV area is within a previously cultivated area that currently contains secondary grassland. Remaining areas are natural grassland. A broad classification of the habitat units on site, which also reflects relatively uniform plant species compositional units, is as follows:

**Natural habitats** - Natural grassland (open grassland on undulating plains – the condition is not indicated in the habitat map although there is a gradient from heavily grazed poor condition to moderate condition);

**Transformed and degraded areas** - Old lands (secondary grasslands on previously cultivated areas);

## 8.8.3 Habitat Sensitivity

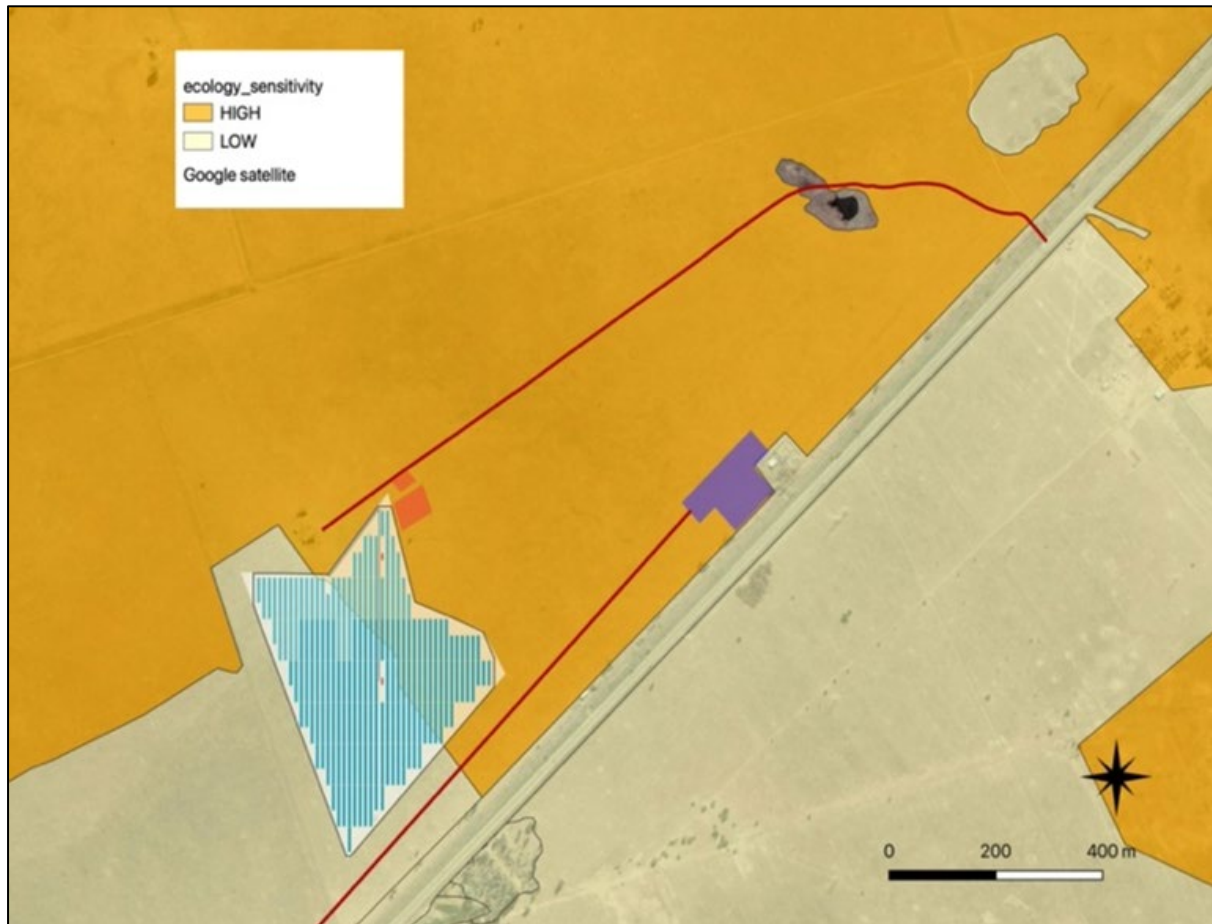
A summary of sensitivities that occur on site are as follows:



Listed ecosystems - Vaal-Vet Sandy Grassland is listed as Endangered in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011).

ESAs - The entire site is within an Ecological Support Area1.

This information was used in conjunction with methodology to calculate Site Ecological Importance, described below. A map of habitat sensitivity on site is provided in **Figure 17** below.



**Figure 16: Habitat sensitivity of the study area**

#### **8.8.4 Site Ecological Importance**

The Species Environmental Assessment Guidelines (SANBI 2020) require that a Site Ecological Importance is calculated for each habitat on site, and provides methodology for making this calculation.

- Natural grassland (open grassland on undulating plains, including moderately to heavily grazed areas);
- Old lands (secondary grasslands on old lands);

As per the Species Environmental Assessment Guidelines (SANBI 2020), Site Ecological Importance (SEI) is calculated as a function of the Biodiversity Importance (BI) of the receptor and its resilience to impacts ( $SEI = BI + RR$ ). The Biodiversity Importance (BI) in turn is a function of Conservation Importance (CI) and Functional Integrity (FI), i.e.  $BI = CI + FI$ .

**Table 16: Site ecological importance for habitats found on site**

Habitat	Conservation importance	Functional integrity	Receptor resilience	Site Ecological Importance (BI)
Natural grassland	<b>High</b> Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type.	<b>Medium</b> Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types. (Chrissiesmeer Panveld is listed as EN) BUT Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.	<b>Very low</b> Habitat that is unable to recover from major impacts	<b>High</b> (BI = Medium)
Old lands	<b>Low</b> No natural habitat remaining.	<b>Very low</b> Several major current negative ecological impacts.	<b>High</b> Habitat that can recover relatively quickly (5-10 years) to restore >75% to restore the original species composition and functionality	<b>Very low</b> (BI = Very low)

Guidelines for development activities within different importance levels are given in the Table below:

**Table 17: Guidelines for interpreting SEI in the context of the proposed development activities**

Site ecological importance	Interpretation in relation to proposed development activities
<b>Very high</b>	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/ not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/ unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
<b>High</b>	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
<b>Medium</b>	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
<b>Low</b>	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities
<b>Very low</b>	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

### 8.8.5 Discussion and Conclusion

In general, the site is considered to have potentially high sensitivity or biodiversity value, based on the location of the site within a listed ecosystem as well as being within an Ecological Support Area. However these areas have not been identified as no-go areas by the specialist.

The project study area consists of natural grassland habitat, and degraded areas associated with previous cultivation. The site is within an area where the remaining natural habitat has been assessed as having high conservation value. Existing impacts on natural habitat are related to possible previous cultivation on site. The extent of previous cultivation can be determined from the combination of local species composition and patterns from aerial imagery. The proposed project will therefore have some effects on areas of natural habitat that may possibly have important biodiversity value.

The vegetation on site is part of a threatened ecosystem and has been assessed as being of high conservation value due to rates of transformation. The regional vegetation type that occurs on site, Vaal-Vet Sandy Grassland, is listed as Endangered in the National Ecosystem List, is part of an area earmarked for future National Park expansion and is part of a Provincial Ecological Support Area. Any remaining natural habitat on site therefore has high terrestrial biodiversity value.

The most significant impact associated with the project is due to clearing of indigenous natural vegetation. This impact was evaluated as having a significance of MEDIUM after mitigation. All other assessed impacts had a significance of LOW after mitigation. One potential impact with the most significant risk in the absence of any management is due to the potential spread and growth of alien invasive plant species, which is facilitated by disturbance.

On the basis of the relatively limited extent that will be disturbed, and the general absence of any species of concern, the proposed development can be authorised.

### 8.9 Agricultural and Soil

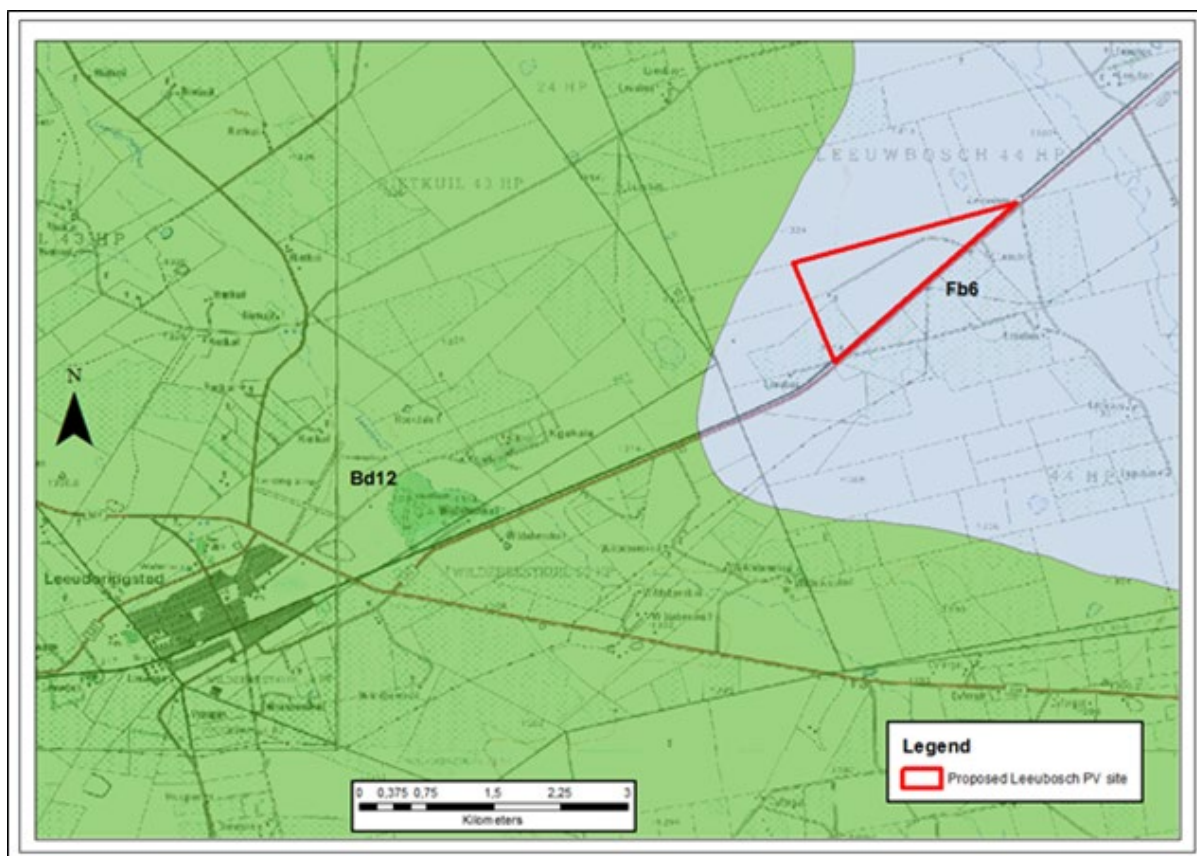
An Agricultural and Soils Compliance Statement was undertaken for the Leeuwbosch 1 and 2 Solar PV facilities in 2017/2017 and the amended project again in 2020. The site assessed as part of the 2016/2017 and 2020 assessment encompasses the area proposed for the new Leeumax Solar PV facility and therefore a new Agricultural Assessment has not been undertaken. The specialist has however reviewed the previous report and confirmed that the proposed Leeumax Solar PV Facility falls within the same mapping unit and will be subject to the same soil pattern, agricultural potential and potential impacts. The specialist has confirmed that all findings and results from the previous report are still completely valid. The previous assessment as well as the amendment letter and compliance statement are included in **Appendix 6**.

The environmental baseline from an agricultural and soils perspective is presented below.

Existing soil information was obtained from the map sheet 2726 Kroonstad (Bruce & Schoeman, 1974) from the national Land Type Survey, published at a 1:250 000 scale. A land type is defined as an area with a uniform terrain type, macroclimate and broad soil pattern. The soils are classified according to MacVicar *et al.*, (1977).

Based on the land type survey information, the area under investigation is covered by only one (1) land type (as shown on **Figure 18**), namely:

- **Fb6** (miscellaneous soils, usually shallow, sometimes calcareous).



**Figure 17: Land Types**

A summary of the dominant soil characteristics of the land types occurring is given in **Table 15** below.

The soils are predominantly shallow, with much exposed rock. The prevailing dominant agricultural potential of the area is thus low to very low, defined mainly by the restricted rooting depth. Where subsurface restrictions, such as rock or hard plinthite, are present at shallow depth (generally less than 450 mm from the surface), then the arable agricultural potential will be significantly restricted. More than 80% of the area has low potential arable soils and rock.

These soils would be most suited to grazing of livestock, and the prevailing grazing potential of the area is moderate, at 10-12 hectares per Large Stock Unit (ha/LSU) (Schoeman & van der Walt, 2004).

**Table 18: Land types occurring (with soils in order of dominance)**

Land Type	Dominant soils	Depth (mm)	Percent of land type	Characteristics	Agric. Potential (%)
Fb6	Glenrosa 16/17, Mispah 10/11	150-300	47.3%	Grey-brown, weakly structured, sandy loam to sandy clay loam topsoil on hard to weathering rock or ferricrete	High: 2.4 Mod: 13.2
	Rock	450-750	30.0%	Exposed surface rock outcrops	Low: <b>84.4</b>
	Arcadia 20		24.8%	Dark brown to black, swelling clay soils, usually calcareous	



There are no especially sensitive areas regarding soils that can be identified.

## 8.10 Visual

The Visual Assessment (VIA) was conducted by SLR Consulting (South Africa) (Pty) Ltd (report dated July 2022) and attached in **Appendix 6**.

Baseline information about the physical characteristics of the study area was initially sourced from spatial databases. The characteristics identified via desktop analysis were later verified during site visits undertaken in October 2016 (early summer) as part of a visual assessment undertaken for preliminary solar PV development proposals on the Leeuwbosch application site. A second site visit was undertaken, involving a two (2) day site visit between the 12th and 13th of August 2020 (late winter).

### 8.10.1 Description of Receiving Environment

#### Topography

The topography within and in the immediate vicinity of the proposed application site is characterised by a mainly flat to gently undulating landscape, sloping down in a south-easterly direction. The topography in the wider visual assessment zone is largely characterised by level plains with little noticeable relief and very gradual slopes.

#### Vegetation

The entire study area is lies in the Vaal-Vet Sandy Grassland vegetation unit. The vegetation and landscape features of the Vaal-Vet Sandy Grassland vegetation unit are associated with plains-dominated landscapes with some scattered, slightly irregular and undulating plains and hills. Mainly low-tussock grasslands are prevalent with an abundant karroid element. Much of the study area is characterised by low grassland, however with a scattering of low acacia trees in evidence (**Figure 19**).



**Figure 18: Typical grassland vegetation with Acacia trees in evidence**

In some parts of the study area, anthropogenic activities such as cultivation and livestock rearing have had an impact on the natural vegetation. Cultivated and fallow or burned fields are evident and in some instances, tall trees (sometimes exotic) and other typical garden vegetation have been established over many years around farmsteads.

### Land Use

Refer to **Section 8.2** of DBAR for details regarding land use in study area.

#### **8.10.2 Specialist Findings**

##### Visual Character and Cultural Value

Much of the study area is characterised by rural areas with natural unimproved vegetation. Agriculture in the form of cultivation and livestock rearing is the dominant land use, which has transformed the natural vegetation in some areas. However, a large portion of the study area has retained a natural appearance due to the presence of the low shrubs and grasslands and the introduction of a solar PV power plant into this environment could be considered to be a degrading factor.

The most prominent anthropogenic elements in these areas include the R502 and R504 regional roads, rail infrastructure, high voltage power lines, the Leeubos TR 132kV Traction Substation, and other linear elements such as telephone poles, communication poles and farm boundary fences. However, the Kgakala Township and its environs appear more urban or disturbed, thus altering the overall visual character of the study area. In addition, litter in and around the township and the presence of a refuse dumping site on the outskirts of the township contribute to the overall disturbed nature of the area and will ultimately further degrade the visual character of the surrounding area.

The presence of the anthropogenic elements in the landscape is an important factor in this context, as the introduction of the proposed development would result in less visual contrast where other anthropogenic elements are already present. As such, the proposed development is not expected to result in significant visual impacts within these transformed areas.

The area can be considered to be typical of a rural farming landscape that consists of largely flat areas of natural low shrubland and grassland interspersed with farmsteads, windmills, livestock holding pens and agricultural land. Livestock farming and other forms of agriculture are evident within the area. In addition, cultivation is an important land use within the study area.

The small farming town of Leeudoringstad was established in 1920 and named after the Lion-thorn tree that was once characteristic of the farm Rietkuil, upon which the village was laid out. With the passing of time hunters gradually reduced the numbers of game in the area and the natural vegetation, including the "lion thorn" also gradually disappeared.

Considering the historical significance of the area, the broader area could potentially be seen to have some significance as a "cultural landscape" in the South African context. Cultural Landscapes can fall into three categories (according to the Committee's Operational Guidelines):

- "a landscape designed and created intentionally by man";
- an "organically evolved landscape" which may be a "relict (or fossil) landscape" or a "continuing landscape"; and

- an "associative cultural landscape" which may be valued because of the "religious, artistic or cultural associations of the natural element".

The study area can be regarded as a type 'ii', an organically evolving cultural landscape. However, visual impacts on the cultural landscape would be reduced by the fact that the visual character has been significantly transformed and degraded by urban and infrastructural development and also the fact there are relatively few tourism or nature-based leisure facilities in the study area.

### Visual Sensitivity

In order to assess the visual sensitivity of the area, a matrix has been developed based on the characteristics of the receiving environment which, according to the Guidelines for Involving Visual and Aesthetic Specialists in the EIA Processes, indicate that visibility and aesthetics are likely to be 'key issues' (Oberholzer: 2005).

Based on the criteria in the matrix, the visual sensitivity of the area is broken up into a number of categories, as described below:

- High - The introduction of a new development such as a solar PV facility would be likely to be perceived negatively by receptors in this area; it would be considered to be a visual intrusion and may elicit opposition from these receptors.
- Moderate – Receptors are present, but due to the nature of the existing visual character of the area and likely value judgements of receptors, there would be limited negative perception towards the new development as a source of visual impact.
- Low - The introduction of a new development would not be perceived to be negative, there would be little opposition or negative perception towards it.

Based on the above factors, the area is rated as having a LOW visual sensitivity. This is mainly due to significant landscape transformation and degradation resulting from urban and infrastructural development (such as the Kgakala Township, R502 and R504 regional roads, high voltage power lines, Leeubos TR 132kV Traction Substation and the existing railway line) which would have reduced the scenic quality of the area.

