DRAFT SCOPING REPORT

24 August 2023

THE PROPOSED MIDDELPUNT SOLAR PV NEAR HENNENMAN, FREE STATE PROVINCE

PROJECT DETAIL

DFFE Reference No.	:	To be obtained.
Project Title	:	The Proposed Middelpunt Solar PV near Hennenman, Free State Province
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Reviewed	:	Mrs. Carli an Niekerk
Client	:	Middelpunt Solar PV (Pty) Ltd
Report Status	:	Draft Scoping Report
Submission date	:	1 September 2023

When used as a reference this report should be cited as: Solis Environmental (2023) Draft Scoping Report: The Proposed Middelpunt Solar PV Project near Hennenman, Free State Province.

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GLOSSARY OF TERMS AND ACRONYMS

AC	Alternating Current
BA	Basic Assessment
BAR	Basic Assessment Report
BESS	Battery Energy Storage System
BOS	Balance of System
CBA	Critical Biodiversity Area
CEA	Cumulative Effects Assessment
CR	Critically Endangered
DAFF	Department of Agriculture, Forestry and Fisheries
DC	Direct Current
DFFE	Department of Forestry, Fisheries and the Environment
DM	District Municipality
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EN	Endangered
EP	Equator Principles
EPFI	Equator Principles Financial Institutions
Environmental impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.
GHG	Greenhouse Gas
GNR	Government Notice Regulation
HGM	Hydrogeomorphic

I&AP	Interested and affected party
IAP	Invasive Alien Plant
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
IRP	Integrated Resource Plan
kV	Kilo Volt
LC	Least Concern
LCOE	Lowest Levelized Cost of Energy
LM	Local Municipality
Mitigate	Activities designed to compensate for unavoidable environmental damage.
MW	Megawatt
NEMA	National Environmental Management Act No. 107 of 1998
NEM:BA	National Environment Management Biodiversity Act
NERSA	National Energy Regulator of South Africa
NFEPA	National Freshwater Ecosystem Priority Areas
NT	Near Threatened
NWA	National Water Act No. 36 of 1998
O&M	Operational & Maintenance
OHPL	Overhead Powerline
PROJECT AREA	Project area of influence
POSA	Plants of South Africa
PPP	Public Participation Process
PV	Photovoltaic
REIPPP	Renewable Energy IPP Procurement Process
SAHRA	South African Heritage Resources Agency
SAIIAE	South African Inventory of Inland Aquatic Ecosystems
SCC	Species of Conservation Concern

SDF	Spatial Development Framework
SEI	Site Ecological Importance
SPP	Solar Power Plant
VN	Vulnerable
VU	Vegetation Unit

CONTEXT FOR THE DEVELOPMENT

According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand, fueled by increasing economic growth and social development, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmentally responsible development, the impacts of climate change and the need for sustainable development. The use of renewable energy technologies, as one of a mix of technologies needed to meet future energy consumption requirements is being investigated as part of the national Department of Mineral Resources and Energy's (DMRE) (previously referred to as the Department of Energy) long-term strategic planning and research process.

The primary rationale for the proposed solar photovoltaic (PV) facility is to add new generation capacity from renewable energy to the national electricity mix and to aid in achieving the goal of 42% share of all new installed generating capacity being derived from renewable energy forms, as targeted by DMRE (Integrated Resource Plan Update 2010-2030). The IRP also identifies the preferred generation technologies required to meet the expected demand growth up to 2030 and incorporates government objectives including affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources and localisation and regional development. In terms of the Integrated Resource Plan Update (2019 IRP Update, 2010-2030), over the short term (of the next two or three years), clear guidelines arose; namely to continue with the current renewable bid programme with additional annual rounds of 1000 MW PV, with approximately 8.4 GW of the renewable energy capacity planned to be installed from PV technologies over the next twenty years.

The proposed project is intended to form part of the Department of Mineral Resources and Energy's (DMREs) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or any other programmes/opportunities to generate power in South Africa. The REIPPP Programme aims to secure 14 725 Megawatts (MW) of new generation capacity from renewable energy sources, while simultaneously diversifying South Africa's electricity mix. According to the 2021 State of the Nation Address, Government will soon be initiating the procurement of an additional 11 800 MW of power from renewable energy, natural gas, battery storage and coal in line with the Integrated Resource Plan 2019 and fulfilling their commitments under the United Nations Framework Convention on Climate Change and its Paris Agreement which include the reduction of greenhouse gas emissions. Eskom, our largest greenhouse gas emitter, has committed in principle to net zero emission by 2050 and to increase its renewable capacity.

During the 2022 State of the Nation Address it was indicated that during the past year the government had taken "firm steps" to bring additional generation capacity online as quickly as possible to close the shortfall in terms of electricity. As a result, it was confirmed that several new generation projects will be coming online over the next few years. During the recent 2023 State

of the Nation Address, the government has embarked upon allowing private developers to generate electricity. There are now more than 100 projects, which are expected to provide over 9 000 MW of new capacity over time. Several companies that have participated in the renewable energy programme will soon enter construction and deliver a total of 2 800 MW of new capacity. Through the Just Energy Transition Investment Plan, R1.5 trillion will be invested in our economy over the next five years in new frontiers such as renewable energy, green hydrogen, and electric vehicles. Several projects are already underway, including the development of a new facility by Sasol at Boegoebaai in the Northern Cape, the Prieska Power Reserve in the Free State, and the Hydrogen Valley initiative in Limpopo, Gauteng and KwaZulu-Natal.

In response to the above, Middelpunt Solar PV (Pty) Ltd is proposing the development of a photovoltaic solar facility and associated infrastructure (including grid connection infrastructure) for the purpose of commercial electricity generation on the Remaining Extent of Farm Vredesverdrag No. 427 and Remaining Extent of Farm Middelpunt No. 769 in the Free State Province situated within the Matjhabeng Local Municipality area of jurisdiction (refer to Figure A for the locality map). The project entails the generation of up to 240 MW electrical power through photovoltaic (PV) technology. The total area assessed as part of the EIA will be up to 750 hectares (including supporting infrastructure) identified and assessed as part of the Environmental Impact Assessment (EIA) process. The proposed grid connection and corridor will be assessed in a separate Environmental Impact Assessment but will however be addressed in cumulative impacts.

EXECUTIVE SUMMARY

Like many other municipalities in the country, the Matjhabeng Metropolitan Municipality faces a number of challenges in addressing the needs of sustainable growth and improved quality of life (IDP, 2023-2024). The Matjhabeng Metropolitan Municipality Integrated Development Plan (2023-2024) identifies specific threats and weaknesses experienced in the municipal area which includes increasing poverty, unemployment, inequality, non-payment of municipal services, fraud and corruption as well as poor governance challenges. In line with its developmental mandate, Matjhabeng Metropolitan Municipality understands its service delivery objectives as set out in the developmental strategies. Therefore, the developmental strategies as espoused in the IDP are directly linked to a specific developmental needs and objectives which must be measured in the organizational Performance Management System (PMS) and give effect to Service Delivery and Budget Implementation Plan (SDBIP) targets/ goals.