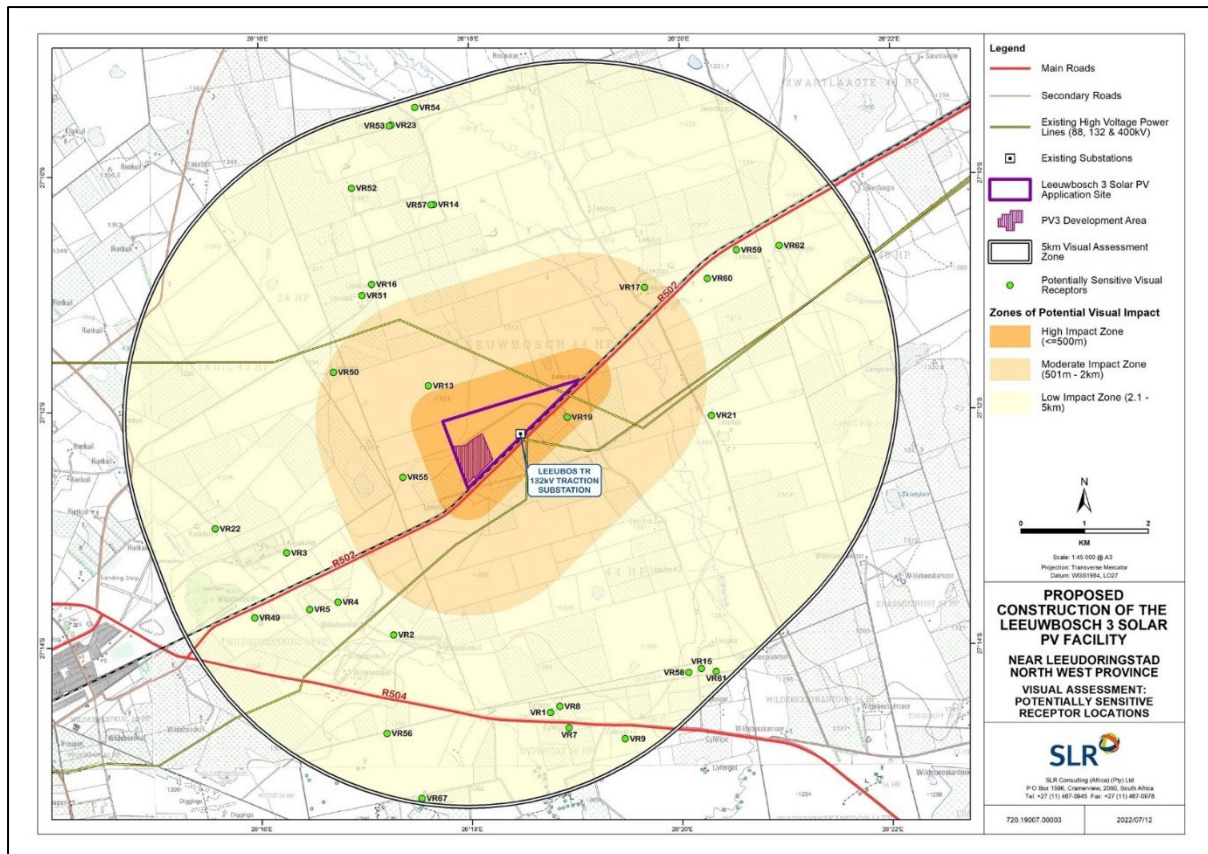
### Receptor Identification

A significant number of potentially sensitive visual receptor locations (32 in total) were identified within the study area by desktop means, most of which appear to be existing farmsteads.

None of these receptor locations were identified as being sensitive. This is mainly due to the relative scarcity of leisure-based or nature based tourism activities in the assessment area.

In many cases, roads, along which people travel, are considered to be sensitive receptors. The primary thoroughfares in the broader area the R502 and R504 Main Roads. These roads do not form part of any formal scenic tourist routes, and are not specifically valued or utilised for their scenic or tourism potential. As such, the roads are not considered to be visually sensitive.

The potentially sensitive visual receptor locations in relation to the zones of visual impact are indicate in **Figure 20** below.



**Figure 19: Visual Receptors in the Study Area**

### 8.10.3 Conclusion and Impact Statement

It is the specialist's opinion that the visual impacts associated with the proposed Leeuwmass Solar PV and associated infrastructure are of moderate significance. Given the relative absence of sensitive receptors and the significant degree of human transformation and landscape degradation in areas close to the application site, the project is deemed acceptable from a visual impact perspective and the EA should be granted for the BA application. The specialist is of the opinion that the visual impacts associated with the construction, operation and decommissioning phases of the project can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

## 9. DESCRIPTION OF THE SOCIO-ECONOMIC ENVIRONMENT

### 9.1 Socio economic characteristics

The Desktop Socio-Economic Impact Assessment was conducted by Urban Econ Development Economists (report dated April 2021)

#### 9.1.1 Demographic Profile

The population of Maquassi Hills Local Municipality is estimated to be 96 042 in 2020 and constitutes 11.6% of the Dr Kenneth Kaunda District Municipality and only 2.4% of the North West Province's population (Urban-Econ calculations based on Quantec 2020). Evidently, the Maquassi Hills LM, from a provincial and district context, houses a relatively small population. The average growth rate over the past ten years has been 2.3%, which is slightly above the national and provincial growth rates by 1.4% and 1.6%, respectively (Urban-Econ calculations based on Quantec 2020). A recorded 26 941 households resided in the Maquassi Hills LM in 2020 and thus comprise of 2% of all households in

the North-west province. This indicates a significantly small residential footprint from a provincial level. The average household size in the LM is 3.9 ha; whereas the average provincial household size is 3.4 ha(Quantec, 2020). Thus, the household size in Maquassi LM is higher than that of the province.

Approximately 59 065 residents of the Maquassi LM's population are between the ages of 15 and 64 and therefore make up the working age population (Quantec, 2020). This makes up 61.5% of the LM's population. In terms of gender distribution, there is a 1% difference between males and females with males dominating.

### **9.1.2 Economy**

The economy of Maquassi Hills LM was valued at R3 515,9 million in current prices. The tertiary sector accounts for 65% of the LM's Gross Domestic Product (GDP), followed by the primary sector and secondary sector with 21% and 14% contributions, respectively (Quantec, 2020). The general government sector particularly contributes close to a fifth (19.06%) of the local economy's production. The second largest contributing sector is the wholesale and retail trade with a contribution of R549 million in current prices.

### **9.1.3 Labour Force and Employment Structure**

A significant proportion (61.5%) of the population of the Maquassi Hills LM is of working age (Quantec, 2020). However, only close to one-third of this population is employed. The Maquassi Hills LM employment figure represents only 2% of the provincial employment figure due to the fact that it holds only 2.4% of the province's population (Quantec, 2020). Thus, from a local level, the 66.1% unemployment rate is massive; however, from a provincial scale it is relatively minor.

### **9.1.4 Access to Electricity**

The introduction of new solar PV developments in the Maquassi Hills LM region will have an impact on the local household's access to electricity, if the municipality purchases electricity directly from the SPV. An analysis of the types of electricity usage in the Maquassi Hills LM will indicate the number of households that may utilise additionally generated electricity.

An estimated 26 557 households had access to the electricity grid in 2020, while 2 141 households had no access to electricity. In accordance with the North West Provincial Development Plan (2013) target of 95% of households with access to the electricity grid, the Maquassi Hills LM falls short by approximately 2,6%.

In order to reach the goals of the North West Provincial Development Plan, additional energy generators are required to increase electricity supply, which would therefore improve the affordability in the long run, due to a decrease in real prices.

## **9.2 Historical Environment**

### **9.2.1 Archaeological**

A selective survey of the study area was conducted on 13 September 2016 and 21 April 2022. Due to the nature of cultural remains, with the majority of artefacts occurring below surface, an archaeologist from PGS conducted a vehicle and foot-survey that covered the study area. The fieldwork identified six (6) heritage resources within the development footprint the project area (**Figure 21**).





**Figure 20: Heritage features in relation to the PV footprint**

The concentration of features is distributed in an area of 300x100 meters in the western section of the study area. Most of the structures consist of a square single stone packed foundation. A few small ash middens were identified close to each of the structures. The structures were most probably a concentration of labourer cottages. The structures in themselves are of low heritage significance, but the possibility of infant burials close to or in the remaining foundations as per African custom cannot be excluded. The resources are graded as having medium local heritage significance.

For sites LD07, LD09, LD10, LD11 LD12, it is recommended that further consultation with local communities on the previous inhabitants of these areas be initiated to determine the possibility of infant burials. In the event that such burial is confirmed a grave relocation process must be initiated.

The specialist further recommends that an archaeologist monitor the earth moving activities during construction.

Site LD13 is older than 60 years and protected under section 34 of NHRA. It is recommended that the site be documented by means of a layout drawing and photographic documentation after which a destruction permit must be applied for from the North West Provincial Heritage Authority prior to destruction.



**Figure 21: Foundation of Kraal at LD07 and LD 09**



**Figure 22: Site LD 13**

### 9.2.2 Palaeontological

A PIA was undertaken by Banzai Environmental Pty Ltd (report dated May 2022). The report is included in **Appendix 6**.

The proposed site is underlain by the Allanridge Formation (Ventersdorp Supergroup) (**Figure 19**). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Allanridge Formation is LOW (Almond and Pether 2008, SAHRIS website). It is therefore considered that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological heritage of the area. Hence, the project may be authorised in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources

If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol must be implemented by the Environmental Control Officer (ECO) in charge of these developments. These discoveries ought to be protected (if possible, in situ) and the ECO must report to SAHRA.



**Figure 23: Geology of the proposed site area underlain by the Allanridge Formation**

## 10. POLICY AND LEGISLATIVE CONTEXT

### 10.1 The Constitution

The Constitution of the Republic of South Africa, Act 108 of 1996 sets the legal context in which environmental law in South Africa occurs and was formulated. All environmental aspects should be interpreted within the context of the Constitution, NEMA 107 of 1998 and the Environment Conservation Act 73 of 1989 (ECA).

The Constitution has enhanced the status of the environment by virtue of the fact that an environmental right has been established (Section 24) and because other rights created in the Bill of Rights may impact on environmental management through, for example, access to health care, food and water and social security (Section 27). An objective of local government is to provide a safe and healthy environment (Section 152) and public administration must be accountable, transparent and encourage participation (Section 195(1) (e) to (g)).

Section 24 of the Constitution states that:

*“Everyone has the right –*

- To an environment that is not harmful to their health or well-being; and
- To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:



- Prevent pollution and ecological degradation;
- Promote conservation and
- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”

The Constitution is the overarching legislation for South Africa. Although it provides for certain rights and obligations, the NEMA has been promulgated in order to manage the various spheres of both the social and natural environment.

## **10.2 National Environmental Management Act (107 of 1998)**

The National Environmental Management Act (NEMA) (Act No. 107 of 1998) was promulgated in 1998 but has since been amended on several occasions from this date. This Act replaces parts of the Environment Conservation Act (ECA) (Act No. 73 of 1989) with exception of certain parts pertaining to Integrated Environmental Management.

The act intends to provide for:

- co-operative environmental governance by establishing principles for decision-making on matters affecting the environment;
- institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state;
- to provide for the prohibition, restriction or control of activities which are likely to have a detrimental effect on the environment; and
- to provide for matters connected therewith.

The NEMA is the overarching legislation which governs the BA process and environmental management in South Africa. Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities which may not commence without an EA. Activities that may significantly affect the environment must be considered, investigated and assessed prior to implementation.

According to Section 2(3) of the National Environmental Management Act (NEMA) (Act No. 107 of 1998), “development must be socially, environmentally and economically sustainable”, which means the integration of these three factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

The EIA Regulations, 2014 (as amended) identify lists of activities which have the potential to result in detrimental environmental impacts and thus require EA, subject to either “Basic Assessment” or “Scoping and Environmental Impact Assessment”. The Regulations prescribe the procedural and substantive requirements for the undertaking of EIAs and the issue of EA’s.

The proposed project triggers listed activities as detailed in Section 6 above and thus requires a Basic Assessment to be undertaken.

### **10.3 Environmental Impact Assessment (EIA) Guideline for Renewable Energy Projects, DFFE Notice 989 of 2015**

The purpose of this document is primarily to provide guidance on the environmental management legal framework applicable to renewable energy operations and all the role players in the sector. The guideline is principally intended for use by the following stakeholder groups:

- Public Sector Authorities (as regulator and/or competent authority);
- Joint public sector authorities and project funders (e.g., Eskom, IDC, etc.);
- Private Sector Entities (as project funder / developer / consultant); and
- Other interested and affected parties (as determined by the project location and/or scope).

This guideline seeks to identify activities requiring authorisation prior to commencement of that activity and provide an interface between national EIA Regulations and other legislative requirements of various authorities.

The guidelines are applicable for the construction, installation and/or development of the following renewable energy projects:

- Concentrating Solar Power (CSP) Plant;
- Wind Energy Facility (WEF);
- Hydropower Station; and
- Photovoltaic (PV) Power Plant.

As the proposed development is for a solar PV plant, it is subject to the recommendations proposed in the guidelines.

### **10.4 National Energy Act (Act No. 34 of 2008)**

South Africa has two (2) acts that direct the planning and development of the country's electricity sector, namely:

- i. The National Energy Act of 2008 (Act No. 34 of 2008) [NEA]; and
- ii. The Electricity Regulation Act (ERA) of 2006 (Act No. 4 of 2006).

The National Energy Act (Act No. 34 of 2008), promulgated in 2008, has, as one (1) of its key objectives, the promotion of diversity of supply of energy and its sources. From this standpoint, the Act directly references the importance of the renewable energy (RE) sector, with a mention of the solar energy sector included. The aim is to ensure that the South African economy is able to grow and develop, fast-tracking poverty alleviation, through the availability of a sustainable, diverse energy mix. Moreover, the goal is to provide for the increased generation and consumption of RE (Republic of South Africa, 2008).

### **10.5 Electricity Regulation Act (Act No. 4 of 2006)**

In 2011, the electricity regulation on new generation capacity was published under Section 35(4) of the Electricity Regulation Act (ERA). These regulations apply to the procurement of new generation capacity by organs of state.

The objectives of the regulations include:

- To facilitate planning for the establishment of new generation capacity;
- The regulation of entry by a buyer and a generator into a Power Purchase Agreement (PPA);
- To set minimum standards or requirements for PPAs;
- The facilitation of the full recovery by the buyer of all costs efficiently incurred by it under, or in connection with, a PPA including a reasonable return based on the risks assumed by the buyer thereunder and to ensure transparency and cost reflectivity in the determination of electricity tariffs; and
- The provision of a framework for implementation of an Independent Power Producer (IPP) procurement programme and the relevant agreements concluded.

The Act establishes a National Energy Regulator as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licenses and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated.

## **10.6 National Heritage Resources Act (NHRA) (Act No. 25 of 1999)**

This Act requires investigation to determine the impact of heritage resources when developments exceed the thresholds listed in section 38(1) of the act:

- (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- (b) the construction of a bridge or similar structure exceeding 50m in length;
- (c) any development or other activity which will change the character of a site—
  - (i) exceeding 5000m<sup>2</sup> in extent; or
  - (ii) involving three (3) or more existing erven or subdivisions thereof; or
  - (iii) involving three (3) or more erven or divisions thereof which have been consolidated within the past five (5) years; or
  - (iv) the costs of which will exceed a sum set in terms of regulations by the South African Heritage Resources Agency (SAHRA) or a provincial heritage resources authority;
- (d) the re-zoning of a site exceeding 10000m<sup>2</sup> in extent; or
- (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

The proposed development would involve; (c) the development of a SEF and associated infrastructure that will change the character of more than 0.5ha, and (d), the rezoning of a site that will exceed 1ha.

Under the legislation the South African Heritage Resources Agency (SAHRA), was established, which replaced the National Monuments Council. SAHRA is responsible for the preservation of heritage resources with exceptional qualities of special national significance (Grade I sites). A Provincial Heritage Resources Authority, established in each province, will protect Grade II heritage resources which are significance within the context of a province or region. Buildings and sites of local interest (Grade III sites) is the responsibility of local authorities as part of their planning functions. In this case, the South African Heritage Resource Agency (SAHRA) will need to be consulted with extensively throughout the process.

Within the scope of this project, Section 38 of the NHRA (25 of 1999), states that, as described above, an assessment of potential heritage resources in the development area needs to be done. A Heritage Impact Assessment (HIA), and Paleontological Impact Assessment (PIA) (**Appendix 6**) has therefore been commissioned to explore how the proposed development may impact on heritage resources and potential cultural artefacts as protected by the Act.

### **10.7 National Water Act (NWA) (Act No. 36 of 1998, as amended)**

The National Water Act (NWA) (Act No. 36 of 1998), as amended, was promulgated on the 20th of August 1998. This Act was created in order to ensure the protection and sustainable use of water resources (including wetlands) in South Africa. This Act is important in that it provides a framework to protect water resources against over-exploitation and to ensure that there is water for socio-economic and economic development, human needs and to meet the needs of the aquatic environment. The Act also recognises that water belongs to the whole nation for the benefit of all people.

The NWA recognises that the ultimate aim of water resource management is to achieve the sustainable use of water for the benefit of all users. Bearing these principles in mind, there are a number of stipulations within the NWA that are relevant to the potential impacts on rivers, streams and wetlands that may be associated with the proposed development. These stipulations are explored below and are discussed in the context of the proposed development.

It is important to note that water resources (including wetlands) are protected under the Act. Under the NWA, a 'water resource' includes a watercourse, surface water, estuary, or aquifer. Specifically, a watercourse is defined as (inter alia):

- A river or spring;
- A natural channel in which water flows regularly or intermittently; and
- A wetland, lake or dam into which, or from which, water flows.

Due to the proximity to the wetland areas, the following Section 21 water uses in terms of the NWA may be triggered and require licensing:

- (c) impeding or diverting the flow of water in a watercourse; and
- (i) altering the bed, banks, course or characteristics of a watercourse.

In light of the above, there are a number of stipulations within the NWA that are relevant to the potential impacts on rivers, streams and wetlands that may be associated with the proposed development. An Aquatic / Freshwater Impact Assessment (**Appendix 6**) has been conducted to explore how the proposed development may impact on identified water resources as protected by the Act. Should the proposed development require a General Authorisation (GA) or Water Use Licence (WUL), it will be determined and applied for separately prior to construction.

### **10.8 National Environmental Management Biodiversity Act (NEM:BA) (Act No. 10 of 2004, as amended)**

As the principal national act regulating biodiversity protection, the National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004), which is administered by the DFFE, is concerned with the management and conservation of biological diversity, as well as the use of indigenous biological resources in a sustainable manner. The term biodiversity, according to the Convention on Biodiversity (CBD) (section 6.1.9), refers to the variability among living organisms from

all sources including, inter alia terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity in genes, species and ecosystems.

The overarching aim of the NEM:BA, within the framework of the NEMA, is to provide for:

- The management and conservation of biological diversity within South Africa, and of the components of such biological diversity;
- The use of indigenous biological resources in a sustainable manner; and
- The fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources.

In terms of this Act, the developer has a responsibility for:

- Conservation of endangered ecosystems and restriction of activities according to the categorisation of the area (not just by listed activity as specified in the EIA regulations);
- Promote the application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all development within the area are in line with ecological sustainable development and protection of biodiversity; and
- Limit further loss of biodiversity and conserve endangered ecosystems.

The South African National Biodiversity Institute (SANBI) was established in terms of the NEM:BA, its purpose being (inter alia) to report on the status of the country's biodiversity and the conservation status of all listed threatened or protected species and ecosystems.

The NEM:BA provides for a range of measures to protect ecosystems and for the protection of species that are threatened or in need of protection to ensure their survival in the wild, including a prohibition on carrying out a 'restricted activity' involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7 of the Act. According to Section 57 of the Act, 'Restricted activities involving listed threatened or protected species':

A Terrestrial Biodiversity Assessment (**Appendix 6**) has been conducted to explore how the proposed development may impact on biodiversity as protected by the Act.

In addition, all relevant conservation departments (such as the SANBI and DEDECT) will be invited to provide comments with regards to the proposed development.

## **10.9 National Environmental Management: Protected Areas Act (NEM: PAA) (Act No. 57 of 2003, as amended)**

The overarching aim of the National Environmental Management: Protected Areas Act (NEM: PAA) (Act No. 57 of 2003, as amended), within the framework of the NEMA, is to:

- the declaration and management of protected areas;
- co-operative governance in the declaration and management of protected areas;
- effect a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity;
- a representative network of protected areas on state land, private land and communal land;
- promote sustainable utilisation of protected areas for the benefit of people, in a manner that would preserve the ecological character of such areas;

- promote participation of local communities in the management of protected areas, where appropriate; and
- the continued existence of South African National Parks.

The proposed development falls outside of any formally protected areas. A small area of the application site falls within areas earmarked as part of the National Protected Areas Expansion Strategy (NPAES).

### **10.10 National Forests Act (NFA) (Act No. 84 of 1998)**

The National Forest Act (NFA) (Act No. 24 of 1998) was enacted to:

- Provide for the protection, management and utilisation of forests;
- The protection of certain plant and animal life;
- The regulation of trade in forest produce; and
- The control and management of a national hiking way system and National Botanic Gardens.

The NFA enforces the necessity for a license to be obtained prior to destroying any indigenous tree in a natural forest and, subject to certain exemptions, cutting, disturbing, damaging, destroying or removing any protected tree. The list of protected trees is currently contained in GN 908 of 21 November 2014. Licenses are issued by the Minister and are subject to periods and conditions as may be stipulated.

#### Protected trees

According to this act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. 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'.

#### Forests

Prohibits the destruction of indigenous trees in any natural forest without a licence.