Middelpunt Solar PV (Pty) Ltd intends to develop a 240 MW photovoltaic solar facility and associated infrastructure on the Remaining Extent of Farm Vredesverdrag No. 427 and Remaining Extent of Farm Middelpunt No. 769, situated within the Matjhabeng Local Municipality, area of jurisdiction. The town of Hennenman is located approximately 7 km southeast of the proposed development (refer to Figure A and B for the locality and regional map). The total area assessed as part of the EIA is 750 hectares (including supporting infrastructure on site). The site was identified as being highly desirable due to its suitable climatic conditions, topography (i.e., in terms of slope), environmental conditions (i.e., low agricultural potential, ecological sensitivity and archaeology), proximity to the R70 (i.e., to facilitate the movement of machinery, equipment, infrastructure and people during the construction phase).

In terms of the National Environmental Management Act (Act 107 of 1998), with specific reference to Sections 24 and 24D, as read with GNR 324-327, as amended (2017), Environmental Authorisation is required for the Middelpunt Solar PV. The following listed activities have been identified with special reference to the proposed development and are listed in the EIA Regulations (as amended):

- LN1 – Activity 11 (i) (GN.R. 327): *"The development of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."*
- LN1 – Activity 24 (ii) (GN.R 327): *"The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters."*
- LN1 – Activity 28 (ii) (GN.R. 327): *"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."*

- LN1 – Activity 56 (ii) (GN.R 327): "*The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres…"*

- LN2 – Activity 1 (GN.R. 325): *"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more..."*

- LN2 – Activity 15 (GN.R. 325): *"The clearance of an area of 20 hectares or more of indigenous vegetation..."*

- LN3 – Activity 4 (b)(i)(ee)(gg) (GN.R 324): *"The development of a road wider than 4 metres with a reserve less than 13,5 metres within (b) the Free State, (i) outside urban areas, (ee) critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans and (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas."*

- LN3 – Activity 10 (b)(i)(ee)(gg) (GN.R 324): *"The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres (b) Free State, (i) outside urban areas, (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans and (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas."*

- LN3 – Activity 12(b)(ii): *"The clearance of an area of 300 square metres or more of indigenous vegetation (b) Free State (ii) Within critical biodiversity areas identified in bioregional plans."*

- LN3 – Activity 18 (b)(i)(ee)(gg) (GN.R 324): *"The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (b) Free State (i) outside urban areas, within (ee) critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans and (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas."*

Activities required for the development of the solar PV facility which are listed under Listing Notice 1, 2 and 3 (GNR 327, 325 and 324) implies that the development could potentially have a significant impact on the environment that will require mitigation. Subsequently a thorough assessment process is required as described in Regulations 21-24 of the EIA Regulations in order

to obtain Environmental Authorisation (EA). Solis-Environmental has been appointed as the independent consultant to undertake the EIA on behalf of Middelpunt Solar PV (Pty) Ltd.

Regulation 21 of the EIA Regulations requires that a scoping report must contain the information set out in Appendix 2 of the Regulations or comply with a protocol or minimum information requirements relevant to the application as identified and gazetted by the Minister in a government notice. Appendix 2 of GNR326 requires that information which is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process undertaken be set out in the scoping report.

The potentially sensitive areas which have been identified through the environmental scoping study are detailed in the chapters to follow. The scoping phase provides a high-level overview of the sensitivity on the Middelpunt Solar PV site. The detail is based on the desktop review of available baseline information for the project site, as well as the sensitivity data received from specialist studies undertaken during the scoping phase. During the scoping phase, the affected area was investigated in sufficient detail in order to provide reliable insight into the potential for constraining factors on the site. The sensitivity map(s) must be used as a tool by the developer to avoid any areas flagged to be of higher risk or sensitivity which must in turn inform the development layout which can then be further investigated during the EIA Phase in order to develop an environmentally suitable, reasonable and practical facility layout for the Middelpunt Solar PV.

Based on the high-level assessments undertaken to inform this scoping process, it has been predicted that the proposed development will have a net positive impact for the area and will subsequently ensure the optimal utilisation of resources and land. All negative environmental impacts can be effectively mitigated through the recommended mitigation measures and no residual negative impacts are foreseen. The potentially most significant environmental impacts associated with the development, as identified in this scoping phase, are briefly summarised below.

It must be noted that the Environmental Impact Assessment (EIA) phase of the project will consider the impacts on a more detailed level and provide feedback on the facility layout for the proposed project.

<u>Predicted impacts during the construction phase:</u>

During the construction phase minor negative impacts are foreseen over the short term. The latter refers to a period of up to 24 months. The potentially most significant impacts relate to impacts on fauna and flora including the destruction, loss and fragmentation of habitats, ecosystems and the vegetation community, introduction of Invasive Alien Plant (IAP) species and invasive fauna, destruction of protected plant species, and displacement of the indigenous faunal community, direct disturbance / degradation / loss to wetland soils or vegetation and increased erosion and sedimentation, visual impact of construction activities on sensitive visual receptors in close

proximity to the Solar PV facility, loss or damage to sites, features or objects of cultural heritage significance (burial sites and homestead site located on site), destroy or permanently seal-in fossils at or below the surface that are then no longer available for scientific study. Socio-economic impacts relate to the including creation of direct and indirect employment opportunities, influx of jobseekers and change in population in the study area, temporary increase in safety and security concerns associated with the influx of people, temporary increase in traffic disruptions and movement patterns, nuisance impact (noise and dust) and increased risk of potential veld fires.

Predicted impacts during the operational phase:

During the operational phase the site will serve as a solar PV energy facility and the potential impacts will take place over a period of 20 – 30 years. The negative impacts are generally associated with impacts on fauna and flora include continued fragmentation and degradation of natural habitats and ecosystems, continuing spread of IAP and weed species and ongoing displacement and direct mortalities of the faunal community, potential for increased stormwater runoff leading to Increased erosion and sedimentation and potential for increased contaminants entering the wetland systems, and soil erosion and compaction effects. The operational phase will have a direct positive impact through the creation of employment opportunities and skills development, development of non-polluting, renewable energy infrastructure, contribution to Local Economic Development (LED) and social upliftment and increase in household earnings.

Predicted impacts during the decommissioning phase:

The negative impacts generally associated with the decommissioning phase include habitat destruction caused by clearance of vegetation and the loss of permanent employment. However, skilled staff will be eminently employable, and several temporary jobs will also be created in the process. It is not expected that the facility will be decommissioned, but rather that the technology used will be upgraded.

Cumulative impacts:

Cumulative impacts could arise as other similar projects are constructed in the area. According to the Department of Forestry, Fisheries and Environment (DFFE) database, there are approximately nineteen (19) similar developments that have been proposed near the proposed activity.

The potential for cumulative impacts therefore exists. The draft scoping report includes an assessment of the potential cumulative impacts associated with the proposed development. Potential cumulative impacts with a significance rating of negative medium during the construction phase relate to habitat destruction and fragmentation, displacement of priority avian species from important habitats, loss of important avian habitats, impacts of employment opportunities, business opportunities and skills development and impact associated with large-scale in-migration of people. Cumulative impacts during the operational phase relate to habitat

destruction and fragmentation and visual intrusion. The cumulative effect of the generation of waste was identified as being potentially significant during the decommissioning phase.