The NFA is relevant to the proposed development as the removal and/or disturbance and/or clearance of indigenous vegetation will be required and a license in terms of the NFA may be required for this to be done.

A Terrestrial Biodiversity Assessment (**Appendix 6**) has been conducted to explore how the proposed development may impact on vegetation as protected by the Act.

In addition, all relevant conservation departments (such as the SANBI and DEDECT) will be invited to provide comments with regards to the proposed development.

### **10.11 National Veld and Forest Fire Act (Act No. 101 of 1998)**

Provides requirements for veldfire prevention through firebreaks and required measures for firefighting. Chapter 4 of the Act places a duty on landowners to prepare and maintain firebreaks. Chapter 5 of the Act places a duty on all landowners to acquire equipment and have available personnel to fight fires.

## 10.12 Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983)

The Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983) controls the utilisation of natural agricultural resources in South Africa. The Act promotes the conservation of soil, water sources and vegetation as well as the combating weeds and invader plants. The Act requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.

The primary objective of the Act is to conserve natural agricultural resources by:

- maintaining the production potential of land;
- combating and preventing erosion and weakening or destruction of the water resources;
- protecting vegetation; and
- combating weeds and invaders plants.

In terms of this Act, no degradation of natural land is permitted. Rehabilitation after disturbance to agricultural land is also managed by this Act. The CARA is relevant to the proposed development as the construction of a SEF as well as other components (such as the on-site switching substation and permanent guard house) may impact on agricultural resources and vegetation on the site. The Act prohibits the spreading of weeds and prescribes control measures that need to be complied with in order to achieve this. As such, measures will need to be taken to protect agricultural resources and prevent weeds and exotic plants from invading the site as a result of the proposed development.

Declared Weeds and Invaders in South Africa are categorised according to one (1) of the following categories:

- Category 1 plants: are prohibited and must be controlled.
- Category 2 plants: (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.
- Category 3 plants: (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

An Agricultural and Soils Site Verification (**Appendix 6**) has been conducted to explore how the proposed development may impact on the agricultural production potential of the proposed site.

## 10.13 Subdivision of Agricultural Land Act (SALA) (Act No. 70 of 1970, as amended)

The Subdivision of Agricultural Land Act (SALA) (Act No. 70 of 1970, as amended) controls the subdivision of all agricultural land in South Africa, prohibiting certain actions pertaining to agricultural land. Under the Act, the owner of agricultural land is required to obtain consent from the Minister of Agriculture in order to subdivide agricultural land.

The SALA is limited to long term leases and subdivision and is therefore not applicable in this case. However, the Department of Agriculture, Land Reform and Rural Development will be notified as an I&AP.



#### **10.14 National Road Traffic Act (NRTA) (Act No. 93 of 1996, as amended)**

The National Road Traffic Act (NRTA) (Act No. 93 of 1996, as amended) provides for all road traffic matters and is applied uniformly throughout South Africa. The Act enforces the necessity of registering and licensing motor vehicles. It also stipulates requirements regarding fitness of drivers and vehicles as well as making provision for the transportation of dangerous goods.

All the requirements stipulated in the NRTA will need to be complied with during the construction and operational phases of the proposed development.

#### **10.15 Civil Aviation Act (CAA) (Act No. 13 of 2009)**

The Civil Aviation Act (CAA) (Act No. 13 of 2009) controls and regulates aviation within South Africa. It provides for the establishment of a South African Civil Aviation Authority (SACAA) and independent Aviation Safety Investigation Board in compliance with Annexure 13 of the Chicago Convention. It gives effect to various conventions related to aircraft offences, civil aviation safety and security, and provides for additional measures directed at more effective control of the safety and security of aircrafts, airports and matters connected thereto.

Although the Act is not directly relevant to the proposed development, it should be considered as the establishment of a solar PV plant may impact on aviation and air traffic safety, if located directly within aircraft flight paths.

The Air Traffic and Navigation Services Company Limited (ATNS) and the SACAA will be notified as an I&AP during the BA process and the required approvals will be obtained, where necessary. It is not however anticipated that any approvals will be required.

#### **10.16 North West Biodiversity Management Act (Act No. 4 of 2016)**

This Act provides for the management and conservation of the North West Province's biophysical environment and protected areas within the framework of the NEMA, to provide for the protection of species and ecological systems that warrant provincial protection, and to provide for the sustainable use of indigenous biological resources. Amongst other regulations, the following may apply to the current project:

- Protects threatened or protected ecosystems, riparian habitats and aquatic systems (Chapter 3, Part 2, sections 10 - 12).
- Protects species by listing those that require protection and restricting activities involving listed species (Chapter 4, sections 13 - 23).
- Provides for the management of species and organisms posing potential threats to biodiversity (Chapter 5, sections 27 - 37) through listing invasive species, restricting activities involving listed invasive species, and providing guidelines and requirements for control and eradication, including control plans and invasive species status reports.

A Terrestrial Biodiversity Assessment (**Appendix 6**) has been conducted to explore how the proposed development may impact on biodiversity as protected by the Act.

In addition, all relevant conservation departments (such as the SANBI and DEDECT) will be invited to provide comments with regards to the proposed development.



## 10.17 Astronomy Geographic Advantage Act (Act No. 21 of 2007)

The Astronomy Geographic Advantage Act (Act No. 21 of 2007) provides for:

- The preservation and protection of areas that are uniquely suited for optical and radio astronomy;
- Intergovernmental cooperation and public consultation on matters concerning nationally significant astronomy advantage areas and matters connected therewith.

Under Section 22(1) of the Act, the Minister has the authority to protect the radio frequency spectrum for astronomy observations within a core or central astronomy advantage area. As such, the Minister may under section 23(1) of the Act, declare that no person may undertake certain activities within a core or central Astronomy Advantage Area (AAA). These activities include the construction, expansion or operation; of any fixed radio frequency interference source, facilities for the generation, transmission or distribution of electricity, or any activity capable of causing radio frequency interference or which may detrimentally influence the astronomy and scientific endeavours.

In terms of section 7(1) and 7(2) of this Act, national government established the following AAAs:

- Central Karoo AAA (GN 198 of 2014) – proposed development falls outside this AAA
- Sutherland Central AAA – proposed development falls outside this AAA
- Northern Cape AAA (GN 115 of 2010) – proposed development falls outside of this AAA

Even though the proposed development falls outside the respective AAAs, the relevant authorities, including the Square Kilometre Array (SKA) and South African Large Telescope (SALT), will be consulted throughout the BA process.

## 10.18 Renewable Energy Development Zones (REDZs) and Strategic Transmission Corridors

The Strategic Environmental Assessment (SEA) for Wind and Solar PV Energy in South Africa (CSIR, 2015) originally identified eight (8) formally gazetted Renewable Energy Development Zones (REDZs) that are of strategic importance for large-scale wind and solar PV development in terms of Strategic Integrated Project 8: Green Energy in Support of the South African Economy, as well as associated strategic transmission corridors, including the rollout of its supporting transmission and distribution infrastructure, in terms of Strategic Integrated Project 10: Electricity Transmission and Distribution.

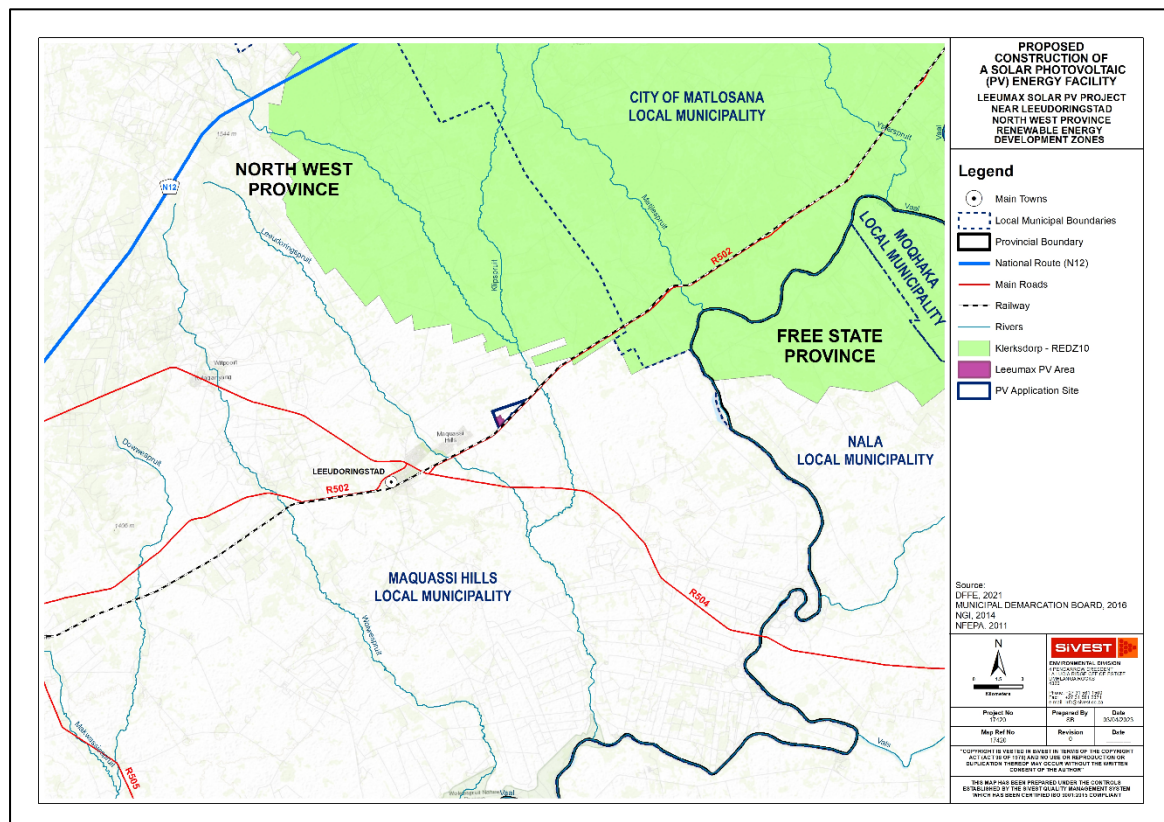
- REDZs for large-scale wind and solar photovoltaic development;
- associated Strategic Transmission Corridors which support areas where long-term electricity grid will be developed;
- process of basic assessment to be followed and reduced decision-making timeframe for processing of applications for environmental authorisation in terms of the NEMA; and
- acceptance of routes which have been pre-negotiated with all landowners as part of applications for environmental authorisations for power lines and substations.

In addition to the eight (8) formally gazetted REDZs mentioned above, the Phase 2 SEA for Wind and Solar Photovoltaic Energy in South Africa (2019) identified three (3) additional REDZs (namely REDZ 9, REDZ 10 and REDZ 11) that are of strategic importance for large scale wind and solar photovoltaic energy development. These REDZs were published under Government Notice No. 786, Government Gazette No. 43528 of 17 July of 2020, and were officially gazetted under Government Notice No. 144, Government Gazette No. 44191 of 26 February 2021.

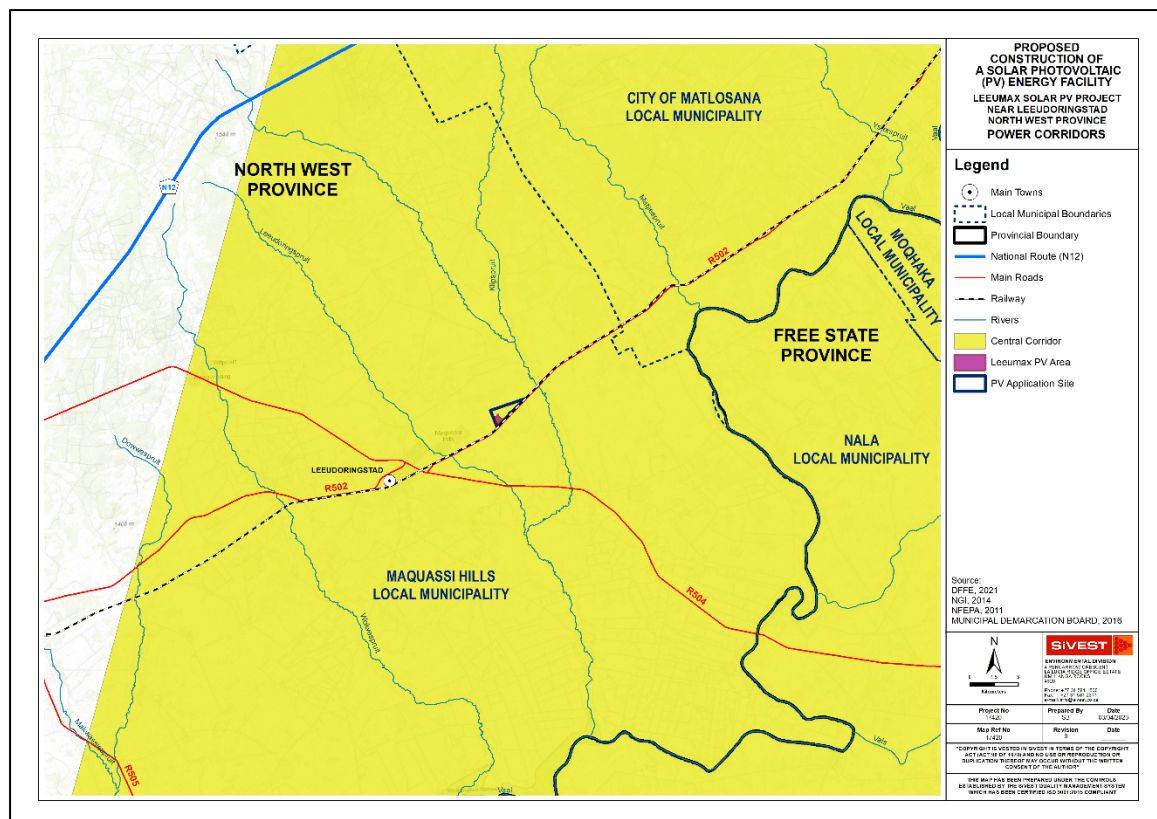
**Table 19: The SEA for Wind and Solar PV Energy in South Africa (Phase 1 and Phase 2) (CSIR, 2015; CSIR, 2019) identified the following eleven (11) geographic areas for REDZs**

REDZ Number	Name	Applicability of REDZ
REDZ 1	Overberg	Large-scale wind and solar photovoltaic energy facilities
REDZ 2	Komsberg	Large-scale wind and solar photovoltaic energy facilities
REDZ 3	Cookhouse	Large-scale wind and solar photovoltaic energy facilities
REDZ 4	Stormberg	Large-scale wind and solar photovoltaic energy facilities
REDZ 5	Kimberley	Large-scale solar photovoltaic energy facilities
REDZ 6	Vryburg	Large-scale solar photovoltaic energy facilities
REDZ 7	Upington	Large-scale solar photovoltaic energy facilities
REDZ 8	Springbok	Large-scale wind and solar photovoltaic energy facilities
REDZ 9	Emalaheni	Large scale solar photovoltaic energy facilities
REDZ 10	Klerksdorp	Large scale solar photovoltaic energy facilities
REDZ 11	Beaufort West	Large scale wind and solar photovoltaic energy facilities

It should be noted that the proposed PV plant is not located within any of the above-mentioned REDZs formally gazetted in South Africa for the purpose of development of solar and wind energy generation facilities (**Figure 25**). The proposed development is, however, located within the Central Power Corridor (**Figure 26**). Ultimately, the proposed development is subject to a full BA process in terms of the NEMA, as amended, and the EIA Regulations, 2014 (as amended).



**Figure 24: Formally gazetted REDZs in South Africa and the proposed Leeumax PV Plant location in relation to the REDZs**



**Figure 25: Location of proposed development within the Central Corridor**

### 10.19 Additional Relevant Legislation

- Occupational Health and Safety Act (Act No. 85 of 1993) [OHSA];
- Environment Conservation Act (Act 73 of 1989) [ECA]
- Road Safety Act (Act No. 93 of 1996) [RSA];
- National Environmental Management: Air Quality Act (Act No. 39 of 2004) [NEM:AQA];
- National Environmental Management: Waste Act (Act No. 59 of 2008, as amended) [NEM:WA];
- Development Facilitation Act (Act No. 67 of 1995) [DFA];
- Promotion of Access to Information Act, (Act No. 2 of 2000); [PAIA]
- The Hazardous Substances Act (Act No. 15 of 1973) [HSA];
- Water Services Act (Act No. 108 of 1998) [WSA];
- Municipal Systems Act (Act No. 32 of 2000) [MSA];
- Subdivision of Agricultural Land Act 70 of 1970 [SALA]; and
- Mineral and Petroleum Resource Development Act (Act No. 28 of 2002, as amended) [MPRDA].

## 11. KEY DEVELOPMENT STRATEGIES AND GUIDELINES

In his 2021 State of the Nation Address, President Cyril Rhamaposa announced government are taking the following measures to rapidly and significantly increase generation capacity outside of Eskom:

- *One of the priority investment areas is to rapidly expand energy generation capacity.*

- *Restoring Eskom to operational and financial health and accelerating its restructuring process is central to achieving this objective. Eskom has been restructured into three separate entities for generation, transmission and distribution.*
- *A Section 34 Ministerial Determination will be issued shortly to give effect to the Integrated Resource Plan 2019, enabling the development of additional grid capacity from renewable energy, natural gas, hydro power, battery storage and coal.*
- *We will initiate the procurement of emergency power from projects that can deliver electricity into the grid within 3 to 12 months from approval.*
- *The Department of Mineral Resources and Energy gazetted the Amended Schedule 2 of the Electricity Regulation Act 4 of 2006 on 12 August 2021, for 100 Megawatts of embedded electricity generation as approved by Minister Gwede Mantashe.*
- *We will negotiate supplementary power purchase agreements to acquire additional capacity from existing wind and solar plants.*
- *We will also put in place measures to enable municipalities in good financial standing to procure their own power from independent power producers.*

Policy decisions taken in the next decade will largely determine the dimension of the impact of climate change. Local government is in the front line of implementation and service delivery, and thus needs to pursue adequate mitigation and adaptation strategies which should include participation from the public sector, the private sector and NGOs.

The DoE gazetted its White Paper on Renewable Energy in 2003 and introduced it as a 'policy that envisages a range of measures to bring about integration of renewable energies into the mainstream energy economy.' At that time, the national target was fixed at 10 000GWh (0.8Mtoe) renewable energy contribution to final energy consumption by 2013. The White Paper proposed that this would be produced mainly from biomass, wind, solar and small-scale hydropower. It went on to recommend that this renewable energy should be utilised for power generation and non-electric technologies such as solar water heating and biofuels. Since the White Paper was gazetted, South Africa's primary and secondary energy requirements have remained heavily fossil-fuel dependent, both in terms of indigenous coal production and use, as well as the use of imported oil resources. Alongside this, the projected electricity demand of the country has led the National utility Eskom, to embark upon an intensive build programme to secure South Africa's longer-term energy needs, together with an adequate reserve margin.

The National Development Plan (NDP), 2011 – 2030, aims to address parts of the South African triple development challenges of poverty and inequality by 2030. In order to achieve this, numerous enabling milestones and critical actions have been formulated. One (1) of the critical actions is the formulation and implementation of interventions that aim to ensure environmental sustainability and resilience to future shocks.

The emphasis is on South African investment and assistance in the exploitation of various opportunities for low-carbon energy in the clean energy sources of Southern Africa (National Planning Commission, 2011).

A more efficient and competitive infrastructure is envisaged, particularly infrastructure that facilitates economic activity and is conducive to growth and job creation. The plan identifies key services that need strengthening; namely commercial transport, energy, telecommunications and water, while ensuring their long-term affordability and sustainability. The National Planning Commission maintains that South Africa has missed a generation of capital investment in many infrastructure opportunities



including electricity. Therefore, one (1) infrastructure investment priority is in the procurement of at least 20000MW of renewable energy-efficiency (National Planning Commission, 2011).

The proposed project is thus well aligned with the aims of the NDP which is further detailed in the following national and provincial plans:

- National Integrated Resource Plan (IRP) for Electricity (2010-2030);
- Integrated Resource Plan (IRP 2019)
- National Infrastructure Plan 2012, as amended;
- North West Provincial Development Plan 2013
- Dr Kenneth Kaunda District Municipality Integrated Development Plan 2017/18-2021/22
- Maquassi Hills Local Municipality (LM) Integrated Development Plan 2013-2016

The proposed project is also well aligned with the Local Municipality IDP (refer **Section 11.1** and **11.2**).

## 11.1 National and Provincial Policies

**Table 20: Relevant National and Provincial Policies for the Solar PV Facility**

Relevant policy	Key Policy Objectives
<b>NATIONAL POLICIES</b>	
National Development Plan (NDP) 2030, 2012	<p>The National Development Plan (NDP) 2030 aims to address South Africa's developmental challenges of poverty and inequality by 2030. The NDP 2030 seeks to ensure that half of all electricity generation capacity is provided by renewable resources. Key aspects deemed necessary to enhance social cohesion, reduce poverty and raise living standards to include:</p> <ul style="list-style-type: none"> <li>✓ Creating jobs and livelihoods</li> <li>✓ Expanding infrastructure</li> <li>✓ Transitioning to a low-carbon economy</li> <li>✓ Transforming urban and rural spaces</li> <li>• Improving education and training</li> <li>• Providing quality health care</li> <li>• Building a capable state</li> <li>• Fighting corruption and enhancing accountability</li> <li>• Transforming society and uniting the nation</li> </ul> <p>The proposed development is somewhat in alignment with the National Development Plan through its potential to create employment and its plans to develop infrastructure.</p> <p>(National Planning Commission, 2012)</p>
National Spatial Development Framework 2018	<p>The National Spatial Development Framework, 2018 (NSDP) is a government document that seeks to make a bold and decisive contribution to bringing about peaceful, prosperous, and truly transformed South Africa, as articulated in the Freedom Charter, the Reconstruction and Development Programme (RDP) and</p>

Relevant policy	Key Policy Objectives
	<p>the National Development Plan (Department of Planning, 2018). The Key focuses of the NSDP include:</p> <ul style="list-style-type: none"> <li>✓ Technology, Innovation, Resilience and Disruptions in the Space Economy.</li> <li>✓ Energy Infrastructure Network to Ensure a Shared, Inclusive and Sustainable Economy.</li> <li>• Urbanisation, the Pursuit of a Better Life and a Desire for Quality Urban Living and Spaces</li> <li>• Move Away from Ecosystem Destruction, Pollution and a National Water Security Crisis.</li> </ul> <p>Based on the above key focuses, the proposed development is somewhat in alignment with the National Spatial Development Framework through its intention of increasing technological innovation and energy infrastructure networks. (National Spatial Development Framework 2018)</p>
New Growth Path Framework (NGPF), 2010	<p>The New Growth Path Framework (NGPF) aims to ensure that jobs and decent work are at the centre of economic policy. The NGPF has identified several job drivers and priority sectors that should be focused on over the coming years.</p> <p>These include:</p> <ul style="list-style-type: none"> <li>✓ Infrastructure investment.</li> <li>✓ Prioritising efforts to support employment in the main economic sectors, including the Green Economy</li> <li>• Seizing the potential of new economies</li> <li>• Investing in social capital and public services</li> <li>• Spatial development</li> <li>• Fostering rural development and regional integration</li> </ul> <p>The proposed development shows alignment to the New Growth Path regarding its aim to invest in infrastructure and the potential to increase employment within the Green Economy. (Department of Economic Development, 2011)</p>
Integrated Resource Plan (IRP), for Electricity (2010 – 2030)	<p>The IRP provides for the disaggregation of RE technologies to differentiate and display solar photovoltaic (PV), concentrated solar power (CSP), and wind options. Moreover, a review of the IRP, relevant to the RE sector, is that the accelerated roll-out of RE technologies must be allowed and promoted to derive the benefits of localisation in these RE technologies. Moreover, it emphasizes the establishment of a Solar PV programme. The following policy considerations assisted in arriving at this version of the IRP which entail:</p> <ul style="list-style-type: none"> <li>✓ The installation of RE technologies brought forward to accelerate a local industry</li> <li>• To provide for the uncertainties associated with the cost of renewables and fuels, a nuclear fleet was included</li> <li>• The emissions constraint of 275 million tons of carbon dioxide per year after</li> </ul>

Relevant policy	Key Policy Objectives
	<p>2024 was maintained</p> <ul style="list-style-type: none"> <li>• Energy efficiency demand-side management measures were maintained</li> </ul> <p>The proposed development is in alignment with the IRP for electricity strategy through its role in accelerating renewable energy in South Africa.</p> <p>(Department of Mineral Resources and Energy, 2011)</p>
South African National Infrastructure Plan 2012	<p>The South African National Infrastructure Plan, 2012 speaks of 'greening the economy'. In terms of electricity generation, transmission, and distribution, three Strategic Integrated Projects (SIP) are relevant:</p> <ul style="list-style-type: none"> <li>✓ SIP 4: Unlocking the economic opportunities in the North-West Province</li> <li>✓ SIP 9: Accelerate the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy</li> <li>✓ SIP 10: Expanding the transmission and distribution network to address historical imbalances, provide access to electricity for all and support Policy Objectives economic development (Presidential Infrastructure Coordinating Commission, 2012)</li> </ul> <p>The proposed development is strongly aligned with South Africa's National Infrastructure plan through its potential to contribute to the three mentioned Strategic Integrated Projects aimed at increasing economic opportunities, accelerating electricity generation, and increasing access to electricity.</p> <p>(Presidential Infrastructure Coordinating Commission, 2012).</p>
Industrial Policy Action Plan (IPAP) 2018/2019 – 2020/2021	<p>The Industrial Policy Action Plan, 2018/2019 – 2020/2021 provides an economic analysis of prevailing global and domestic economic conditions relevant to industrial policy; time-bound action plans and programmes across a range of sectors and lists the key constraints to an optimal industrial strategy (DTI, 2018). The South African electrotechnical sector is largely dependent on imported content. As a result, South Africa needs to increase its design and production capabilities through the following:</p> <ul style="list-style-type: none"> <li>✓ Attract and maintain investments in certain areas of production.</li> <li>✓ Localise production of inputs where local capacity and capability exist.</li> <li>✓ Focus on potentially highly lucrative export markets across the African continent.</li> </ul> <p>All of these are aimed at addressing historical imbalances and the proposed project is evidently in line with this plan.</p> <p>(Department of Trade and Industry, 2018)</p>
<b>PROVINCIAL POLICIES</b>	
North-West	North-West is a province that significantly depends on non-renewable sources



Relevant policy	Key Policy Objectives
Provincial Development Plan (2013)	<p>and experiences pollution and environmental degradation. The North-West Provincial Development Plan (2013) therefore acknowledges that energy provision is a concern in some areas, given that the mining sector consumes a great portion of the available electricity. The specific targets for the development plan regarding renewable energy are to:</p> <ul style="list-style-type: none"> <li>✓ Increase the population with access to electricity from 84% in 2011 to 95% by 2030, with non-grid options available for the rest</li> <li>✓ Increase renewable energy consumption to 37% by 2030</li> <li>• Ensure that 67% of households have a solar water heater installed</li> </ul> <p>The actions set out to achieve this are:</p> <ul style="list-style-type: none"> <li>✓ Develop energy infrastructure and service provision</li> <li>✓ Expand renewable energy with special reference to solar power</li> <li>✓ Increase energy efficiency (reduce demand)</li> </ul> <p>The proposed project fulfils the operation and maintenance of the PV plant's aims and is fully aligned with the NW Provincial Development Plan.</p> <p>(North West Planning Commission, 2013)</p>
Renewable Energy Strategy for the North-West Province 2012	<p>The Renewable Energy Strategy for the North-West Province 2012 argues that the generation of clean energy is one of the responses to climate change and it is a way to meet the commitments of the Kyoto Protocol. The objectives of the strategy are to:</p> <ul style="list-style-type: none"> <li>✓ Improve the NWP's environment</li> <li>✓ Reduce the NWP's contribution to adverse climate change,</li> <li>✓ Alleviate energy poverty</li> <li>✓ Promoting economic development and job creation in the province</li> <li>✓ Developing its green economy.</li> </ul> <p>The proposed development is strongly aligned with Renewable Energy Strategy for the North-West Province through its potential to contribute to the mentioned strategic objectives.</p> <p>(Department of Economic Development, Environment, Conservation and Tourism, 2012)</p>

## 11.2 District and Local Policies

**Table 21: District and Local Policies for the Solar PV Facility**

Relevant policy	Key Policy Objectives
Dr Kenneth Kaunda District Municipality Integrated Development Plan 2017/18 - 2021/22	<p>The Dr Kenneth Kaunda District Municipality Integrated Development Plan 2017/18 - 2021/22 identifies the comparative advantage of electricity provision and production that the region has in the provincial context. The integrated development plan aims to support the constitutional obligations of local government through the following strategic objectives:</p> <ul style="list-style-type: none"> <li>✓ To promote physical infrastructure development</li> <li>✓ To promote socio-economic development</li> </ul>

Relevant policy	Key Policy Objectives
	<p>✓ To provide environmental health services</p> <ul style="list-style-type: none"> <li>• To ensure disaster risk management</li> <li>• To ensure municipal excellence</li> <li>• To provide integrated Public Transport within the District</li> <li>• To provide integrated waste management facilities</li> </ul> <p>The proposed project is somewhat aligned with the Dr Kenneth Kaunda District Municipality Integrated Development Plan. The proposed project will develop infrastructure and contribute to the social and economic development of the community by producing sustainable energy for the community.</p> <p>(Dr. Kenneth Kaunda District Municipality, 2017)</p>
Maquassi Local Municipality Integrated Development Plan (IDP) 2013-2016 (Amendments based on the 2016 Annual Report)	<p>The Maquassi Hills Local Municipality (LM) Integrated Development Plan, 2013 - 2016 (latest available IDP) recognises that the municipality's electricity network has aged. The integrated development plan aims to support the constitutional obligations of local government through the following strategic objectives:</p> <ul style="list-style-type: none"> <li>✓ Provision of basic services and infrastructure development</li> <li>✓ Local economic development</li> <li>• Municipal transformation and institutional development</li> <li>• Municipal financial viability</li> <li>• Good governance and public participation.</li> </ul> <p>The proposed project is therefore somewhat aligned with the Maquassi Local Municipality Integrated Development Plan. The proposed project will contribute to providing electricity, which is considered a basic service, as well as contribute to the local economic development of Maquassi LM.</p> <p>(Maquassi Hills Local Municipality, 2013)</p>

## 12. NEED AND DESIRABILITY

### 12.1 National Renewable Energy Requirement

In 2019, South Africa had 51 504MW of power generation capacity installed (IRP, 2019). Current forecasts indicate that by 2030, the expected growth in demand will require the current installed power generation capacity to be increased to approximately 77 834MW (IRP,2019).

This growing demand, fuelled by increasing economic growth and social development within Southern Africa, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmental impact, climate change and the need for sustainable development. Despite the worldwide concern regarding Green House Gas (GHG) emissions and climate change, South Africa continues to rely heavily on coal as its primary source of energy, while most of the country's renewable energy resources remain largely untapped. There is

therefore an increasing need to establish a new source of generating power in South Africa within the next decade.

The use of renewable energy technologies, as one (1) of a mix of technologies needed to meet future energy consumption requirements is being investigated as part of Eskom's long-term strategic planning and research process. It must be remembered that solar energy is plentiful, renewable, widely distributed, clean and reduces GHG emissions when it displaces fossil-fuel derived from electricity. In this light, renewable solar energy can be seen as desirable.

The competitive nature of the Renewable Energy Independent Power Producer Procurement Programme's (REIPPPP's) bidding process has resulted in significant lowering of solar and wind tariff prices since 2011. For example, the bidding tariffs of solar PV have decreased from R2.80/kWh in 2011 to sub-60c/kWh at present. Further projects will increase the competitive nature and further result in cost savings to South African consumers. It should also be noted that the Minister of Mineral Resources and Energy has recently welcomed the concurrence by the NERSA to the second Section 34 Ministerial Determination issued in February 2020. This is another milestone that gives effect to commitments made by President Cyril Ramaphosa in his 2020 State of the Nation Address (SONA) to increase generation capacity and ensure security of energy supply to society rapidly and significantly. The Section 34 Determination enables the Department to undertake procurement of additional electricity capacity in line with the Integrated Resource Plan (IRP 2019). This will open-up various Bid Windows (BW), including BW 5 of renewable energy. 6 800MW of capacity is determined to be generated from renewable energy sources (PV and Wind), 513MW from storage, 3 000MW from gas and 1 500MW from coal. This will enable the development of an additional 11 813MW of power in total from the year 2022. This is in addition to the 2 000MW already being procured under the RMIPPP (as per media statement released 10 September 2020).

## 12.2 National Renewable Energy Commitment

In support of the need to find solutions for the current electricity shortages, the increasing demand for energy, as well as the need to find more sustainable and environmentally friendly energy resources, South Africa has embarked on an infrastructure growth programme supported by various government initiatives. These include the National Development Plan (NDP), the Presidential Infrastructure Coordinating Commission (PICC), the DoE's IRP, the National Strategy for Sustainable Development, the National Climate Change Response White Paper, the Presidency of the Republic of South Africa's Medium-Term Framework, and the National Treasury's Carbon Tax Act.

The Government's commitment to growing the renewable energy industry in South Africa is also supported by the *White Paper on Renewable Energy* (2003), which sets out the Government's principals, goals and objectives for promoting and implementing renewable energy in South Africa. In order to achieve the long-term goal of achieving a sustainable renewable energy industry, the DoE has set a target of contributing 40% of renewable energy to the final energy consumption by 2030. This target is to be produced mainly through, wind and solar; but also, through small-scale hydro and CSP. According to the IRP 2019, 1 474MW of solar PV energy output capacity had been installed by 2018 already. Additionally, the IRP 2019 states that new installed energy capacity to 2030 will include approximately 6 484MW solar PV. It is also recommended that 10.5% of the generation capacity should be from solar PV energy by 2030 (IRP, 2019)

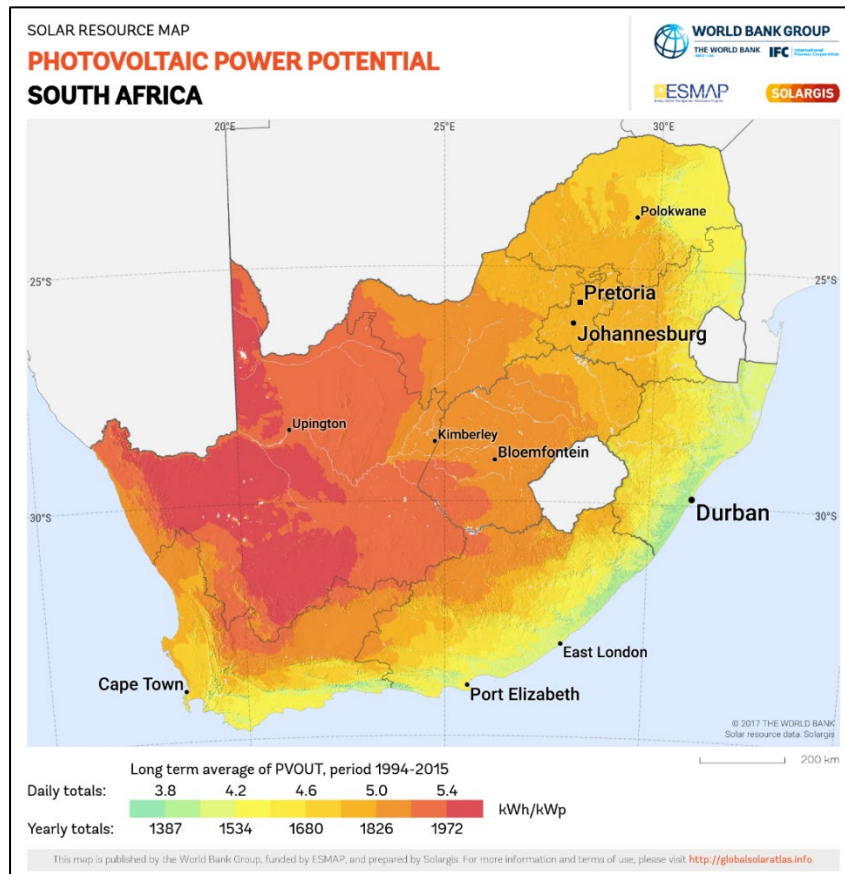
## 12.3 Site Suitability

The selection of a potential site for the proposed solar PV energy facility included several key aspects, namely solar resource, climate, topography, environmental, grid connections and access to the site.

As mentioned, the proposed project site is one of a cluster of three solar PV projects. The other two were approved in 2021.

### 12.3.1 Solar Resource

According to the Photovoltaic Power Potential map (2020 The World Bank, Source: Global Solar Atlas 2.0, Solar resource data: Solargis) in **Figure 27** below, the North West has a very high solar potential. The overall project site is thus suitable for the establishment of the proposed solar PV energy facility.



**Figure 26: Photovoltaic Power Potential in South Africa**

### 12.3.2 Site Access

The Leeuwxmax site sits directly adjacent to the tarred R 502. Access to the facility is via existing gravel roads which connect to the tarred R 502 road... There are two existing access points. Both have gates to the property and have existing access road tracks. The site therefore has good access and is situated approximately 6km from the town of Leeudoringstad

### 12.3.3 Topography

The topography within the immediate vicinity of the proposed application site is characterised by a mainly flat to gently undulating landscape, sloping down in a south-easterly direction. In addition, the topography in the wider area is largely characterised by level plains with little noticeable relief and very gradual slopes.

#### **12.3.4 Environmental**

The site forms part of a cluster of PV projects and was therefore already pre-screened as part of the initial application process. All assessments conducted for the initial approval process were taken into account, as well as updates from all specialists, and used to determine the proposed layout being put forward for approval.

#### **12.3.5 Land Availability**

While the proposed project site is not located in an identified REDZs, the proposed solar PV energy facility is still considered to be important for South Africa as it will reduce the country's overall environmental footprint from power generation (including externality costs), and thereby steer the country on a pathway towards sustainability. The proposed development will provide socio-economic benefits to the region it is situated in and will have a high commercial attractiveness. In addition, the negative environmental impacts associated with the proposed project can be mitigated to acceptable levels.

The affected landowner has given their consent and have signed a letter of consent for the undertaking of the BA Process and the subsequent development of the proposed Leeumax Solar PV project.

In terms of the agricultural assessment, the potential impact on the loss of agricultural land will be low, and there is not expected to be any significant soil erosion hazard. As such, it is not envisioned that farming activities will be negatively impacted by the proposed development.

#### **12.3.6 Access to Grid**

Grid connection suitability is the next fundamental element which drives the project location. The proposed project site has good grid connection potential and is in close proximity to a grid connection.

The site is considered suitable for the reasons provided above. The investigation of an alternative site is not currently proposed within this project. There is therefore no Site alternative for the Leeuwxmax SEF.

#### **12.3.7 Reduced Dependency on Fossil Fuels**

At present, more than 90% of South Africa's energy is generated by coal-fired power stations. Apart from the fact that these are finite resources that will eventually run out, fossil fuels are also harmful to the environment when used to produce electricity. During combustion, fossil fuels such as coal emit many by-products into the atmosphere, two (2) of which are carbon dioxide (CO<sub>2</sub>) and sulphur dioxide (SO<sub>2</sub>). Both these gases have been shown to contribute to the worsening climate crisis. Wind is a free and infinite resource that occurs naturally in the environment. Converting wind energy into electricity releases no harmful by-products into the environment and will reduce the dependency on fossil fuels.

#### **12.3.8 Stimulate the Economy**

A significant portion of the capital expenditure envisaged for the proposed development will be spent on procurement of goods and services within South Africa and specifically within the North West Province. If goods and services are procured locally (i.e. within South Africa), it increases the production of the respective industries. This has a positive impact on the national economy and economies of the municipalities where inputs are procured.

The proposed development has the potential to stimulate the demand for other industries, among others construction services, engineering services, transport services, steel structures, cement and other aggregates, and electrical equipment. At the local level, increase in demand for accommodation, personal services, perishable and non-perishable goods is expected, which will stimulate the local economies of the towns and settlements, where labour will be procured from or where migrant workers will be temporarily located.