Regulation 23 of the EIA Regulations determine that an EIA report be prepared and submitted for the proposed activity after the competent authority approves the final scoping report. The EIA report will evaluate and rate each identified impact and identify mitigation measures that may be required. The EIA report will contain information that is necessary for the competent authority to consider the application for Environmental Authorisation and to reach a decision contemplated in Regulation 24 of the EIA Regulations.

1 INTRODUCTION

This section aims to introduce the scoping report and specifically to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include- (a) details of:
(i) the EAP who prepared the report; and
(ii) the expertise of the EAP, including a curriculum vitae.

1.1 LEGAL MANDATE AND PURPOSE OF THE REPORT

The National Environmental Management Act identifies listed activities (in terms of Section 24) which are likely to have an impact on the environment. These activities cannot commence without obtaining an Environmental Authorisation (EA) from the relevant competent authority, the Department of Forestry, Fisheries, and the Environment (DFFE). Sufficient information is required by the competent authority to make an informed decision and the project is therefore subject to an environmental assessment process which can be either a Basic Assessment Process or a full Scoping and Environmental Impact Assessment process.

The Listing Notices 1, 2 and 3 (GNR 327, 325 and 324) outline the activities that may be triggered and therefore require EA. This implies that the development is considered as potentially having a significant impact on the environment. Subsequently a 'thorough S&EIA assessment process' is required as described in Regulations 21-24. A detailed description of the listed activities that are triggered are included in chapter 2 to follow. According to Appendix 2 of Regulation 326 the objective of the scoping process is to, through a consultative process:

- Identify the relevant policies and legislation relevant to the activity;
- Motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- Identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks;
- Identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- Identify the key issues to be addressed in the assessment phase;
- Agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be

undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and

- Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

This Draft Scoping Report has been submitted to the DFFE for review and comment. According to Regulation 326 all registered I&APs and relevant State Departments (including Organs of State) must be allowed the opportunity to review and provide comment on the scoping report. The Draft Scoping Report has been made available to I&APs and all relevant State Departments. They have been requested to provide written comments on the report within 30 days of receiving it. All issues to be identified and comments received during the review period will be documented and compiled into a Comments and Response Report to be included as part of this Final Scoping Report. Where comments have been received prior to the release of the Draft Scoping Report for the 30-day review and comment period, these comments have been included in Appendix C5 and C6 and has also been included and responded to in the Comments and Responses Report (Appendix C7).

1.2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Solis-Environmental was appointed by the applicant as the independent EAP to conduct the EIA and prepare all required reports. All correspondence to the EAP can be directed to:

Author:	Siyongamele Dzingwa
Contact person:	Siyongamele Dzingwa
Postal Address:	14 Kingfisher Street, Tuscany Ridge Estate, Potchefstroom, 2531
Telephone:	083 928 8612 (Cell)
Electronic Mail:	siyo@Solis-Environmental.co.za

And/or

Contact person:	Vivienne Vorster
EAPASA Registration:	2021/4398
Postal Address:	14 Kingfisher Street, Tuscany Ridge Estate, Potchefstroom, 2531
Telephone:	082 449 5356 (Cell)
Electronic Mail:	vivienne@Solis-Environmental.co.za

Regulation 13(1)(a) and (b) determines that an independent and suitably qualified and experienced EAP should conduct the S&EIR process. In terms of the independent status of the EAP

a declaration is attached as Appendix A to this report. The expertise of the EAP responsible for conducting the S&EIR process is also summarized in the curriculum vitae included as part of Appendix A.

1.3 DETAILS OF SPECIALISTS

Table 1.1 provides information on the specialists that have been appointed as part of the S&EIR process. Regulation 13(1)(a) and (b) determines that an independent and suitably qualified, experienced and independent specialist should conduct the specialist study, in the event where the specialist is not independent, a specialist should be appointed to externally review the work of the specialist as contemplated in sub regulation (2), must comply with sub regulation 1. In terms of the independent status of the specialists, their declarations are attached as Appendix E to this report. The expertise of the specialists is also summarized in their respective reports.

Table 1.1: Details of specialists

Study	Prepared by	Contact Person	Postal Address	Tel	e-mail
Ecological Impact Assessment	The Biodiversity Company	Andrew Husted and Rudolph Greffrath	-	Cell: 081 319 1225	info@thebiodiversitycompany.com
Avifaunal Impact Assessment		Lindi Steyn and Carami Burger			
Wetland Baseline and Risk Assessment		Namitha Singh			
Soil and Agricultural Impact Assessment	-	Johann Lanz	1A Wolfe Street Wynberg 7800	Cell: 082 927 9018	johann@johannlanz.co.za
Heritage Impact Assessment	CTS Heritage	Jenna Lavin	-	Cell: 0828249308	jenna.lavin@ctsheritage.com
Paleontological Study					
Traffic Impact Assessment	BVi Consulting Engineers	Liza Botha	Edison Square, Century City 7441	Cell: 060 557 7467	lizab@bviwc.co.za
Social Impact Assessment	Donaway Environmental Consultants	Johan Botha	30 Fouche Street Steynsrus 9515	Cell: 082 493 5166	johan@donaway.co.za
Visual Impact Assessment					

1.4 STATUS OF THE EIA PROCESS

The Scoping and Environmental Impact Reporting (S&EIR) process is conducted strictly in accordance with the stipulations set out in Regulations 21-24 of Regulation No. 326. Table 1.2 provides a summary of the EIA process and future steps to be taken. It can be confirmed that to date:

- A site visit was conducted by the EAP on 8 June 2023.
- Site notices were erected on site on 8 June 2023 informing the public of the commencement of the EIA process.
- A pre-application meeting request was submitted to DFFE on 16 August 2023.
- The DFFE indicated that a pre-application meeting is not required, in an email dated 17 August 2023.
- A newspaper advertisement was placed in the Vista on 8 June 2023, informing the public of the EIA process and for the public to register as I&APs.
- An application form and the draft Scoping Report was submitted to DFFE on 1 September 2023.
- The draft Scoping Report will be made available for a 30-day review and comment period from 1 September 2023 to 2 October 2023.

It is envisaged that the Final Scoping Report will be submitted to the Department in September 2023 and that the Final Scoping Report will be accepted by the Department in November 2023. The S&EIR process should be completed within approximately nine months of submission of the Draft Scoping Report, i.e., by March / April 2024 – see Table 1.2.

Table 1.2: Estimated timeframe for completion of the 'scoping and EIA process'

Activity	Prescribed timeframe	Timeframe
Site visits	-	8 – 9 June 2023
Public participation (BID)	30 Days	14 June – 14 July 2023
Submit pre-application meeting request	-	August 2023
Conduct specialist studies	-	Apr - July 2023
Submit application form and DSR	-	24 August 2023
Public participation (DSR)	30 Days	Sep/October 2023
Submit FSR	44 Days	October 2023

Approval of Final Scoping Report	43 Days	November 2023
Submit Draft EIR & EMPr	106 Days	December 2023
Public participation (DEIR)	30 Days	Dec/Jan 2024
Submission of FEIR & EMPr	-	January 2024
Decision	107 Days	April 2024
Public participation (decision) & submission of appeals	20 Days	April 2024

Table 1.3 below provides more detail on timeframes as well as process flow for the S&EIR process.

Table 1.3: Estimated Timeframe for Completion of the 'S&EIR Processes' for the Middelpunt Solar PV Project.

Tasks to be performed	June				July				August				September				October				November				December				January				February				March				April/May			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
REGISTRATION PHASE																																												
Pre-application meeting (DFFE doesn't require meeting)																																												
Site visits																																												
Public participation																																												
– Press advertisement																																												
– On site advertisement																																												
– Distribution of notices																																												
– Complete PP report																																												
Specialist inputs and reports																																												
– Draft terms of reference																																												
– Receive specialist studies																																												
'Draft' Scoping Report																																												
- Information gathering																																												
- Report writing																																												
- Circulate 'Draft' Scoping Report																																												
SCOPING PHASE																																												
Complete and submit application form																																												
– Information gathering																																												
– Complete and submit application form																																												
Authority acknowledges receipt of application form																																												
Final Scoping Report																																												
– Information gathering																																												
– Report writing																																												
– Submission of Final Scoping Report																																												
– Approval																																												
EIA PHASE																																												
Specialist inputs and reports																																												
– Draft terms of reference																																												
– Receive specialist studies																																												
Draft EIR Report																																												
– Information gathering																																												
– Report writing																																												
– Submission of Draft EIR Report																																												
– Circulate Draft EIR Report																																												
Final EIA Report & EMP																																												
– Information gathering																																												
– Report writing																																												
– Submission																																												
– Approval																																												

The competent authority has 107 days for decision-making after the EIR has been submitted and an additional 5 days to notify the applicant in writing of their decision. The applicant must within 14 days of the date of the decision notify registered i&APs of the decision. Registered i&APs are then provided 20 days in which to lodge appeals. The appeal period expires 20 days after registered i&APs have been informed of the decision according to GNR326, Regulation 7.

1.5 SPECIALIST STUDIES IDENTIFIED IN THE DFFE SCREENING TOOL REPORT

In terms of GN R.960 (promulgated on 05 July 2019) and Regulation 16(1)(b)(v) of the 2014 EIA Regulations (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of applications in terms of Regulations and 21 – 24 of the EIA Regulations. The requirement for the submission of a Screening Report for the Middelpunt Solar PV is applicable as it triggers Regulation 21 of the EIA Regulations, 2014 (as amended).

The tables included below provides an indication of the specialist studies identified by the DFFE Screening Tool Report (Appendix B) within the different applicable categories, an indication of whether the studies were undertaken or not and a motivation or confirmation of the studies being included or not.

Table 1.4: Specialist studies identified by the DFFE screening tool, Middelpunt Solar PV category and specialist studies completed.

Study identified in the DFFE Screening Tool and sensitivity	Study included?	Comment and Appendix
Agricultural Impact Assessment Sensitivity: High Feature(s): Annual crop cultivation/ planted pastures rotation and old fields. Low to moderate land capability.	Yes	An Agricultural Statement is included in Appendix E of the Scoping Report.
Animal Species Assessment Sensitivity: Medium Feature(s): Presence of sensitive animal species i.e., Mammalia, *Hydrictis maculicollis.*	Yes	An ecological assessment is included in Appendix E of the Scoping Report.
Aquatic Biodiversity Impact Assessment Sensitivity: Very High Feature(s): Wetlands, Dry Highveld Grassland Bioregion (Depressions).	Yes	An aquatic assessment is included in Appendix E. This assessment has been undertaken in terms of the Protocols of GNR320 – refer to the content of the report.

Archaeological and Cultural Heritage Impact Assessment Sensitivity: Low	Yes	A Cultural Heritage assessment included in Appendix E of the Scoping Report, as per the requirements of the National Heritage Resources Act.
Avian Impact Assessment Sensitivity: Low	Yes	An Avifaunal scoping statement is included in Appendix E. The sensitivity rating is disputed due to the presence of Species of Conservation Concern (Secretary Bird) in close proximity to the site. A sensitivity rating of medium is considered to be appropriate
Civil Aviation Assessment Sensitivity: Low	No	The identification of the site as low sensitivity considering civil aviation is agreed to by the EAP. No major or other types of civil aviation aerodromes were found to be located in close proximity of the site. The Civil Aviation Authority has been consulted regarding the development of the project since the commencement of the S&EIR Process. No specific negative impacts or issues have been raised to date by the CAA regarding the project.
Defence Theme Sensitivity: Low	No	The identification of the site as low sensitivity considering defence is agreed to by the EAP. The South African National Defence Force (SANDF) has been consulted regarding the development of the project since the commencement of the S&EIR Process. No specific negative

		impacts or issues have been raised to date regarding the project.
Landscape / Visual Impact Assessment Sensitivity: Very High Feature(s): The project area is characterised by mountain tops and high ridges. Also located within 1.5 km of a nature reserve.	Yes	A Visual Impact Assessment is included in Appendix E of the Scoping Report.
Palaeontological Impact Assessment Sensitivity: Very High Feature(s): The project area may comprise features that have a medium to very high paleontological sensitivity	Yes	A Palaeontological screening assessment is included in Appendix E of the Scoping Report, as per the requirements of the National Heritage Resources Act.
Plant species Assessment Sensitivity: Low	Yes	An ecological scoping statement is included in Appendix E of the Scoping Report.
RFI Assessment Sensitivity: Low	No	The site verification is inconclusive as no desktop information could be sought. However, no negative impacts are expected to impact on weather radar installations. Impacts resulting from the proposed development are expected to occur within the project area and will be mitigated accordingly. The South African Radio Astronomy Observatory (SARAO) has been consulted regarding the development of the project since the commencement of the S&EIR Process. No specific negative

		impacts or issues have been raised to date by the SARAO regarding the project.
Terrestrial Biodiversity Impact Assessment Sensitivity: Very High Feature(s): The project area comprises of a Critical Biodiversity Area 1 and Endangered Ecosystem (Vaal-Vet Sandy Grassland)	Yes	An ecological impact assessment is included in Appendix E of the Scoping Report.
Geotechnical Assessment Sensitivity: Not indicated	No	The detailed Geotechnical Assessment will be conducted before construction begins as part of the micro-siting of the facility layout. The consideration of geotechnical aspects is of a technical concern rather than an environmental concern.
Socio-Economic Assessment Sensitivity: Not indicated	Yes	A Social Impact Assessment is included in Appendix E.

Kindly refer to the Site Verification Report included under Appendix D of the DSR. The site verification report further details reasons for exclusion of specialist studies where applicable.

1.6 STRUCTURE OF THE REPORT

This report is structured in accordance with the prescribed contents stipulated in Appendix 2 of Regulation No.326. It consists of eight sections demonstrating compliance to the specifications of the regulations as illustrated in Table 1.5.