Some of the local businesses could benefit from sub-contracting opportunities, if the construction companies appointed by the developer implement a local community procurement policy, and consumer expenditure of the construction crew. Furthermore, the demand for hospitality services (including accommodation and catering in the town of Leeudoringstad and other nearby towns) is expected to increase and provide much-needed stimulus for the local economy.

### **12.3.9 Job opportunities and Household Livelihoods**

Solar PV developments create temporary and permanent job opportunities in South Africa for both skilled and unskilled workers. At this stage, it is anticipated that approximately 25 local people will be employed during the construction phase of the proposed development. In addition, approximately five (5) local people will be employed on a permanent basis during the operational phase of the proposed development. This includes cleaning and security staff. It should however be noted that for certain highly skilled positions, employees may need to be sourced from outside the local communities.

In addition to those benefitting from direct employment created at the proposed development, various multiplier effects will assist in temporarily supporting existing jobs in the businesses offering services and goods that will be procured during construction activities. The increased temporary income earned by these businesses will, in turn, stimulate consumer spending, creating another round of multiplier effect, positively impacting employment in the area.

According to the 2011 National Census, the weighted average household income in the Maquassi Hills LM was R4 836 in basic prices. About 2 973 or 14.5% of the LM's households had no regular income in 2011 (Stats SA, 2020). In total 77.2% of LM's households are surviving on an income of less than R3 200 per month at current prices (Stats SA, 2020). One fifth (20.6%) of the population is in the middle-income category. In this light, the LM can be considered as dominantly relatively poor. This status can be attributed to the education levels of the LM.

## **13.6 Skills Development**

In addition to job creation, there is valuable opportunities for skills enhancement and knowledge transfer as quite often input from experts are required in this field. Therefore, opportunities for guiding and training of local workers will be created. A variation of skill-sets is required, ranging from semi-skilled construction workers to highly skilled engineers. The majority of the municipality's residents are low-skilled, which means that with proper planning and recruitment strategies, many of the local unemployed residents could be hired as temporary construction workers provided they satisfy any other recruitment criteria.

Those employed will either develop new skills or enhance current skills. This implies that inexperienced workers will have the opportunity to attain and develop new skills, while experienced workers will further improve their existing skills. Albeit the employment is temporary, the skills attained will be of long-term benefit to employees. However, these skills will need to be supported and practised on a regular basis to remain current.



## **13. DETAILS OF PROCESS FOLLOWED TO REACH THE PREFERRED OPTION**

### **13.1 Details of alternatives**

#### **13.1.1 Introduction**

As per the 2014 EIA Regulations (as amended), feasible and reasonable alternatives are required to be considered during the BA process. Alternatives are defined in Chapter 1 of the 2014 EIA Regulations (as amended) as “different means of meeting the general purpose and requirements of the activity”. These alternatives may include:

- (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.

Each of the alternatives in relation to the proposed development is discussed in the sections below.

#### **13.1.2 Location/Site alternatives**

There are several factors which are favourable for the placement of SEFs and substations at the proposed site location. This included land availability and topography, environmental sensitivities, distance to the national grid, solar resource, site accessibility and current land use. The project site and placement for the SEF and substation has been identified based on the following:

- The proposed project is adjacent to approved SEFs on the same property.
- The relatively flat topography of the proposed development site and it's the availability for use for an alternative energy generation facility.
- The grid connection potential based in proximity to existing transmission and substation infrastructure- existing Leeubosch Traction Substation nearby.
- The site is located directly adjacent to the tarred R 502.
- The site falls within a moderated to high solar radiation area which allows for the maximisation of solar energy received.
- The terrain is flat which allows for optimisation of the layout and minimum interference with respect to shadows between individual solar infrastructure
- The proposed activity falls within an area with low agricultural potential.
- Ground conditions are considered suitable with reduced construction cost.

Therefore no location / site alternatives are being considered for the proposed Leeumax SEF and associated infrastructure.

#### **13.1.3 Activity/technology alternatives**

Activity alternatives refer to the consideration of alternatives requiring a change in the nature of the proposed activity to be undertaken.



No other activity / technology alternatives are being considered. Renewable energy development in South Africa is highly desirable from a social, environmental and development point of view. Based on the terrain, the climatic conditions and surrounding land uses it was determined that the proposed site would be best-suited for a SEF, instead of any other type of renewable energy technology. It is generally preferred to install solar energy facilities (SEFs) on flat ground. Therefore, SEF with associated infrastructure is the preferred technology being considered.

#### **13.1.4 Design or Layout alternatives**

Specialist studies identified the environmental constraints upfront and a layout that maximises the footprint was chosen. Therefore, site layout alternatives will not be assessed further. The layout takes into account all environmental no-go areas.

#### **13.1.5 No – go option**

The ‘no-go’ alternative is the option of not undertaking the proposed SEF project. Hence, if the ‘no-go’ option is implemented, there would be no further development. This alternative would result in no additional environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the BA process.

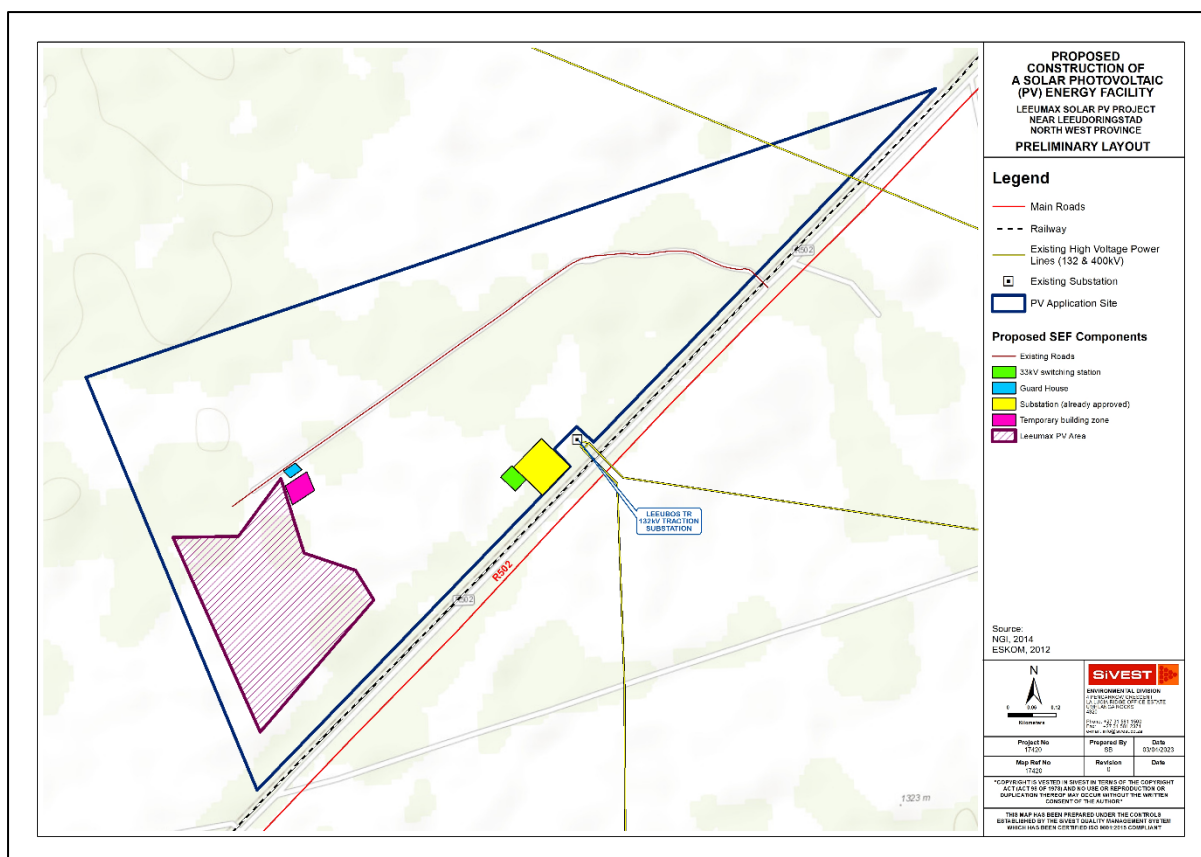
The option of not implementing the activity, or the “no-go” alternative, has been considered in this BA process. South Africa is under immense pressure to provide clean sources of electricity generating capacity in order to reduce the current electricity demand from aging and polluting coal-fired power stations. With the global focus on climate change, the government is under severe pressure to explore alternative energy sources in addition to coal-fired power stations. Although solar energy is not the only solution to solving the energy crisis in South Africa, not developing the proposed SEF and associated infrastructure would be detrimental to the mandate that the government has set to promote the implementation of renewable energy. It is a suitable sustainable solution to the energy crisis and this project could contribute to addressing the problem. This project will thus aid in achieving South Africa’s goals in terms of sustainability, energy security, mitigating energy cost risks, local economic development and national job creation.

#### **13.1.6 Comparative Assessment of Alternatives**

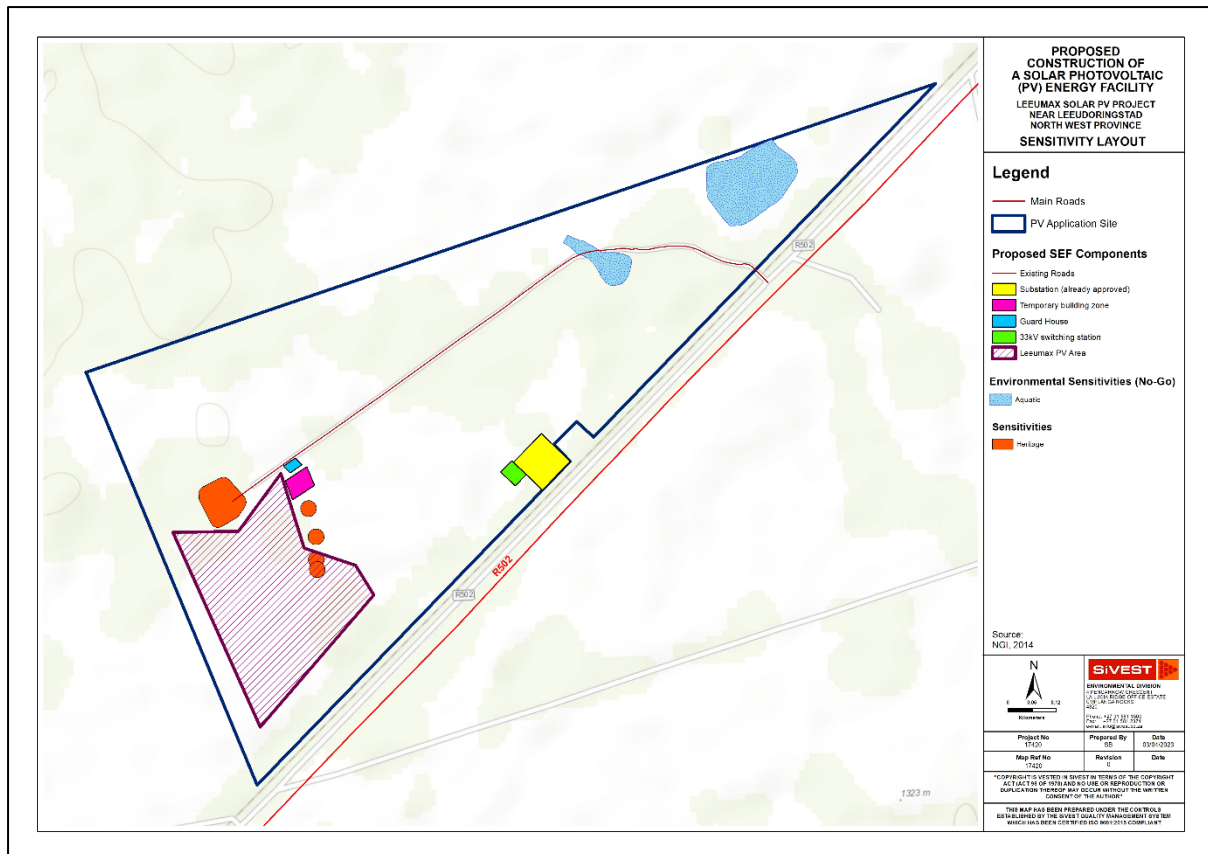
The site area presented in the Basic Assessment Report has been selected as a practicable option for the Leeumax SEF considering technical preference and constraints, the placement of the already approved SEF on the property, as well as no-go layers informed by the relevant specialist during the screening studies. Therefore, there are no alternatives being comparatively assessed.

### **13.2 Motivation and concluding statement for preferred alternative**

No activity alternatives are being considered. Renewable Energy development in South Africa is highly desirable from a social, environmental and development point of view. Solar energy installations are more suitable for the site because of the good solar resource. The choice of technology selected for the Leeumax SEF was based on environmental constraints as well as technical and economic considerations. The layout was informed by studies undertaken by the respective specialists both during the initial project approval and updated thereafter. The proposed layout is reflected in the figure below:



The above layout has been assessed by the specialists in their respective specialist studies. All constraints identified to date as indicated in the sensitivity mapping below (**Figure 29**) have been taken into account and the layout has avoided all no-go areas. In terms of the Heritage Sensitivity, the specialist has advised that these are not no-go areas, but rather recommended that further consultation with local communities on the previous inhabitants of these areas be initiated to determine the possibility of infant burials. In the event that such burial is confirmed a grave relocation process must be initiated. It is further recommended that an archaeologist monitor the earth moving activities during construction.



**Figure 28: Proposed layout with sensitivities**

### 13.3 Public Participation Process undertaken

Public participation is the cornerstone of any EIA. The principles of the National Environmental Management Act (NEMA) as well as the EIA Regulations (as amended 2017) govern the EIA process, including public participation. These include provision of sufficient and transparent information on an ongoing basis to stakeholders to allow them to comment, and ensuring the participation of previously disadvantaged people, women and the youth. All documents relating to the PP process have been included in **Appendix 5**.

The aim of the Basic Assessment Process is to collect the issues, concerns and queries of interested and affected parties (I&APs). The main objective is to:

- Inform the stakeholders about the proposed project and the environmental assessment process to be followed;
- Provide opportunity to all parties to exchange information and express their views and concerns;
- Obtain contributions from stakeholders (including the client, consultants, relevant authorities and the public) and ensure that all issues, concerns and queries raised are fully documented;
- Evaluate the issues raised and identify the significant issues; and
- Provide comment on how these issues are to be assessed as part of the Environmental Assessment Process.

### 13.3.1 Identification of Key Stakeholder and I&AP's

Liaison with the relevant authorities plays a crucial role in the successful completion of any environmental assessment process. In addition to the competent authority, NW DEDECT, key stakeholders, the local municipality as well as other potentially affected I&APs, including adjacent property owners and dwellers, are identified.

### 13.3.2 Responsibilities of interested and affected parties (I&AP's)

Members of the public who want to participate in the assessment process need to register and are referred as I&AP's. Registered I&AP's are entitled to comment, in writing, on all written submissions to the authority and to raise any issues that they believe may be significant, provided that:

- Comments are submitted within the timeframes set by the competent authority or extensions of timeframes agreed to by the applicant, EAP and competent authority.
- A copy of the comments submitted directly to the competent authority is served on the applicant or EAP.
- The I&AP discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

### 13.3.3 Steps taken to notify key stakeholders and potential I&APs

#### Notification of BA process was undertaken as follows:

- Issuing of the notifications and initial landowner consultation (circulated to all I&APs in November 2022 respectively as part of the Draft Basic Assessment Report (proof to be included in Final Basic Assessment Report).
- Placement of site notices in English and Afrikaans (as per regulations) were placed along the entrance road to the application site and around the site itself on **11 -13 November 2022** (proof included in the Basic Assessment Report).
- Notification letters were sent via E-mail or sms (if cell phone number / email is available, it is assuming the I&AP have an email or cell phone).
- Public notification of the BA process was advertised along with the SEF project, in a local newspaper (**namely Stellalander Newspaper**) on **17 November 2022**, as required according to Regulation 41(2) (c) of the EIA Regulations (2014), as amended. Proof to be included in the Final Basic Assessment Report.

#### Availability of report for review:

- Report available on SiVESTs website for download.
- Electronic copies were made available to parties via a secure digital link emailed upon request for the documentation.
- CDs / Flash drive were posted, as requested.
- The Draft Basic Assessment Report was located and available for review at the following locations:
  - Maquassi Hills Library, 56 Smuts Street, Leeudoringstad, North West.
  - Kgakala Library, 415 Tladi Street, Leeudoringstad, North West

#### 13.3.4 Summary of issues raised

Issues, comments and concerns raised during the public participation process have been captured in the Comments and Response Report (C&RR). The C&RR provides a summary of the comments received and issues raised by I&APs and key stakeholders, as well as the responses provided. This information has been used to feed into the evaluation of environmental and social impacts and has also been taken into consideration when compiling this report. All comments received to date have been included in the C&RR and attached in **Appendix 5**.

#### 13.3.5 Details of notification of landowners

Regulation 39 (1) of the EIA Regulations, 2014 (as amended), states that *'if the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land'*.

The applicant is not the owner or the person in control of the land on which the proposed Leeumax SEF is proposed, therefore landowner consent is required and has been included as part of the application form.

### 14. IMPACTS AND RISKS IDENTIFIED FOR THE PREFERRED ALTERNATIVE

The SiVEST Impact Assessment method, dated 28 July 2017 (attached as **Appendix 7**) has been utilised to assess the following potential impacts identified in the assessment phase and is presented in the following sections.

The method used in this impact assessment determines significance (can be both positive and negative) of an impact by multiplying the value of the environmental system or component affected by the magnitude of the impact on that system or component (System or Component Value x Impact Magnitude).

In this method, all significant impacts on the natural or biophysical environment are assessed in terms of the overall impacts on the health of ecosystems, habitats, communities, populations and species. Thus, for example, the impact of an increase in stormwater runoff generated by a development can only be assessed in terms of the impact on the health of the affected environmental systems.

Similarly, all significant impacts on the social and socio-economic environment are assessed in terms of the overall impacts to the quality of life, health and safety of the affected population, communities and/or individuals, with the exception of impacts on resources that are assessed on their own.