Table 1.5: Structure of the report

Requirements for the contents of a scoping report as specified in the Regulations	Section in report

(a)	details of -	1
	(i) the EAP who prepared the report; and	
	ii) the expertise of the EAP, including a curriculum vitae.	
(b)	the location of the activity, including-	2
	(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, the coordinates of the boundary of the property or properties;	
(c)	a plan which locates the proposed activity or activities applied for 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;	
(d)	a description of the scope of the proposed activity, including-	
	(i) all listed and specified activities triggered;	
	(ii) a description of the activities to be undertaken, including associated structures and infrastructure.	
(e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	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;	4
(g)	a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including –	5
	(i) details of all the alternatives considered;	

	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	
	(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.	
	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	
	(ix) the outcome of the site selection matrix;	
	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and	
	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	
(g)	(v) the impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	
	(vi) the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	6
	(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 geographical, physical, biological, social, economic, heritage and cultural aspects;	
	(viii) the possible mitigation measures that could be applied and level of residual risk;	
(i)	a plan of study for undertaking the environmental impact assessment process to be undertaken, including-	8
	(i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;	

	(ii) a description of the aspects to be assessed as part of the EIA process;	
	(iii) aspects to be assessed by specialists;	
	(iv) a description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists;	
	(v) a description of the proposed method of assessing duration and significance;	
	(vi) an indication of the stages at which the competent authority will be consulted;	
	(vii) particulars of the public participation process that will be conducted during the EIA process; and	
	(viii) a description of the tasks that will be undertaken as part of the EIA process;	
	(ix) identify 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.	
(j)	an undertaking under oath or affirmation by the EAP in relation to-	Appendix A to the report
	(i) the correctness of the information provided in the report;	
	(ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and	
	(iii) any information provided by the EAP to I&APs and any responses by the EAP to comments or inputs made by I&APs;	
(k)	an undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and I&APs on the plan of study for undertaking the EIA;	
(l)	where applicable, any specific information required by the CA; and	N/A
(m)	any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A

2 ACTIVITY DESCRIPTION

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include-

(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, the coordinates of the boundary of the property or properties;

(c) a plan which locates the proposed activity applied for 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;

(d) a description of the scope of the proposed activity, including-

(i) all listed and specified activities triggered;

(ii) a description of the activities to be undertaken, including associated structures and infrastructure.

2.1 THE LOCATION OF THE ACTIVITY AND PROPERTY DESCRIPTION

The activities entail the development of a PV solar facility and associated infrastructure on the Remaining Extent of Farm Vredesverdrag No. 427 and Remaining Extent of Farm Middelpunt No. 769. The site is located between the towns of Welkom and Virginia, Free State Province, and situated within the Matjhabeng Local Municipality area of jurisdiction. The proposed development is in the Free State Province in the central interior of South-Africa (refer to Figure B for the regional map). The City of Bloemfontein is located approximately 90 km south of the proposed development and other smaller towns within the project's vicinity include Kroonstad, approximately 45km north-east and Ventersburg, approximately 25km south-east and Hennenman proposed is located approximately 7km south-east of the proposed development (refer to Figure A for the locality map).

The project entails the generation of up to 240MW electrical power through the installation and operation of photovoltaic (PV) panels. An area of 750 ha has been assessed as part of this Scoping Report (hereafter referred to as the "assessment area"). The full extent of the assessment area

has been considered during scoping with the aim of confirming the suitability from an environmental and social perspective. A development footprint will be defined based on the outcomes of the scoping phase and will be further assessed in the EIA phase. The property on which the facility is to be constructed will be leased by Middelpunt Solar PV (Pty) Ltd from the property owner for the life span of the project (minimum of 20 years).

Energy generated by the facility will be transmitted from the facility substation/Eskom switching station to the existing Everest Substation via a new 132kV powerline or an alternative substation to be identified (alternative). Two (02) grid alternatives will be considered and will be assessed as part of a separate BA process but will however be addressed in cumulative impacts. Confirmation in terms of the preferred alternative for the grid corridor will be based on the negotiations with the landowners and feedback provided by the Eskom Grid Access Unit. Refer to Table 2.1 for the general site information for the Middelpunt Solar PV.

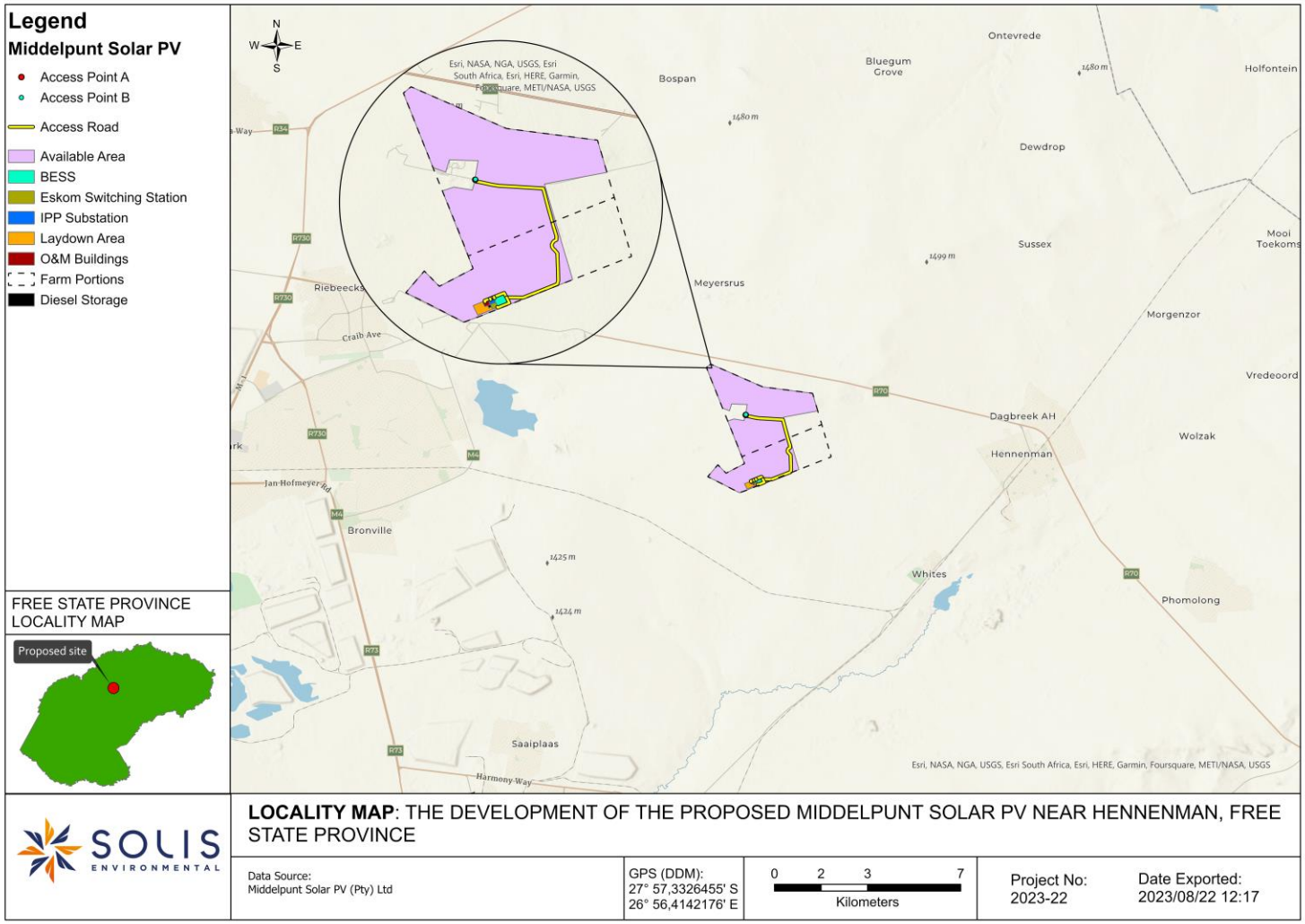


Figure A: Locality Map

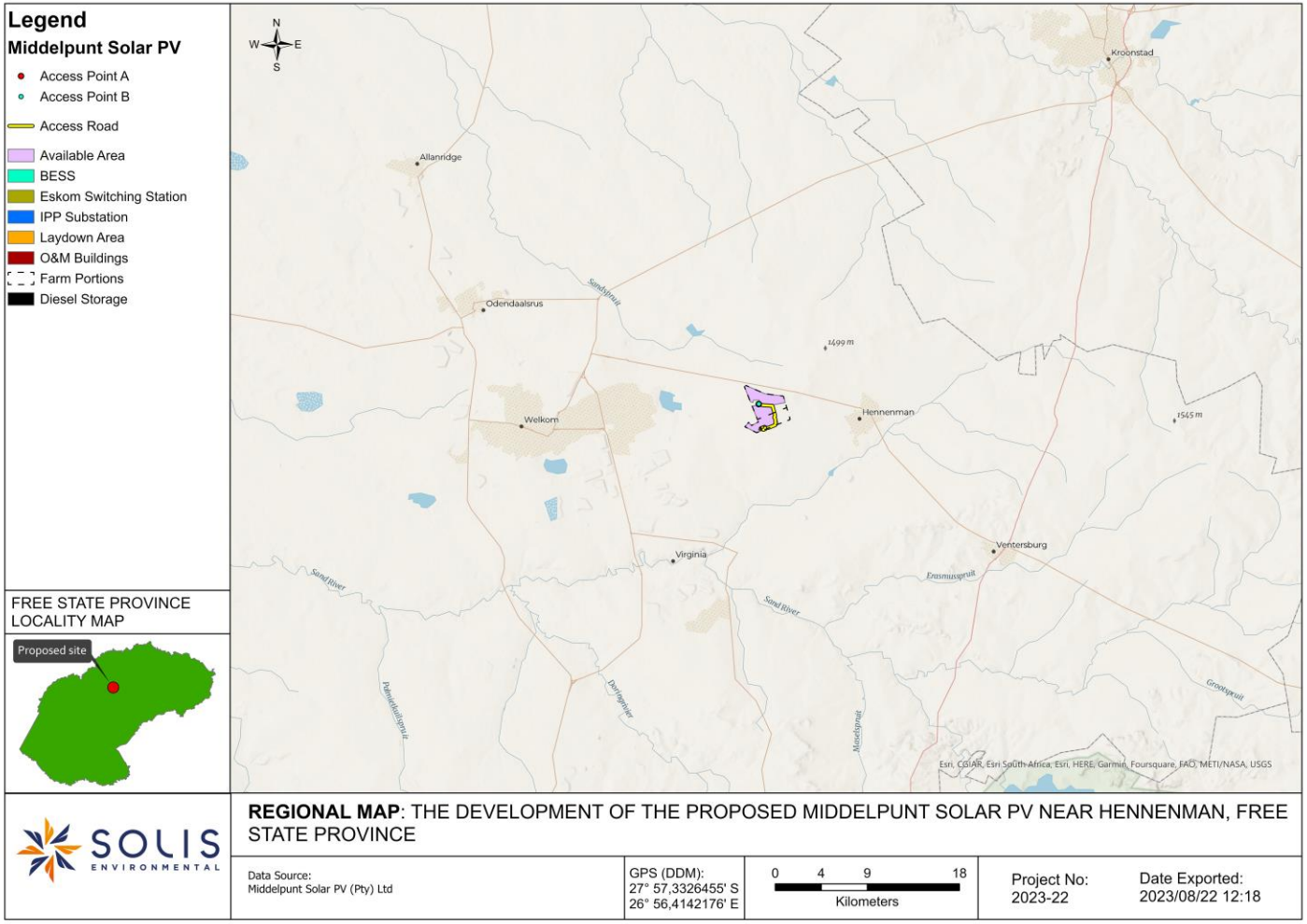


Figure B Regional Map

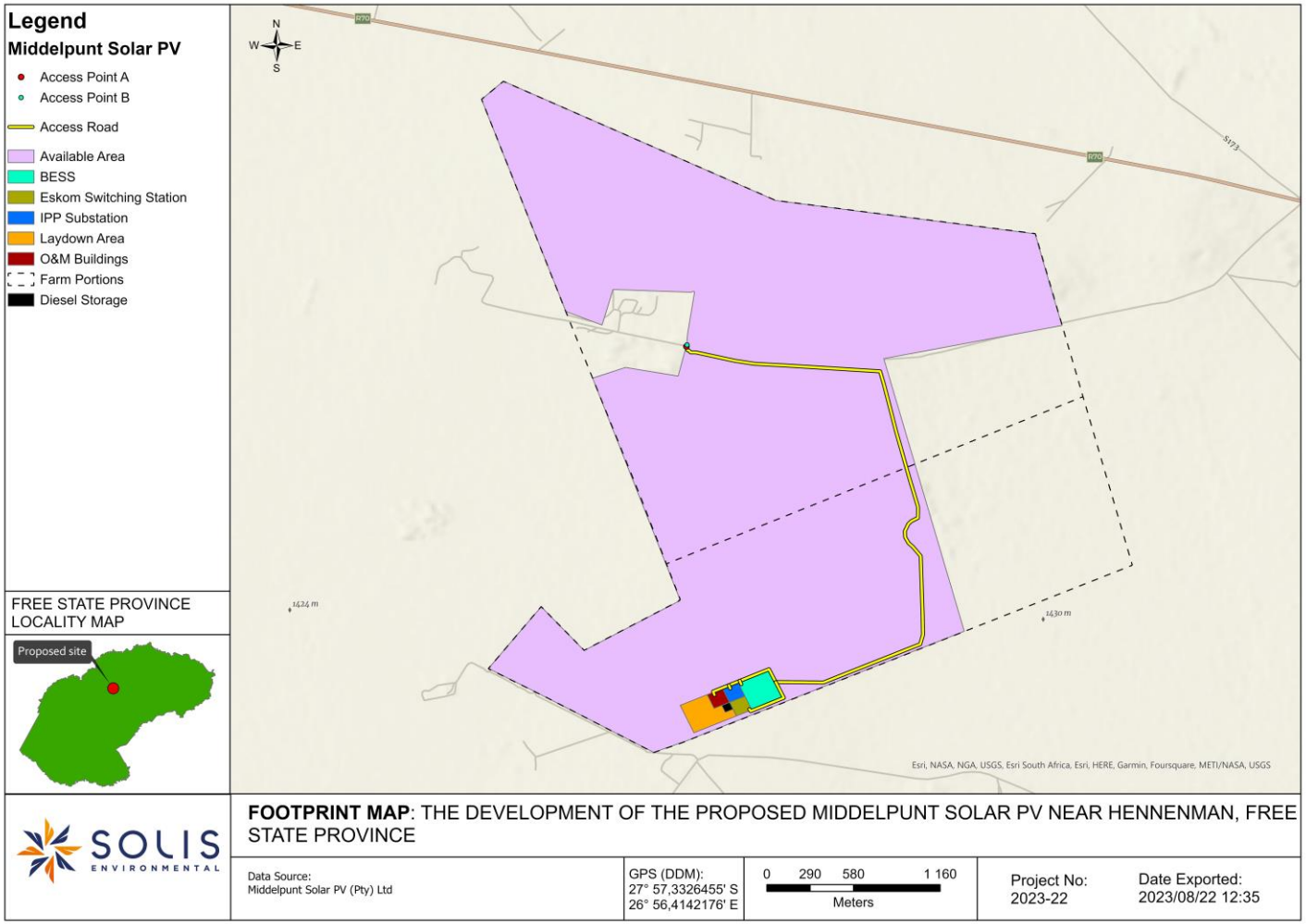


Figure C: Footprint Map

Table 2.1: General site information

Description of affected farm portion	Solar PV Facility (Middelpunt Solar PV): • Remaining Extent of Farm Vredesverdrag No. 427 • Remaining Extent of Farm Middelpunt No. 769 Access Road: • Access via the R70 (The access road initially joins a tertiary road T202 which then intersects the R70) and the existing gravel roads. No new road will be constructed.
Province	Free State
District Municipality	Lejweleputswa District Municipality
Local Municipality	Matjhabeng Local Municipality
Closest towns	The town of Hennenman is located approximately 7km to the south-east of the proposed development.
21 Digit Surveyor General codes	Solar PV Facility: • Remaining Extent of Farm Vredesverdrag No. 427 F03500000000042700000 • Remaining Extent of Farm Middelpunt No. 769 F03500000000076900000
Photographs of the site	Included in Photographs as an appendix to the Report
Type of technology	Photovoltaic solar facility
Structure Height	• Panels up to 4.5 m • Buildings up to 6 m • Powerline up to 25 - 32 m • BESS up to 5 m • Lightning Masts on the switching station up to 25 m

Battery storage	Within a 4 ha area of the development footprint.
Surface area to be covered (Development footprint)	550 ha
Structure orientation	Tracking system mounted with PV panels. PV panels with single axis tracking is preferred over fixed-tilt or double axis tracking systems due to the potential to achieve higher annual energy yields whilst minimising the balance of system (BOS) costs, resulting in the lowest levelized cost of energy (LCOE). The final design of the PV facility will likely use bifacial PV modules, mounted on a single axis tracking structures.
Laydown area dimensions (area assessed as part of the EIA)	Assessed 750 ha
Generation capacity	Up to 240 MW

The area surrounding the proposed Middelpunt Solar PV is characterised mostly by agricultural development. Refer to photographs 1 – 8 for photographs of the affected property and assessment area.

2.2 ACTIVITY DESCRIPTION

The National Environmental Management Act identifies listed activities (in terms of Section 24) which are likely to have an impact on the environment. These activities cannot commence without obtaining an EA from the relevant competent authority. Sufficient information is required by the competent authority to make an informed decision and the project is therefore subject to an environmental assessment process which can be either a Basic Assessment Process or a full Scoping and Environmental Impact Assessment process.

The EIA Regulation No. 327, 325 and 324 outline the activities that may be triggered and therefore require EA. The following listed activities with special reference to the proposed development is triggered:

Table 2.2: Listed activities

Relevant notice:	**Activity No (s)**	**Description of each listed activity as per project description**:
Listing Notice 1, GNR 327 (as amended in 2017)	Activity 11(i)	• *"The development of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial*

Relevant notice:	**Activity No (s)**	**Description of each listed activity as per project description**:
		complexes with a capacity of more than 33 but less than 275 kilovolts." • Activity 11(i) is triggered as the proposed photovoltaic solar facility will transmit and distribute electricity of 132 kilovolts outside an urban area.
Listing Notice 1, GNR 327 (as amended in 2017)	Activity 24(ii)	• *"The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters;* • Activity 24(ii) is triggered as the internal and perimeter roads will vary between 6 and 12 meters in width.