The following impacts have been identified for the proposed project:

## 14.1 Planning

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+/-)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+/-)	S
Aquatic / Freshwater- none identified																				
Terrestrial Ecology- none identified																				
Agricultural - none identified																				
Avifaunal - none identified																				
Social - none identified																				
Construction Materials	Availability of sufficient local construction materials for the PV Plant	1	3	3	2	1	4	40	-	Medium	• Source unavailable materials from abroad (import)	4	3	1	2	1	3	33	+	Medium
Heritage and Palaeontology - none identified																				
Visual - none identified																				

## 14.2 Construction

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Avifaunal																				
Avifauna	Displacement of priority species due to disturbance associated with construction of the PV plant and associated infrastructure	1	4	2	3	1	3	33	-	Medium	<ul style="list-style-type: none"><li>Construction activity should be restricted to the immediate footprint of the infrastructure</li><li>Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species.</li><li>Measures to control noise and dust should be applied according to current best practice in the industry.</li><li>Maximum used should be made of existing access roads and the construction of new roads should be kept to a minimum.</li></ul>	1	3	2	3	1	3	30	-	Medium
Aquatic / Freshwater																				
Clearing of infrastructure footprints for	Loss of wetland areas through direct impact or indirect impacts of erosion or sedimentation).	1	1	2	1	2	1	7	-	Low	During site clearing the vegetation and topsoil is removed, increasing the runoff and erosion potential of flowing water. to mitigate these impacts the following measures must be followed:	1	1	2	1	2	1	7	-	Low



ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/ M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/ M	TOTAL	STATUS (+ OR -)	S
construction											<ul style="list-style-type: none"> <li>Minimise the area of soil disturbance to reduce the impact of sedimentation into waterbodies.</li> <li>Clearing and grading must occur only where necessary to build and provide access to structures and infrastructure. Clearing must be done immediately before construction, rather than leaving soils exposed for months or years.</li> <li>Where possible, plants should be cut down to ground level instead of being removed completely to stabilise the soil during land-clearing operations.</li> <li>The proposed limits of land disturbance must be physically marked off to ensure that only the land area required for the development is cleared.</li> <li>When excavated areas are backfilled the surface must be level with the surrounding land surface, to minimise soil erosion from the areas when the excavation is complete.</li> <li>The most efficient approach to control erosion is to minimise the area of land disturbed as well as the duration for which it is exposed.</li> <li>Once surfaces have been exposed, they must immediately be protected from erosion, so limiting the source of the sediment.</li> <li>During the excavation of pits, roads, construction sites etc. the removed topsoil must be stored and appropriately protected so that it does not wash into waterbodies, causing sedimentation and nutrient loading. This is then used to backfill the area so that it can be effectively rehabilitated.</li> <li>Topsoil that is removed during excavation must NEVER be buried or rendered unusable in any way (such as mixing it with spoils or being compacted by machinery).</li> <li>During excavation soil must be excavated one layer at a time and stored in separate stockpiles so they can be returned in their natural order when the area is backfilled. This improves soil functions and improves the template for plant growth.</li> <li>To ensure that it reaches most people signs must be written in the languages of the area (NOT just English). This ensures that non-English speakers can understand and will hopefully cooperate in reducing water pollution by the measures indicated on the sign.</li> <li>Within a construction site, vehicle access must be strictly controlled (i.e., there must be set parking, turning areas, set routes and no access to undisturbed areas.) This minimises soil disturbance and compaction and pollution from fluids leaking onto the ground as well as the disturbance of aquatic organisms.</li> </ul>									

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/ M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/ M	TOTAL	STATUS (+ OR -)	S
Operation of equipment and machinery	Hydrocarbon spills and compaction within wetland zones.	1	1	1	1	1	2	10	-	Low	<ul style="list-style-type: none"> <li>Areas (away from surface water bodies and outside of the riparian zone) must be designated for the storage of materials and mixing of materials (such as concrete or chemicals). This reduces contamination of water resources from these materials/ activities.</li> <li>Portable toilets must be provided where work is being done and must be located a considerable distance away from water resources and riparian areas.</li> <li>If soil contamination occurs (such as due to a spill) the soil must be removed from the site and disposed of appropriately.</li> <li>Prevention of spills eliminates or minimizes the discharge of pollutants to water bodies.</li> <li>Handle hazardous and non-hazardous materials, such as concrete, solvents, asphalt, sealants, and fuels, as infrequently as possible and observe all national and local regulations when using, handling, or disposing of these materials.</li> <li>An effective response plan must be in place and personnel must be ready to mobilise in the event of a spillage to reduce the environmental effects of an oil or chemical spill.</li> <li>Spill control devices such as absorbent snakes and mats must be placed around chemical storage areas, and they can be used in an emergency to contain a spill.</li> <li>Implement preventative maintenance system to ensure that work vehicles are maintained in an acceptable condition. This would involve routinely checking vehicles for leaks before construction begins; and not allowing vehicles with significant leaks to operate or be repaired within the construction site. Ideally, vehicle maintenance and washing occurs in garages and wash facilities, not on active construction sites.</li> <li>Before an operation occurs near a waterbody, vehicles must be checked for leaks, to reduce soil and water contamination from vehicle fluids.</li> <li>Old engine oil must NOT be thrown on the ground or down a stormwater drains but rather collected in containers and recycled.</li> <li>Ensure that appropriate solid waste disposal facilities are provided, and adequate signage is provided for all solid, liquid, and hazardous waste types. These must contain waste products in a weatherproof manner and to prevent any airborne litter, access to scavengers or loss of food residues that may be washed into surface or ground waters. Collected waste needs to be disposed of at a registered landfill site/hazardous waste facility.</li> <li>Re-fuelling areas for vehicles must be bunded and located away from water resources and sensitive environments to prevent any accidental spillage contaminating soil or seeping</li> </ul>	1	1	1	1	1	2	10	-	Low
Waste and ablutions	Sewerage spills within wetlands or drainage lines feeding wetlands	1	1	1	1	1	2	10	-	Low		1	1	1	1	1	2	10	-	Low
Storage of construction material	Spills of stored hazardous material into wetlands or drainage lines feeding wetlands	1	2	1	1	1	1	6	-	Low		1	1	1	1	1	1	5	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/ M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/ M	TOTAL	STATUS (+ OR -)	S
											<p>into groundwater aquifers. All servicing area run-off must be directed towards a fully contained collection sump for recovery and appropriate disposal.</p> <ul style="list-style-type: none"> <li>There must be no standing water at a stockpile site, to reduce erosion as well as the contamination of the water by nutrients/toxics.</li> <li>Water resources must be well fenced and sign-posted, to keep machinery, people, and livestock away from the water body as well as vegetated areas to reduce the soil disturbance, soil compaction and vegetation destruction, which thus reduces the amount of erosion and habitat loss.</li> </ul>									
Proliferation of alien vegetation	The introduction of alien vegetation into disturbed areas disrupting natural wetland vegetation composition or alteration of water transpiration from soils.	2	3	2	1	2	2	20	-	Low	<ul style="list-style-type: none"> <li>Alien and invasive vegetation have several detrimental effects on water quality, from nutrient enrichment to increased erosion and excessive water use, which is especially relevant in dry areas or in important catchments. Invasive species are highly likely to colonize disturbed areas, even after rehabilitation and follow-up clearing must be done until healthy vegetation return to the site.</li> </ul>	2	2	2	1	1	2	16	-	Low
Alteration of surface & sub-surface drainage	The change in flow dynamics to and through wetlands potentially altering wetland types or potentially causing erosion from increased surface runoff.	1	1	1	1	1	1	5	-	Low	<p><u>Erosion &amp; Sedimentation Control</u></p> <ul style="list-style-type: none"> <li>Sediment traps are small impoundments that allow sediment to settle out of runoff. They are usually installed in a drainageway or other point of discharge from a disturbed area. Temporary diversions can be used to direct runoff to the sediment trap. Sediment traps detain sediments in stormwater runoff to protect receiving water bodies, and the surrounding area. The traps are formed by excavating an area or by placing an earthen embankment across a low area or drainage swale. An outlet or spillway is often constructed using large stones or aggregate to slow the release of runoff.</li> <li>Unprotected stockpiles are very prone to erosion and therefore must be protected. Small stockpiles can be covered with a tarp to prevent erosion. Large stockpiles must be stabilized by erosion blankets, seeding, and/or mulching.</li> </ul> <p><u>Soil Stabilisation</u></p> <ul style="list-style-type: none"> <li>Stabilization practices (e.g., revegetation) must occur as soon as possible after grading. In colder climates, a mulch cover is needed to stabilize the soil during the winter months when grass does not grow or grows poorly.</li> <li>The following measures can be used to stabilize soils for site preparation and construction: hydro mulch, straw (placed evenly on slope), crimping (rolling the placed straw with a sheep-foot roller), seeding, fertiliser, transplanting and net (jute netting pinned onto the slope).</li> </ul>	1	1	1	1	1	1	5	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											<u>Stockpile management</u> <ul style="list-style-type: none"><li>Unprotected stockpiles are very prone to erosion and therefore must be protected. Small stockpiles can be covered with a tarp to prevent erosion. Large stockpiles must be stabilized by erosion blankets, seeding, and/or mulching.</li></ul> <u>Runoff Control</u> <ul style="list-style-type: none"><li>Runoff from disturbed areas (such as landing/depot areas, extraction routes, gravel pits, temporary and unpaved roads) must be directed to silt traps (silt fences, sandbags, etc) to remove sediment and reduce the sedimentation of the water bodies.</li><li>Check dams are small, temporary dams constructed across a swale or channel. They can be constructed using gravel, rock, gabions, or straw bales. They are used to reduce the velocity of concentrated flow and, therefore, to reduce erosion in a swale or channel.</li></ul>									
Terrestrial Biodiversity																				
Indigenous natural vegetation	Loss, degradation or fragmentation of vegetation through direct clearing	1	4	4	2	4	2	30	-	Medium	Use existing road infrastructure for access roads. Avoid construction of infrastructure within sensitive habitats. Minimise vegetation clearing and disturbance to footprint areas only. Compile a rehabilitation programme and rehabilitate disturbed areas. Compile and implement Alien Invasive Management Plan. Limit access to sensitive areas during construction. Undertake monitoring to evaluate whether further measures are required.	1	4	3	2	4	2	28	-	Medium
Agriculture																				
Soil and Agricultural Potential	Loss of agricultural land	1	3	2	2	3	2	26	-	Medium	Avoid any cultivated and especially irrigated areas, if possible.	1	3	2	2	3	1	24	-	Medium
Soil and Agricultural Potential	Soil erosion (wind or water) caused by surface disturbance	2	3	3	3	3	3	42	-	Medium	Avoid extensive vegetation removal; re-vegetate as soon as possible and maintain cover (irrigate if necessary)	1	2	1	2	1	2	14	-	Low
Geotechnical																				
Removal of subsoils (soil, rock)	Displacement of natural earth material and overlying vegetation. <ul style="list-style-type: none"><li>Increase in soil and wind erosion due to clearing of vegetation.</li><li>Construction and earthmoving vehicles may displace soil during operations.</li></ul>	1	3	2	2	2	2	20	-	Low	<ul style="list-style-type: none"><li>Identify protected areas prior to construction.</li><li>Construction of temporary berms and drainage channels to divert surface water.</li><li>Minimize earthworks and fills.</li><li>Use existing road network and access tracks.</li><li>Rehabilitation of affected areas (such as regrassing, mechanical stabilization).</li></ul>	1	2	2	1	4	2	20	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION											
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S			
	<ul style="list-style-type: none"><li>Creation of drainage paths along access tracks.</li><li>Potential oil spillages from heavy plant.</li><li>Excessive dust.</li></ul>										<ul style="list-style-type: none"><li>Correct engineering design and construction of gravel roads and water crossings.</li><li>Correct construction methods for foundation installations.</li><li>Vehicle repairs to be undertaken in designated areas.</li><li>Control stormwater flow</li><li>Dust suppression</li></ul>												
Visual																							
<ul style="list-style-type: none"><li>Potential alteration of the visual character and sense of place</li><li>Potential visual impact on receptors in the study area</li></ul>	<ul style="list-style-type: none"><li>Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction.</li><li>Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.</li><li>Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers.</li><li>Surface disturbance during construction would expose bare soil (scarring) which could visually contrast with the surrounding environment.</li><li>Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.</li></ul>	2	3	1	2	1	2	18	-	Low	<ul style="list-style-type: none"><li>Carefully plan to minimise the construction period and avoid construction delays.</li><li>Inform receptors within 500m of the site of the construction programme and schedules.</li><li>Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.</li><li>Vegetation clearing should take place in a phased manner.</li><li>Where possible, re-vegetate all reinstated cable trenches with the same vegetation that existed prior to the cable being laid.</li><li>Establish erosion control measures on areas which will be exposed for long periods of time. This is to reduce the potential impact heavy rains may have on the bare soil.</li><li>Suitable buffers of intact natural vegetation should be provided along the perimeter of the development area.</li><li>Maintain a neat construction site by removing rubble and waste materials regularly.</li><li>Make use of existing gravel access roads where possible.</li><li>Limit the number of vehicles and trucks travelling to and from the construction site, where possible.</li><li>Ensure that dust suppression techniques are implemented:<ul style="list-style-type: none"><li>on all access roads;</li><li>in all areas where vegetation clearing has taken place;</li><li>on all soil stockpiles.</li></ul></li><li>Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.</li></ul>	2	2	1	2	1	2	16	-	Low			
Heritage and Palaeontology																							
Impact on heritage resources	Site clearance and vegetation stripping	1	1	4	1	3	1	10	-	Low	<ul style="list-style-type: none"><li>Implement a chance finds procedures handle any heritage resources discovered during construction. Implement recommendation in. section 6.5 of this report.</li></ul>	1	1	4	1	3	1	10	-	Low			
Socio-economic																							

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/ M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/ M	TOTAL	STATUS (+ OR -)	S
Economic Production	Increase in production of the national and local economies due to project capital expenditure.	4	4	1	1	1	2	22	+	Low	<ul style="list-style-type: none"> <li>Procure inputs from local and domestic suppliers</li> <li>Employ local contractors where possible</li> </ul>	4	3	1	1	1	2	20	+	Low
Employment opportunities	The creation of new direct and indirect opportunities related to the construction and operation of the proposed solar plant and facilities	4	4	1	1	1	1	11	+	Low	<ul style="list-style-type: none"> <li>Employ labour-intensive methods</li> <li>Employ local residents and communities</li> <li>Sub-contract to local construction companies</li> <li>Utilise local suppliers</li> </ul>	4	4	1	1	1	1	11	+	Low

### 14.3 Operation

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Avifaunal																				
Avifauna	Displacement of priority species due to habitat transformation associated with construction of the PV plant and associated infrastructure	1	4	3	3	3	3	42	-	Medium	<ul style="list-style-type: none"><li>Construction activity should be restricted to the immediate footprint of the infrastructure.</li><li>Access to the remainder of the site should be strictly controlled to prevent unnecessary degradation of habitat.</li><li>Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.</li><li>The mitigation measures proposed by the vegetation specialist must be strictly enforced.</li></ul>	1	2	2	2	3	2	20	-	Low
Avifauna	Entrapment of large-bodied birds in the double perimeter fence	2	2	1	2	3	2	20	-	Low	<ul style="list-style-type: none"><li>It is recommended that a single perimeter fence is used</li></ul>	2	1	1	2	3	2	18	-	Low
Aquatic / Freshwater																				
Drainage patterns change due to altered flow paths	The change in flow dynamics to and through wetlands potentially altering wetland types or potentially causing erosion from increased surface runoff.	1	1	1	1	1	1	5	-	Low	<ul style="list-style-type: none"><li>Same as Construction</li></ul>	1	1	1	1	1	1	5	-	Low
Operational traffic causing hydrocarbon spills	Hydrocarbon spills and compaction within wetland zones.	1	1	1	1	1	1	5	-	Low		1	1	1	1	1	1	5	-	Low



ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/ M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/ M	TOTAL	STATUS (+ OR -)	S
Sedimentation from road surfaces & Infrastructure	Loss of wetland areas through direct impact or indirect impacts of erosion or sedimentation.	1	1	1	1	1	1	5	-	Low		1	1	1	1	1	1	5	-	Low
<b>Terrestrial Biodiversity</b>																				
Vegetation	Establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors	1	3	2	3	3	2	24	-	Medium	<ul style="list-style-type: none"> <li>Compile and implement Alien Invasive Management Plan. Rehabilitate disturbed areas.</li> </ul>	1	2	2	2	3	1	10	-	Low
<b>Agriculture</b>																				
Soil and Agricultural Potential	Loss of agricultural land	1	3	2	2	3	2	26	-	Medium	Avoid any cultivated and especially irrigated areas, if possible.	1	3	2	2	3	1	24	-	Medium
Soil and Agricultural Potential	Soil erosion (wind or water) caused by surface disturbance	2	3	3	3	3	4	56	-	High	Avoid extensive vegetation removal; re-vegetate as soon as possible and maintain cover (irrigate if necessary)	1	2	1	2	1	2	14	-	Low
<b>Geotechnical</b>																				
Removal of subsoils (soil, rock)	Displacement of natural earth material. <ul style="list-style-type: none"> <li>Increase in soil erosion due to concentrated flow received off PV Panels.</li> <li>Potential oil spillages from maintenance vehicles.</li> <li>Sedimentation of non-perennial features caused by soil erosion.</li> </ul>	1	2	2	2	3	1	10	-	Low	<ul style="list-style-type: none"> <li>Use of existing roads and tracks.</li> <li>Rehabilitation of affected areas (such as erosion control mats).</li> <li>Correct engineering design and construction of roads and water crossings.</li> <li>Vehicle repairs to be undertaken in designated areas.</li> <li>Maintenance of stormwater system</li> </ul>	1	3	2	2	3	2	22	-	Low
<b>Visual</b>																				
<ul style="list-style-type: none"> <li>Potential alteration of the visual character and sense of place.</li> <li>Potential visual impact on receptors in the study area.</li> <li>Potential visual impact on the night time visual environment</li> </ul>	<ul style="list-style-type: none"> <li>The PV arrays may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.</li> <li>The proposed solar PV facility will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts.</li> <li>Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers.</li> <li>The night time visual environment will be altered as a result of operational and security lighting at the proposed PV facility.</li> </ul>	2	3	3	3	3	2	28	-	Medium	<ul style="list-style-type: none"> <li>Restrict vegetation clearance on the site to that which is required for the correct operation of the facility.</li> <li>Ensure that the PV arrays are not located within 500m of any farmhouses in order to minimise visual impacts on these dwellings.</li> <li>As far as possible, limit the number of maintenance vehicles which are allowed to access the site.</li> <li>Ensure that dust suppression techniques are implemented on all gravel access roads.</li> <li>Only clear vegetation on site and adjacent to the site which is required to be cleared for the correct operation of the facility.</li> <li>As far as possible, limit the amount of security and operational lighting present on site.</li> <li>Light fittings for security at night should reflect the light toward the ground and prevent light spill.</li> </ul>	2	3	3	2	2	2	24	-	Medium

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S	
											<ul style="list-style-type: none"><li>• If possible, light sources should be shielded by physical barriers (walls, vegetation, or the structure itself);</li><li>• Lighting fixtures should make use of minimum lumen or wattage.</li><li>• Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used.</li><li>• If economically and technically feasible, make use of motion detectors on security lighting.</li><li>• Care should be taken with the layout of the security lights to prevent motorists on the R502 from being blinded by lights.</li></ul>										
Heritage and Palaeontology																					
N/a																					
Socio-economic																					
Economic Production	The plant will increase the size of the local utility sector and stimulate economic production through multiplier effects.	2	4	1	1	3	1	11	+	Low	<ul style="list-style-type: none"><li>• Procure goods and services required for the operation of the plant from the local economy.</li></ul>	2	4	1	1	3	1	11	+	Low	
Employment	Creation of jobs to support the operation and maintenance of the plant	2	4	1	1	3	1	11	+	Low	<ul style="list-style-type: none"><li>• Aim to fill all the positions with labour from the local community</li></ul>	2	4	1	1	3	1	11	+	Low	
Municipal Service Delivery	The generated electricity will improve the security of electricity in the local municipality and increase the government’s revenue and service delivery	2	4	1	1	3	2	22	+	Low	<ul style="list-style-type: none"><li>• No mitigation measures proposed</li></ul>	N A	N A	N A	N A	N A	N A	N A	N A	N/A	