Listing Notice 1, GNR 327 (as amended in 2017)	Activity 28(ii)	• *"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."* • Activity 28(ii) is triggered as portions of the affected farm has been previously used for grazing and the property will be re-zoned to "special" use.
Listing Notice 1, GNR 327 (as amended in 2017)	Activity 56(ii)	• *The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres…"* • Activity 56 (ii) is triggered as existing roads will require widening of up to 6 m and/or lengthening by more than 1 km, to accommodate the movement of heavy vehicles and cable trenching activities.

Relevant notice:	**Activity No (s)**	**Description of each listed activity as per project description**:
Listing Notice 2, GNR 325 (as amended in 2017)	Activity 1	• *"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more."* • Activity 1 is triggered since the proposed photovoltaic solar facility will generate up to 240 MW electricity through the use of a renewable resource.
Listing Notice 2, GNR 325 (as amended in 2017)	Activity 15	• *"The clearance of an area of 20 hectares or more of indigenous vegetation."* • The cumulative area of indigenous vegetation to be cleared for the entire project (excluding linear activities) will exceed 20 ha.
Listing Notice 3, GNR 324 (as amended in 2017)	Activity 4 (b)(i)(ee)(gg)	• "*The development of a road wider than 4 metres with a reserve less than 13,5 metres within (b) the Free State, (i) outside urban areas, (ee) critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans and (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas."* • Activity 4 (b)(i)(ee) is triggered as internal and perimeter access roads with a width of between 6 - 12 meters will be constructed and a portion of the site is located in a Critical Biodiversity Area 1 (CBA1). The site is also located within 5 kilometers from the Thabong Game Ranch.

Relevant notice:	**Activity No (s)**	**Description of each listed activity as per project description**:
Listing Notice 3, GNR 324 (as amended in 2017)	Activity 10 (b)(i)(ee)(gg)	• *"The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres (b) Free State, (i) outside urban areas, (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans and (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas."* • Activity 10(b)(i)(ee) is triggered since the proposed development will need to develop infrastructure for the storage and handling of dangerous goods (diesel and/or oils) in containers with a capacity exceeding 30 but not exceeding 80 cubic metres. A portion of the site is located in a Critical Biodiversity Area 1 (CBA1). The site is also located within 5 kilometers from the Thabong Game Ranch.
Listing Notice 3, GNR 324 (as amended in 2017)	Activity 12(b)(ii)	• "*The clearance of an area of 300 square metres or more of indigenous vegetation (b) Free State (ii) Within critical biodiversity areas identified in bioregional plans."* • Activity 12(b)(i) is triggered since the project site falls with a Critical Biodiversity Area 1 (CBA1).
Listing Notice 3, GNR 324 (as amended in 2017)	Activity 18 (b)(i)(ee)(gg)	• *"The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (b) Free State (i) outside urban areas,*

Relevant notice:	Activity No (s)	Description of each listed activity as per project description:
		within (ee) critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans and (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas." • Activity 18 (b)(i)(ee)(gg) is triggered since the existing access road to the site will need to be widened by more than 4 metres. The project is located within the Free State Province and outside urban areas. A portion of the site is located in a Critical Biodiversity Area 1 (CBA1). The site is also located within 5 kilometers from the Thabong Game Ranch.