#### 14.4 Decommissioning

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Avifaunal																				

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/ M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/ M	TOTAL	STATUS (+ OR -)	S
Avifauna	Displacement of priority species due to disturbance associated with decommissioning of the PV plant and associated infrastructure	1	4	1	2	1	1	9	-	Low	<ul style="list-style-type: none"> <li>De-commissioning activity should be restricted to the immediate footprint of the infrastructure.</li> <li>Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species.</li> <li>Measures to control noise and dust should be applied according to current best practice in the industry.</li> <li>Maximum used should be made of existing access roads and the construction of new roads should be kept to a minimum.</li> <li>The mitigation measures proposed by the vegetation specialist must be strictly enforced</li> </ul>	1	3	1	2	1	1	8	-	Low
Avifauna	Entrapment of large-bodied birds in the double perimeter fence	2	2	1	2	3	2	20	-	Low	<ul style="list-style-type: none"> <li>It is recommended that a single perimeter fence is used</li> </ul>	2	1	1	2	3	2	18	-	Low
Aquatic / Freshwater																				
N/a																				
Terrestrial Biodiversity																				
Vegetation	Loss and disturbance of natural vegetation due to the removal of infrastructure and need for working sites	1	3	2	2	2	2	20	-	Low	<ul style="list-style-type: none"> <li>No additional clearing of vegetation should take place without a proper assessment of the environmental impacts and authorization from relevant authorities.</li> <li>If any additional infrastructure needs to be constructed, for example overhead powerlines, communication cables, etc., then these must be located next to existing infrastructure, and clustered to avoid dispersed impacts.</li> <li>No driving of vehicles off-road. Implement Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas.</li> <li>Access to sensitive areas outside of development footprint should not be permitted during operation.</li> <li>Surface runoff and erosion must be properly controlled and any issues addressed as quickly as possible</li> </ul>	1	3	2	2	2	1	10	-	Low
Vegetation	Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors	1	3	2	3	3	2	24	-	Medium	<ul style="list-style-type: none"> <li>Implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control.</li> <li>Undertake regular monitoring to detect alien invasions early so that they can be controlled.</li> <li>Post-decommissioning monitoring should continue for an appropriate length of time to ensure that future problems are avoided.</li> <li>Do NOT use any alien plants during any rehabilitation that may be required.</li> </ul>	1	2	2	2	3	1	10	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Agriculture																				
Soil and Agricultural Potential	Loss of agricultural land	1	3	2	2	3	2	26	-	Medium	<ul style="list-style-type: none"><li>Avoid any cultivated and especially irrigated areas, if possible.</li></ul>	1	3	2	2	3	1	24	-	Medium
Soil and Agricultural Potential	Soil erosion (wind or water) caused by surface disturbance	2	3	3	3	3	3	42	-	Medium	<ul style="list-style-type: none"><li>Avoid extensive vegetation removal; re-vegetate as soon as possible and maintain cover (irrigate if necessary)</li></ul>	1	2	1	2	1	2	14	-	Low
Geotechnical																				
Removal of subsoils (soil, rock)	<ul style="list-style-type: none"><li>Decommissioning of the structure will disturb the geological environment.</li><li>Increase in soil and wind erosion due to clearance of structures</li><li>Construction and earthmoving vehicles will displace the soil.</li><li>Creation of drainage paths</li><li>Potential oil spillages from vehicles</li><li>Excessive sediments in non-perennial features</li></ul>	1	4	2	1	1	3	27	-	Medium	<ul style="list-style-type: none"><li>Use of temporary berms and drainage channels to divert surface water during flooding.</li><li>Minimize earthworks and demolish footprints.</li><li>Use of existing roads and tracks.</li><li>Rehabilitation of affected areas (such as regrassing).</li><li>Develop a chemical spill response plan.</li><li>Develop dust and demolition fly supression plan.</li><li>Vehicle repairs to be undertaken in designated areas.</li><li>Reinstate channelized drainage features.</li></ul>	1	3	4	2	2	2	24	-	Medium
Visual																				
<ul style="list-style-type: none"><li>Potential visual intrusion resulting from vehicles and equipment involved in the de-commissionin g process;</li><li>Potential visual impacts of increased dust emissions from de-commissionin g activities and related traffic; and</li><li>Potential visual</li></ul>	<ul style="list-style-type: none"><li>Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts.</li><li>Decommissioning activities may be perceived as an unwelcome visual intrusion.</li><li>Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers.</li><li>Surface disturbance during decommissioning would expose bare soil (scarring) which could visually surrounding environment.</li><li>Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.</li></ul>	2	3	1	2	1	2	18	-	Low	<ul style="list-style-type: none"><li>All infrastructure that is not required for post-decommissioning use should be removed.</li><li>Carefully plan to minimize the decommissioning period and avoid delays.</li><li>Maintain a neat decommissioning site by removing rubble and waste materials regularly.</li><li>Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase.</li><li>All cleared areas should be rehabilitated as soon as possible</li><li>Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.</li></ul>	2	2	1	2	1	2	16	-	Low

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		E	P	R	L	D	I/ M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/ M	TOTAL	STATUS (+ OR -)	S
intrusion of any remaining infrastructure on the site																				
Heritage and Palaeontology																				
N/a																				
Socio-economic																				
Loss of agricultural production	Land demarcated for the solar PV plant will be sterilized and all current activities taking place on said land will be discontinued.	1	4	1	2	3	1	11	-	Low	• Rehabilitation of land should take place at the end of the project's life to allow for the land to be used for commercial livestock farming after the project's closure.	1	4	1	2	3	1	11	+	Low

The proposed SEF is located adjacent to several other SEFs within 35km of Leeumax SEF. SiVEST undertook every effort to obtain the information (including specialist studies, BA / EIA / Scoping and EMPr Reports) for the additional surrounding developments. The information that could be obtained for the surrounding planned renewable energy developments was taken into account as part of the cumulative impact assessment.

**PROPOSED CONSTRUCTION OF A SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY**

**LEEUMAX SOLAR PV PROJECT NEAR LEEUDORINGSTAD NORTH WEST PROVINCE RENEWABLE ENERGY PROJECTS (EXISTING AND PROPOSED)**

**Legend**

- Main Towns
- National Route (N12)
- Local Municipal Boundaries
- Provincial Boundary
- Leeumax PV Area
- 35km Radius

**Renewable Energy Sites**

- Solar PV

**Source:**  
DEPP, 2020  
NGI, 2014  
MUNICIPAL DEMARCATION BOARD, 2016

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Project No. E1420	Prepared By SB	Date 01/01/2020
Map Ref No. 17450	Revised By G	Date 01/01/2020

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**UPGRADE ENERGY (PTY) LTD**  
**Project No. 17420**  
**Description Leeumax PV BA**  
**Revision No. 1**





ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Avifaunal																				
Avifauna	Cumulative impact of displacement due to construction and habitat transformation, collisions with solar panels and entrapment in fences	1	3	3	2	3	2	24	-	Medium	Same as other phases.	1	3	3	2	2	2	22	-	Low
Aquatic / Freshwater																				
N/a																				
Terrestrial Biodiversity																				
Indigenous natural vegetation	Loss, degradation or fragmentation of vegetation through direct clearing	2	4	4	2	4	2	32	-	Medium	Limit development within conservation zones, especially CBA1 areas.	2	4	4	2	4	1	16	-	Low
Vegetation, ecosystems and habitats	General increase in the spread and invasion of new habitats by alien invasive plant species	2	3	2	3	3	2	26	-	Medium	<ul style="list-style-type: none"><li>Implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control.</li><li>Undertake regular monitoring to detect alien invasions early so that they can be controlled.</li><li>Post-decommissioning monitoring should continue for an appropriate length of time to ensure that future problems are avoided.</li><li>Do NOT use any alien plants during any rehabilitation that may be required.</li></ul>	2	2	2	2	3	1	11	-	Low
Agriculture																				
Soil ecology and functioning	Proposed project can contribute to overall loss of soil health and productivity	2	3	3	3	3	4	56	-	High	Minimise soil disturbance, re-vegetate all disturbed areas and monitor periodically (6-monthly or seasonally)	1	3	2	2	2	2	20	-	Low
Geotechnical																				
n/a																				
Visual																				
<ul style="list-style-type: none"><li>Potential alteration of the visual character and sense of place in the broader area.</li><li>Potential visual</li></ul>	<ul style="list-style-type: none"><li>Additional renewable energy developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts.</li><li>Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in</li></ul>	3	3	3	3	3	2	30	-	Medium	<ul style="list-style-type: none"><li>Restrict vegetation clearance on development sites to that which is required for the correct operation of the facility.</li><li>Ensure that the PV arrays are not located within 500m of any farmhouses in order to minimize visual impacts on these dwellings.</li><li>As far as possible, limit the number of maintenance vehicles which are allowed to access the facility.</li></ul>	3	3	3	2	2	2	26	-	Medium

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/ M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/ M	TOTAL	STATUS (+ OR -)	S
impact on receptors in the study area. • Potential visual impact on the night time visual environment.	more natural undisturbed settings. • Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. • The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.										• Ensure that dust suppression techniques are implemented on all gravel access roads. • As far as possible, limit the amount of security and operational lighting present on site. • Light fittings for security at night should reflect the light toward the ground and prevent light spill. • If possible, light sources should be shielded by physical barriers (walls, vegetation, or the structure itself). • Lighting fixtures should make use of minimum lumen or wattage. • Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used. • Non – reflective surfaces should be utilised where possible.									
<b>Heritage and Palaeontology</b>																				
Impact on heritage resources	Site clearance and vegetation stripping	1	1	4	1	3	1	10	-	Low	• Implement a chance finds procedures handle any heritage resources discovered during construction	1	1	4	1	3	1	10	-	Low
<b>Socio-economic</b>																				
The proposed project will result in several positive cumulative effects on the socio-economic environment	• Stimulation of the economy and increased production • Creation of employment and business opportunities • Increased household income and standard of living • Adoption of clean, renewable energy and benefits in terms of global warming and climate change.	2	3	1	1	3	2	20	+	Low	• Implement the “locals first” policy • Aim to employ the people who have already worked on other similar projects in the area to provide them with an opportunity for long-term employment and to continue developing their skills • Apply labour intensive construction methods, where feasible. • Use local suppliers, where feasible.	2	3	1	1	3	2	20	+	Low

## 15. POSITIVE AND NEGATIVE IMPACTS OF THE PROPOSED DEVELOPMENT

A summary of the impacts pre-mitigation and post-mitigation are provided below:

**Table 22: Summary of impacts pre-mitigation and post-mitigation**

Impact	Pre-mitigation	Post-mitigation
<b>PLANNING</b>		
<b>Socio-economic</b>		
Availability of sufficient local construction materials for the PV Plant	Negative Medium	Positive Medium
<b>CONSTRUCTION</b>		
<b>Impacts to Biophysical Systems</b>		
<b>Avifaunal</b>		
Displacement of priority species due to disturbance (noise and movement) associated with the construction of the PV plant and associated infrastructure	Negative Medium	Negative Medium
<b>Agriculture</b>		
Loss of agricultural land	Negative Medium	Negative Medium
Soil erosion (wind or water) caused by surface disturbance	Negative Medium	Negative Low
<b>Terrestrial Ecology</b>		
Loss, degradation or fragmentation of vegetation through direct clearing.	Negative Medium	Negative Medium
<b>Geotech</b>		
Displacement of natural earth material and overlying vegetation. 1) Increase in soil and wind erosion due to clearing of vegetation. 2) Construction and earthmoving vehicles may displace soil during operations. 3) Creation of drainage paths along access tracks. 4) Potential oil spillages from heavy plant. 5) Excessive dust.	Negative Low	Negative Low
<b>Aquatic/ Freshwater</b>		
Loss of wetland areas through direct impact or indirect impacts of erosion or sedimentation).	Negative Low	Negative Low
Hydrocarbon spills and compaction within wetland zones.	Negative Low	Negative Low
Sewerage spills within wetlands or drainage lines feeding wetlands	Negative Low	Negative Low
Spills of stored hazardous material into wetlands or drainage lines feeding wetlands	Negative Low	Negative Low
The introduction of alien vegetation into disturbed areas disrupting natural wetland vegetation composition or alteration of water transpiration from soils.	Negative Low	Negative Low
The change in flow dynamics to and through wetlands potentially altering wetland types or potentially causing erosion from increased surface runoff.	Negative Low	Negative Low
<b>Impacts to Socio-Economic Component</b>		
<b>Socio-economic</b>		
Increase in production of the national and local economies due to project capital expenditure.	Positive Low	Positive Low
The creation of new direct and indirect opportunities related to the construction and operation of the proposed solar plant and facilities	Positive Low	Positive Low
<b>Heritage</b>		
Site clearance and vegetation stripping	Negative Low	Negative Low

Impact	Pre-mitigation	Post-mitigation
<b>Visual</b>		
<ul style="list-style-type: none"> <li>Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction.</li> <li>Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.</li> <li>Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers.</li> <li>Surface disturbance during construction would expose bare soil (scarring) which could visually contrast with the surrounding environment.</li> <li>Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.</li> </ul>	Negative Low	Negative Low
<b>OPERATIONAL</b>		
<b>Impacts to Biophysical Systems</b>		
<b>Aquatic / Freshwater</b>		
The change in flow dynamics to and through wetlands potentially altering wetland types or potentially causing erosion from increased surface runoff.	Negative Low	Negative Low
Hydrocarbon spills and compaction within wetland zones.	Negative Low	Negative Low
Loss of wetland areas through direct impact or indirect impacts of erosion or sedimentation.	Negative Low	Negative Low
<b>Agricultural - compliance statement – none identified</b>		
Loss of agricultural land	Negative Medium	Negative Medium
Soil erosion (wind or water) caused by surface disturbance	High	Negative Low
<b>Terrestrial Ecology</b>		
Establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors.	Negative Medium	Negative Low
<b>Avifaunal</b>		
Displacement of priority species due to habitat transformation associated with construction of the PV plant and associated infrastructure	Negative Medium	Negative Low
Entrapment of large-bodied birds in the double perimeter fence	Negative Low	Negative Low
<b>Geotech</b>		
Displacement of natural earth material. 1) Increase in soil erosion due to concentrated flow received off hardstand areas. 2) Potential oil spillages from maintenance vehicles. 3) Sedimentation of non-perennial features caused by soil erosion.	Negative Low	Negative Low
<b>Impacts to Socio-Economic Component</b>		
<b>Socio-economic</b>		
The plant will increase the size of the local utility sector and stimulate economic production through multiplier effects.	Positive Low	Positive Low
Creation of jobs to support the operation and maintenance of the plant	Positive Low	Positive Low
The generated electricity will improve the security of electricity in the local municipality and increase the government's revenue and service delivery	Positive Low	N/A
<b>Heritage (Palaeontology) – none identified</b>		

Impact	Pre-mitigation	Post-mitigation
<b>Visual</b>		
<p>The PV arrays may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.</p> <p>The proposed solar PV facility will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts.</p> <p>Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers.</p> <p>The night time visual environment will be altered as a result of operational and security lighting at the proposed PV facility.</p>	Negative Medium	Negative Medium
<b>DECOMMISSIONING</b>		
<b>Impacts to Biophysical Systems</b>		
<b>Agriculture</b>		
Loss of agricultural land	Negative Medium	Negative Medium
Soil erosion (wind or water) caused by surface disturbance	Negative Medium	Negative Low
<b>Aquatic– none identified</b>		
<b>Avifaunal</b>		
Displacement of priority species due to disturbance associated with decommissioning of the PV plant and associated infrastructure	Negative Low	Negative Low
Entrapment of large-bodied birds in the double perimeter fence	Negative Low	Negative Low
<b>Terrestrial Ecology</b>		
Loss and disturbance of natural vegetation due to the removal of infrastructure and need for working sites	Negative Low	Negative Low
Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors	Negative Medium	Negative Low
<b>Geotech</b>		
Decommissioning of the structure will disturb the geological environment. 1) Increase in soil and wind erosion due to clearance of structures. 2) Construction and earthmoving vehicles will displace the soil. 3) Creation of drainage paths. 4) Potential oil spillages from vehicles. 5) Excessive sediments in non-perennial features.	Negative Medium	Negative Medium
<b>Impacts to Socio-Economic Component</b>		
<b>Socio-economic</b>		
Land demarcated for the solar PV plant will be sterilized and all current activities taking place on said land will be discontinued.	Negative Low	Positive Low
<b>Heritage – None Identified</b>		
<b>Visual</b>		
<ul style="list-style-type: none"> <li>Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts.</li> <li>Decommissioning activities may be perceived as an unwelcome visual intrusion.</li> <li>Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers.</li> <li>Surface disturbance during decommissioning would expose bare soil (scarring) which could visually surrounding environment.</li> <li>Temporary stockpiling of soil during decommissioning may alter the flat</li> </ul>	Negative Low	Negative Low

Impact	Pre-mitigation	Post-mitigation
landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.		
<b>CUMULATIVE</b>		
<b>Impacts to Biophysical Systems</b>		
<b>Aquatic / Freshwater – None Identified</b>		
<b>Terrestrial Ecology</b>		
Loss, degradation or fragmentation of vegetation through direct clearing	Negative Medium	Negative Low
General increase in the spread and invasion of new habitats by alien invasive plant species	Negative Medium	Negative Low
<b>Agricultural</b>		
Proposed project can contribute to overall loss of soil health and productivity	Negative High	Negative Low
<b>Avifaunal</b>		
Cumulative impact of displacement due to construction and habitat transformation, collisions with solar panels and entrapment in fences	Negative Medium	Negative Low
<b>Impacts to Socio-Economic Component</b>		
<b>Socio-economic</b>		
<ul style="list-style-type: none"> <li>Stimulation of the economy and increased production</li> <li>Creation of employment and business opportunities</li> <li>Increased household income and standard of living</li> <li>Adoption of clean, renewable energy and benefits in terms of global warming and climate change.</li> </ul>	Positive Low	Positive Low
<b>Heritage</b>		
Site clearance and vegetation stripping	Negative Low	Negative Low
<b>Visual</b>		
<ul style="list-style-type: none"> <li>Additional renewable energy developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts.</li> <li>Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings.</li> <li>Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes.</li> <li>The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.</li> </ul>	Negative Medium	Negative Medium

## 15.1 Mitigation Measures

Refer to section 14 above. The assessment of each issue/impact is included in Section 14 above and mitigation measures are provided for each impact.



## 16. SUMMARY OF SPECIALIST FINDINGS AND RECOMMENDATIONS

**Table 23: Summary of specialist findings and recommendations**

Specialist Study	Findings	Recommendations
Agricultural and Soils	<p>Soil information was obtained for the solar PV plant and associated infrastructure proposed on Portion 37 of the Farm Leeuwbosch No. 44 near the town of Leeudoringstad in the North West Province. The data source was existing 1:250 000 scale land type information and indicates that the soils are mostly shallow, with much rock.</p> <p>The construction of the solar PV plant and associated infrastructure at the chosen site will have minimal impact on the loss of agricultural land, due to the small percentage of high potential agricultural land indicated by the Land Type survey information.</p> <p>The potential impact on the loss of agricultural land will be low, and there is not expected to be any significant soil erosion hazard, if standard mitigation measures are followed. Cumulative soil-related impacts are also expected to be low.</p>	<p>As far as the soils are concerned, as long as the proposed mitigation measures are adhered to, there should not be any significant cumulative impacts occurring, as any impact on agricultural potential will be contained to the specific site itself.</p>
Geotechnical	<p>The study area is underlain by the Allanridge Formation part of the Ventersdorp Supergroup, which comprises amygaloidal lava.</p> <p>The Ventersdorp Supergroup is predominantly an accumulation of andesitic to basaltic lavas with related pyroclastic rocks.. The desktop study indicates no fatal flaws from a preliminary and geological and geotechnical assessment. The impact of the development from a geotechnical perspective will be restricted to the removal and displacement of soil, boulders and bedrock.</p>	<p>No fatal flaws from a geotechnical perspective were identified. The impact of the Solar PV Facility was found to be "Negative low impact". The anticipated impact will have negligible negative effects and will require little to no mitigation. The site from a desktop level geotechnical study is considered suitable for the proposed PV Plant.</p> <p>It recommended that a detailed geotechnical investigation be undertaken during the detailed design phase of the project. The detailed geotechnical investigation must entail the following:</p> <ul style="list-style-type: none"> <li>• Profiling and sampling exploratory trial pits to determine founding conditions for the PV modules, substation and pylons. Also to determine the subgrade conditions for internal roads and a materials investigation (if required);</li> <li>• Thermal resistivity and electrical resistivity</li> </ul>

Specialist Study	Findings	Recommendations
		<p>geophysical testing for electrical design and ground earthing requirements.</p> <ul style="list-style-type: none"> <li>Groundwater sampling of existing boreholes to establish a baseline of the groundwater quality for construction purposes;</li> <li>Dynamic Probe Super Heavy (DPSH) tests and rotary core drilling may be required depending on the soil profiles and imposed loads of the structures.</li> </ul>
Avifaunal	<p>The proposed SEF will have several potential impacts on priority avifauna. These impacts are the following:</p> <ul style="list-style-type: none"> <li>Displacement of priority species due to disturbance associated with the construction and de-commissioning of the PV plant and associated infrastructure.</li> <li>Displacement of priority species due to habitat transformation associated with the PV plant and associated infrastructure.</li> <li>Mortality of priority species due to electrocution on the medium voltage internal reticulation network.</li> <li>Entrapment of large-bodied birds in the double perimeter fence.</li> <li>Displacement of priority species due to disturbance associated with de-commissioning of the PV plant and associated infrastructure.</li> <li>Cumulative impact of displacement due to construction and habitat transformation, collisions with solar panels and entrapment in fences</li> </ul>	<p>The proposed Leeumax Solar PV Plant will have a medium pre-mitigation negative impact on priority avifauna, which in most instances, can be reduced to low with appropriate mitigation. The development is supported provided the mitigation measures listed in this report is strictly implemented. No fatal flaws were discovered in the course of the investigations.</p> <p>The cumulative impact of the facility on priority avifauna within a 35km radius around the proposed development (considering all current impacts on avifauna) is assessed to be low post mitigation, mainly due to the small size of the proposed development.</p>
Heritage – Archaeological	<p>The overall impact of the Leeumax facility, on the heritage resources identified during this report, is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.</p>	<p>The following is recommended:</p> <ul style="list-style-type: none"> <li>For sites LD07, LD09, LD10, LD11 LD12: <ul style="list-style-type: none"> <li>It is recommended that further consultation with local communities on the previous inhabitants of these areas be initiated to determine the possibility of infant burials. In the event that such burial is confirmed a grave relocation process must be initiated.</li> </ul> </li> <li>It is further recommended that an</li> </ul>

Specialist Study	Findings	Recommendations
		<p>archaeologist monitor the earth moving activities during construction.</p> <ul style="list-style-type: none"> <li>Site LD13 if any changes to the structures for the establishment of the watering point is envisaged permission under section 34 of the NHRA from the Provincial Heritage Authority must be obtained. This application for alteration or destruction must be accompanied by site sketches and photographs as compiled by a heritage specialist.</li> </ul> <p>In the event that heritage resources are discovered during site clearance, construction activities must stop in the vicinity, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures.</p> <p>The overall impact of the Leeumax facility, on the heritage resources identified during this report, is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.</p>
Heritage – Paleontological	<p>The proposed development is underlain by the Allanridge Formation (Ventersdorp Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Allanridge Formation is LOW (Almond and Pether 2008, SAHRIS website).</p> <p>It is therefore considered that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological heritage of the area. Hence, the construction of the development may be authorised in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources</p>	<p>If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol must be implemented by the Environmental Control Officer (ECO) in charge of these developments. These discoveries ought to be protected (if possible, in situ) and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: <a href="http://www.sahra.org.za">www.sahra.org.za</a>) so that correct mitigation (recording and collection) can be carry out by a paleontologist.</p> <p>No mitigation measures are required.</p>
Social	The proposed construction of the Leeumax PV will be associated with multiple capital expenditures. Such expenses typically include the transportation and construction	Regarding the impacts which will arise from the proposed development, it is anticipated that there will be no major direct or indirect concerns. The proposed solar PV plant will

Specialist Study	Findings	Recommendations
	<p>of PV modules, the connection of electricity and grids, foundations, civil engineering, and the construction of supporting structures. If goods and services are procured locally, that is, within South Africa, this will increase the production of the respective industries. This will in turn have a positive impact on the national economy and the economies of the municipalities where inputs are procured. It is anticipated that the proposed development will include an approximate R130 million in investments. Some of this is expected to be spent in South Africa, which will resultantly stimulate the national economy, although for a temporary period of about twelve months during the construction of the Solar PV.</p> <p>The construction of the proposed solar PV plant and associated infrastructure will require the temporary employment of construction workers, foremen, and engineers on site. It is anticipated that approximately 25 employment opportunities will be created during the construction phase. Considering the current skills profile of the local municipality, a good portion of these jobs are likely to be filled by people from the local communities. This project will thus contribute to increasing employment opportunities in the local municipality for a temporary period. Employment of the individuals, albeit temporary, will increase their household income, improve their standard of living, and benefit their families.</p> <p>The nature of the activities taking place on the farms adjacent to the proposed facilities is also not expected to be sensitive to the proposed project's construction or operation. Therefore, the visual or noise effects that may result from the development of the PV system are not expected to adversely affect the farming activities and their respective farmhouses observed in the region.</p>	sterilise approximately 20ha of agricultural land currently used for commercial livestock farming,. Due to the nature of the activities taking place on the farms adjacent to the planned development, it is not expected to cause major disruptions during both construction and operational phase on the farms and their respective farmhouses. Furthermore, all potential impacts considered had no fatal flaws identified across all potential impacts considered.
Wetland	The Leeumax site project does not show wetlands within the boundary of the	It is recommended that an alien invasive management programme is implemented

Specialist Study	Findings	Recommendations
	<p>proposed footprint; however, one (1) wetland (HGM 3) was found within the 500m regulated area. The wetland was located south of the project area approximately 185m away. The wetland is also buffered by the main road. The impact assessment concluded that the wetland will not be impacted by the proposed project and that the impact was rated as Low or no perceived impact.</p>	<p>It is the opinion of the Specialist that the proposed development may proceed and that a GA will be sufficient, this is based on the above findings and recommendations.</p>
Visual	<p>No visually sensitive receptors were identified within the study area. This is most likely due to the fact that the study area is not typically valued or utilised for its tourism significance. Additionally, the R502 and R504 regional roads, which traverse the visual assessment zone, are used almost exclusively as local access roads and do not form part of any scenic tourist routes and are not specifically valued or utilised for their scenic or tourism potential.</p> <p>A total of thirty-two (32) potentially sensitive receptors were however identified, all of which appear to be existing farmsteads. These farmsteads are regarded as potentially sensitive visual receptors as they are located within a mostly rural setting and the proposed development will likely alter natural vistas experienced from these locations, although the residents' sentiments toward the proposed development are unknown. The receptor impact rating conducted in respect of these potentially sensitive receptors found that none of these potentially sensitive receptors are expected to experience high levels of visual impact from the proposed SPEFs. Twenty-six (26) receptors are however expected to experience moderate levels of visual impact, while the remaining six (6) receptors are only expected to experience low levels of impact from the proposed SPEF.</p> <p>The overall impact rating revealed that the Leeumax SPEF is expected to have a (negative) low visual impact rating during both construction and decommissioning</p>	<p>It is the specialist's opinion that the visual impacts associated with the proposed Leeumax SEF and associated infrastructure are of moderate significance. Given the relative absence of sensitive receptors and the significant degree of human transformation and landscape degradation in areas close to the Leeumax SPEF application site, the project is deemed acceptable from a visual impact perspective and the EA should be granted for the BA application. The specialist is of the opinion that the visual impacts associated with the construction, operation and decommissioning phases of the project can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.</p>

Specialist Study	Findings	Recommendations
	<p>phases.</p> <p>From a visual perspective therefore, the proposed Leeumax SPEF is deemed acceptable and the Environmental Authorization (EA) should be granted. SLR is of the opinion that the visual impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented</p>	
Terrestrial	<p>In general, the site is considered to have potentially high sensitivity or biodiversity value, based on the location of the site within a listed ecosystem as well as being within an Ecological Support Area.</p> <p>The project study area consists of natural grassland habitat, and degraded areas associated with previous cultivation. The site is within an area where the remaining natural habitat has been assessed as having high conservation value. Existing impacts on natural habitat are related to possible previous cultivation on site. The extent of previous cultivation can be determined from the combination of local species composition and patterns from aerial imagery. The proposed project will therefore have some effects on areas of natural habitat that may possibly have important biodiversity value.</p> <p>The vegetation on site is part of a threatened ecosystem and has been assessed as being of high conservation value due to rates of transformation. The regional vegetation type that occurs on site, Vaal-Vet Sandy Grassland, is listed as Endangered in the National Ecosystem List, is part of an area earmarked for future National Park expansion and is part of a Provincial Ecological Support Area. Any remaining natural habitat on site therefore has high terrestrial biodiversity value.</p> <p>The most significant impact associated with the project is due to clearing of indigenous</p>	<p>Use existing road infrastructure for access roads. Avoid construction of infrastructure within sensitive habitats. Minimise vegetation clearing and disturbance to footprint areas only. Compile a rehabilitation programme and rehabilitate disturbed areas. Compile and implement Alien Invasive Management Plan. Limit access to sensitive areas during construction. Undertake monitoring to evaluate whether further measures are required.</p> <p>No additional clearing of vegetation should take place without a proper assessment of the environmental impacts and authorization from relevant authorities. If any additional infrastructure needs to be constructed, for example overhead powerlines, communication cables, etc., then these must be located next to existing infrastructure, and clustered to avoid dispersed impacts. No driving of vehicles off-road. Implement Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas. Access to sensitive areas outside of development footprint should not be permitted during operation. Surface runoff and erosion must be properly controlled and any issues addressed as quickly as possible.</p> <p>Implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control. Undertake regular monitoring to detect alien invasions early so that they can be controlled. Post-decommissioning monitoring should continue for an appropriate length of time to</p>



Specialist Study	Findings	Recommendations
	<p>natural vegetation. This impact was evaluated as having a significance of MEDIUM after mitigation. All other assessed impacts had a significance of LOW after mitigation. One potential impact with the most significant risk in the absence of any management is due to the potential spread and growth of alien invasive plant species, which is facilitated by disturbance.</p> <p>On the basis of the relatively limited extent that will be disturbed, and the general absence of any species of concern, the proposed development can be authorised.</p>	<p>ensure that future problems are avoided. Do NOT use any alien plants during any rehabilitation that may be required.</p>

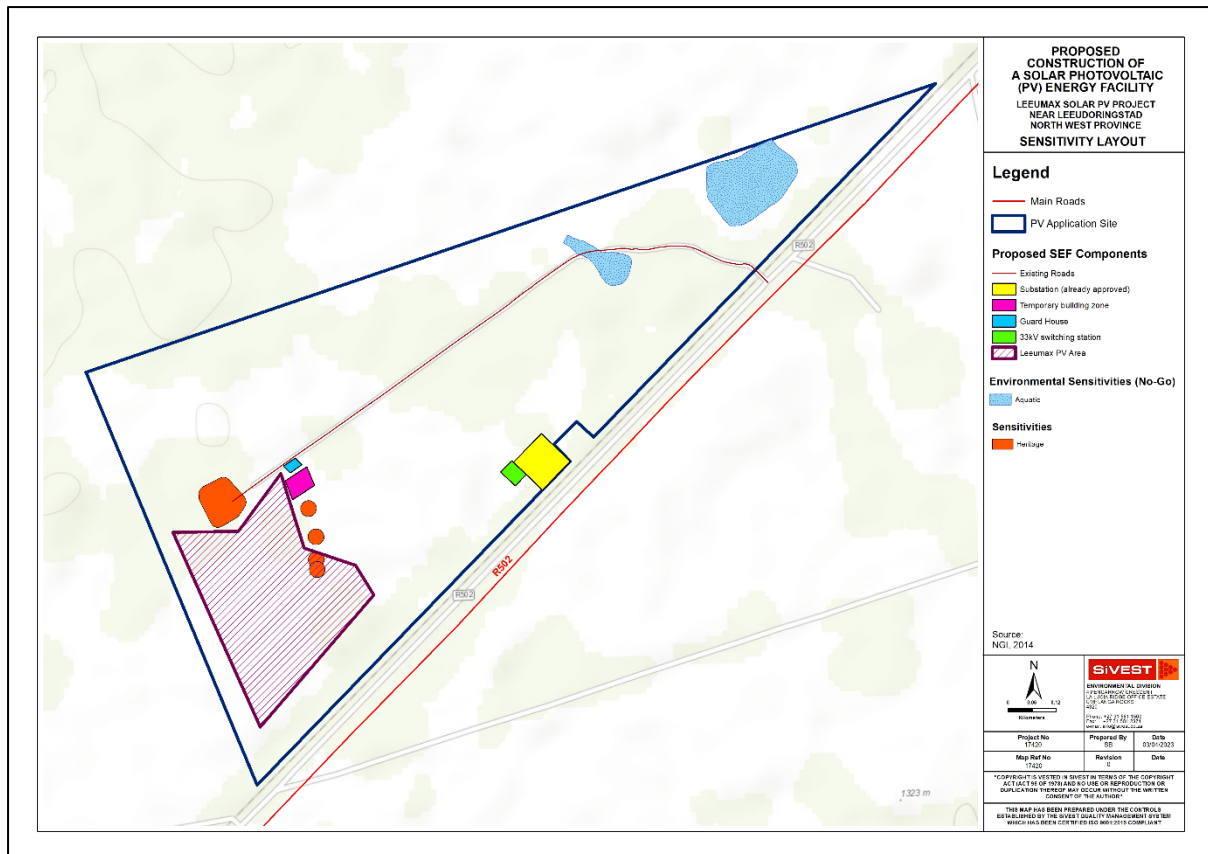
## 17. ENVIRONMENTAL IMPACT STATEMENT

The specialist assessments were conducted to address the potential impacts relating to the proposed Leeumax Solar PV and associated infrastructure in order to ascertain the level of each identified impact, as well as mitigation measures which may be required. The results of the specialist assessments have indicated that the project contains no fatal flaws that should prevent the proposed project from proceeding. In light of this, it is the EAP's reasoned opinion that authorisation be granted and that the layout being proposed as part of this BA process also be authorised (provided there are no concerns raised during the public participation process).

A layout of the development and the environmental sensitivities is included below:

The following specialist studies have been undertaken for the project:

- Desktop Geotechnical Assessment
- Surface Water Impact Assessment
- Terrestrial Biodiversity Impact Assessment
- Agriculture and Soils Impact Assessment (desktop)
- Avifaunal Impact Assessment
- Social Impact Assessment (desktop)
- Heritage Impact Assessment
- Palaeontological Impact Assessment
- Visual Impact Assessment



**Figure 30: Proposed updated layout with no-go and sensitivities overlaid**

All specialist studies are included in **Appendix 6**. The specialist assessments concluded the following:

The **geotechnical specialist** confirmed no fatal flaws from a geotechnical perspective were identified. The impact of the proposed project was found to be “Negative low impact”. The anticipated impact will have negligible negative effects and will require little to no mitigation. The site from a desktop level geotechnical study is considered suitable for the proposed PV Plant.

The **aquatic specialist** concluded that no wetlands will not be impacted by the proposed project and that the impact was rated as Low or no perceived impact. It is recommended that an alien invasive management programme is implemented. It is the opinion of the Specialist that the proposed development may proceed and that a GA will be sufficient, this is based on the above findings and recommendations.

The **terrestrial specialist** confirmed the site is considered to have potentially high sensitivity or biodiversity value, based on the location of the site within a listed ecosystem as well as being within an Ecological Support Area. The most significant impact associated with the project is due to clearing of indigenous natural vegetation. This impact was evaluated as having a significance of MEDIUM after mitigation. All other assessed impacts had a significance of LOW after mitigation. One potential impact with the most significant risk in the absence of any management is due to the potential spread and growth of alien invasive plant species, which is facilitated by disturbance. On the basis of the relatively limited extent that will be disturbed, and the general absence of any species of concern, the proposed development can be authorised.

The **agricultural specialist** confirmed that the solar PV plant and associated infrastructure at the chosen site will have minimal impact on the loss of agricultural land, due to the small percentage of high potential agricultural land indicated by the Land Type survey information.

The **avifaunal specialist** confirmed the proposed Leeumax Solar PV Plant will have a medium pre-mitigation negative impact on priority avifauna, which in most instances, can be reduced to low with appropriate mitigation. The development is supported provided the mitigation measures listed in this report is strictly implemented. No fatal flaws were discovered in the course of the investigations.

In terms of social impacts, the **social specialist** concluded that it is anticipated that there will be no major direct or indirect concerns. Furthermore, all potential impacts considered had no fatal flaws identified across all potential impacts considered.

The **heritage specialist** confirmed that the overall impact of the Leeumax facility, on the heritage resources identified is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.

The **palaeontological specialist** confirmed that the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological heritage of the area. Hence, the construction of the development may be authorised in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

The **visual specialist** confirmed that the visual impacts associated with the proposed Leeumax SEF and associated infrastructure are of moderate significance. Given the relative absence of sensitive receptors and the significant degree of human transformation and landscape degradation in areas close to the site area, the project is deemed acceptable from a visual impact perspective and the EA should be granted for the BA application. The specialist is of the opinion that the visual impacts associated with the construction, operation and decommissioning phases of the project can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

The main findings of the specialist studies are included in **Section 16** above.

A summary of the positive and negative impacts associated with the proposed project is included in **Section 15** above.

It is trusted that the FBAR provides adequate information to the competent authority to make an informed decision regarding the proposed development.

It should be noted that this section is deemed to be in line with the requirements of Appendix 1 of the EIA Regulations 2014, as amended, and contains a summary of the key findings of the environmental impact assessment, a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the site indicating any areas that should be avoided, including buffers, (**Figure 30**) and a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.

## 18. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) AND CONDITIONS TO BE INCLUDED IN ENVIRONMENTAL AUTHORISATION

In accordance with Appendix 4 of the EIA Regulations, 2014 (as amended), an EMPr has been included within the EIA. The EMPr includes the impact management measures formulated by the various specialists and the recording of the proposed impact management outcomes for the proposed project have also been included in the EMPr (**Appendix 8**).

The draft EMPr provides suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored. The relevant management plans have also been incorporated into the EMPr (where required), which will assist in this regard.

Taking into account the potential negative and significant positive impacts that the proposed development could have on the biophysical and social environment, it is the opinion of the EAP that the proposed project should be authorised subject to the following conditions of authorisation:

- All of the mitigation measures identified in this BA Report (**Section 15.1**) must be included in the EMPr.
- All feasible and practical mitigation measures recommended by the various specialists must be incorporated into the Final Environmental Management Programme (EMPr) and implemented, where applicable;
- The activity-specific construction EMPr must be adhered to.
- An independent Environmental Control Officer (ECO) must be appointed by the applicant to monitor the implementation of the construction EMP. The ECO should undertake regular site inspections and compile an environmental audit report.

In March 2019, a generic EMPr relevant to an application for environmental authorisation for substations and overhead transmission and distribution electricity transmission infrastructure developed within or outside of the strategic transmission corridors was published in Government Notice No. 435 in Government Gazette No. 42323. The generic EMPr for the on-site substation has therefore also been prepared accordingly (**Appendix 9**).

## 19. ASPECTS WHICH WERE CONDITIONAL TO THE FINDINGS OF THE ASSESSMENT EITHER BY THE EAP OR SPECIALIST WHICH ARE TO BE INCLUDED AS CONDITIONS OF AUTHORISATION

None.

## 20. UNCERTAINTIES, ASSUMPTIONS AND GAPS IN KNOWLEDGE

The assessment has been based by SiVEST on information sourced and provided by the Applicant, site visits conducted, specialist findings and the application of the SiVEST assessment criteria. The EAP is of the opinion that the assessment method applied is acceptable. SiVEST assumes that:

- All the information provided by the Applicant is accurate and unbiased.

- The available data, including Topocadastral maps, Orthophotographs, geological maps and Google Earth images, are reasonably accurate.
- All information contained in the specialist studies provided is accurate and unbiased.
- Refer to specialist studies (**Appendix 6**) for their specific assumptions and limitations.
- It is not always possible to involve all Interested and/or Affected Parties (I&APs) individually, however, every effort has/will be made to involve as many interested parties as possible. It is also assumed that individuals representing various associations or parties convey the necessary information to these associations / parties.
- It is not possible to determine the actual degree of the impact that the development will have on the immediate environment without some level of uncertainties. Actual impacts can only be determined following construction and/or operation commences.
- SiVEST undertook every effort to obtain the information (including specialist studies, BA / EIA / Scoping and EMPr Reports) for the surrounding developments. However, many of the documents are not currently publicly available to download. The information that could be obtained for the surrounding planned renewable energy developments was taken into account as part of the cumulative impact assessment.

## 21. AUTHORISATION OF THE PROPOSED PROJECT

The specialist assessments were conducted to address the potential impacts relating to the proposed development in order to ascertain the level of each identified impact, as well as mitigation measures which may be required. The results of the specialist assessments have indicated that there are no fatal flaws that should prevent the proposed project from proceeding. In light of this, it is the EAP's reasoned opinion that authorization be granted and that the layout being proposed as part of this BA process also be authorized (provided there are no significant concerns raised during the public participation process).

Conditions to be included in the Environmental Authorisation for the construction phase are listed in **Section 18** above.

The environmental authorization should be valid for a period of 5 to 10 years. It is anticipated that the construction period will however commence shortly after authorization.

## 22. EAP DECLARATION

The EAP declarations, CV's and qualifications for the EAP's responsible for the preparation of this report have been attached in **Appendix 1**.

## 23. INFORMATION REQUIRED BY CA (IF APPLICABLE)

Currently n/a.

## 24. CONCLUSION

This Basic Assessment Report has covered activities and findings related to the BA process for the proposed Leeumax SEF project and associated infrastructure. Professional experience, specialist knowledge, relevant literature and local knowledge of the area have all been used to identify the potential issues associated with the proposed project. There is no guarantee that all the potential impacts arising from the proposed project have been identified within the Basic Assessment phase, however the report provides an outline of the established measures that were taken to best identify all the potential impacts.





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