The potentially most significant impacts will occur during the construction phase of the development, which will include the following activities:

- Site clearing and preparation: Certain areas of the site and access road will need to be cleared of vegetation and some areas may need to be levelled.
- Civil works to be conducted:

- Terrain levelling if necessary – Levelling will be minimal as the potential site chosen is relatively flat.
- Laying foundation - The structures will be connected to the ground through cement pillars, cement slabs or metal screws. The exact method will depend on the detailed geotechnical analysis.
- Construction of access and internal roads/paths – The majority of the access road will follow existing, gravel farm roads that may require widening up to 6 to 12 m (inclusive of storm water infrastructure). Where new sections of road need to be constructed/lengthened, this will be gravel/hard surfaced access road and only tarred if necessary. A network of gravel internal access roads and a perimeter road, each with a

width of up to 6 m, will be constructed to provide access to the various components of the PV development.

- Trenching – all Direct Current (DC) and Alternating Current (AC) wiring within the PV plant will be buried underground. Trenches will have a river sand base, space for pipes, backfill of sifted soil and soft sand and concrete layers where vehicles will pass.

2.3 PHOTOVOLTAIC TECHNOLOGY

The term photovoltaic describes a solid-state electronic cell that produces direct current electrical energy from the radiant energy of the sun through a process known as the Photovoltaic Effect. This refers to light energy placing electrons into a higher state of energy to create electricity. Each PV cell is made of silicon (i.e., semiconductors), which is positively and negatively charged on either side, with electrical conductors attached to both sides to form a circuit. This circuit captures the released electrons in the form of an electric current (direct current). The key components of the proposed project are described below:

- PV Panel Array - To produce up to 240 MW, the proposed facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple panels will be required to form the solar PV arrays which will comprise the PV facility. The PV panels will track the sun through the day, at an optimum angle to capture the highest amount of solar radiation.

- Wiring to Inverters - Sections of the PV array will be wired to inverters. The inverter is a pulse width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency.

- Connection to the grid - Connecting the array to the electrical grid requires transformation of the voltage from the inverter output voltage to 33kV to 132kV. The normal components and dimensions of a distribution rated electrical substation will be required. Output voltage from the inverter is fed into step up transformers to 132kV. An onsite substation will be required on the site to step the voltage up to 132kV, after which the power will be evacuated into the national grid via the proposed power line. It is expected that generation from the facility will connect to the national grid via the Everest Substation or another alternative substation to be identified. The grid connection route will be assessed within a 400m wide corridor. The Project will inject up to 240 MW into the National Grid. The Electrical Grid Infrastructure (EGI) will be assessed as part of a separate Basis Assessment process but will however be addressed in cumulative impacts.

- Electrical reticulation network – An internal electrical reticulation network will be required and will be lain 1.5m underground as far as practically possible.

- Supporting Infrastructure – The following auxiliary buildings with basic services including water and electricity will be required on site:

- Operations & Maintenance Building / Office
- Switch gear and relay room
- Staff lockers and changing room
- Security control
- Offices

- Battery storage – Battery Storage Facilities with a maximum height of 5m will be installed in a 4-hectare area.

- Roads - Access is most likely to be obtained via the R70 Regional Road. This will be confirmed in the Traffic Impact Assessment which has been commissioned. An internal site road network will also be required to provide access to the solar field and associated infrastructure.

- Fencing - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm. Fencing with a height between 3 and 4.5 meters will be used.

2.4 LAYOUT DESCRIPTION

The layout plan will consider and adhere to the limitations of the site and aspects such as environmentally sensitive areas, roads, fencing and servitudes on site (refer to Figures A to G). The total surface area proposed for the layout includes the PV panel arrays (spaced to avoid shadowing), access and maintenance roads and associated infrastructure (buildings, power inverters, power line, battery energy storage system, on-site substation and switching station and perimeter fences). Limited features of environmental significance exist on site, however the sensitivities that do exist have to be avoided in the layout of the solar facility. Table 2.3 below provides detailed information regarding the layout for the proposed facility which will be further assessed during the EIA phase (refer to Figures A to G).

Table 2.3: Technical details for the proposed facility

Component	Description / dimensions
Height of PV panels	Up to 4.5 meters
Area of PV Array	Approximately 538 ha
Area occupied by inverter / transformer stations / substations / BESS	BESS: Up to 4 ha Facility substation: Up to 1 ha Collector Substation: Up to 1 ha
Capacity of on-site substation	132kV
Capacity of the power line	132kV
Area occupied by both permanent and construction laydown areas	Up to 4.5 ha

Area occupied by buildings	A 33 kV switch room, a gate house, ablutions, workshops, storage and warehousing areas, site offices and a control centre: Up to 11.8 ha
Battery storage facility	Maximum height: ~5m Area: Up to 4 ha
Length of internal roads	To be confirmed during the detailed EIA phase
Power line servitude width	Up to 31 m

Table 2.4 provides the co-ordinate points for the proposed project site and associated infrastructure.

Table 2.4: Development co-ordinates

Co-ordinates			
Site Boundary	A	26° 55' 50.93" E	27° 57' 30.13" S
	B	26° 55' 43.63" E	27° 57' 27.56" S
	C	26° 55' 25.30" E	27° 56' 41.54" S
	D	26° 55' 29.91" E	27° 56' 37.80" S
	E	26° 56' 22.77" E	27° 57' 00.79" S
	F	26° 56' 23.49" E	27° 57' 24.67" S
	G	26° 56' 13.04" E	27° 57' 31.83" S
	H	26° 56' 09.93" E	27° 57' 31.99" S
	I	26° 56' 11.27" E	27° 57' 23.10" S
	J	26° 55' 53.61" E	27° 57' 22.59" S
	K	26° 56' 09.29" E	27° 57' 35.62" S
	L	26° 56' 07.63" E	27° 57' 41.38" S
	M	26° 55' 56.34" E	27° 57' 39.64" S
	N	26° 55' 49.31" E	27° 57' 41.93" S
	O	26° 56' 08.51" E	27° 58' 30.02" S
	P	26° 55' 47.42" E	27° 58' 40.89" S
	Q	26° 55' 38.01" E	27° 58' 31.67" S
	R	26° 55' 26.96" E	27° 58' 44.63" S

	S	26° 56' 02.37" E	27° 59' 02.75" S
	T	26° 57' 09.33" E	27° 58' 36.63" S
	U	26° 56' 51.29" E	27° 57' 38.65" S
Supporting Infrastructure			
Eskom Switching Station	A	26° 56' 22.15" E	27° 58' 50.62" S
	B	26° 56' 23.59" E	27° 58' 53.53" S
	C	26° 56' 20.33" E	27° 58' 54.81" S
	D	26° 56' 18.87" E	27° 58' 51.92" S
BESS	A	26° 56' 20.71" E	27° 58' 47.63" S
	B	26° 56' 27.31" E	27° 58' 45.03" S
	C	26° 56' 30.21" E	27° 58' 50.89" S
	D	26° 56' 23.67" E	27° 58' 53.51" S
PP Substation	A	26° 56' 22.15" E	27° 58' 50.62" S
	B	26° 56' 23.59" E	27° 58' 53.53" S
	C	26° 56' 20.33" E	27° 58' 54.81" S
	D	26° 56' 18.87" E	27° 58' 51.92" S
Access point A			
	A	27°57'34.89"S	26°56'9.48"E
Access point B			
	B	27°57'34.56"S	26°56'9.62"E

The Figure provided below correspond to the point location as presented on Table 2.4 above.

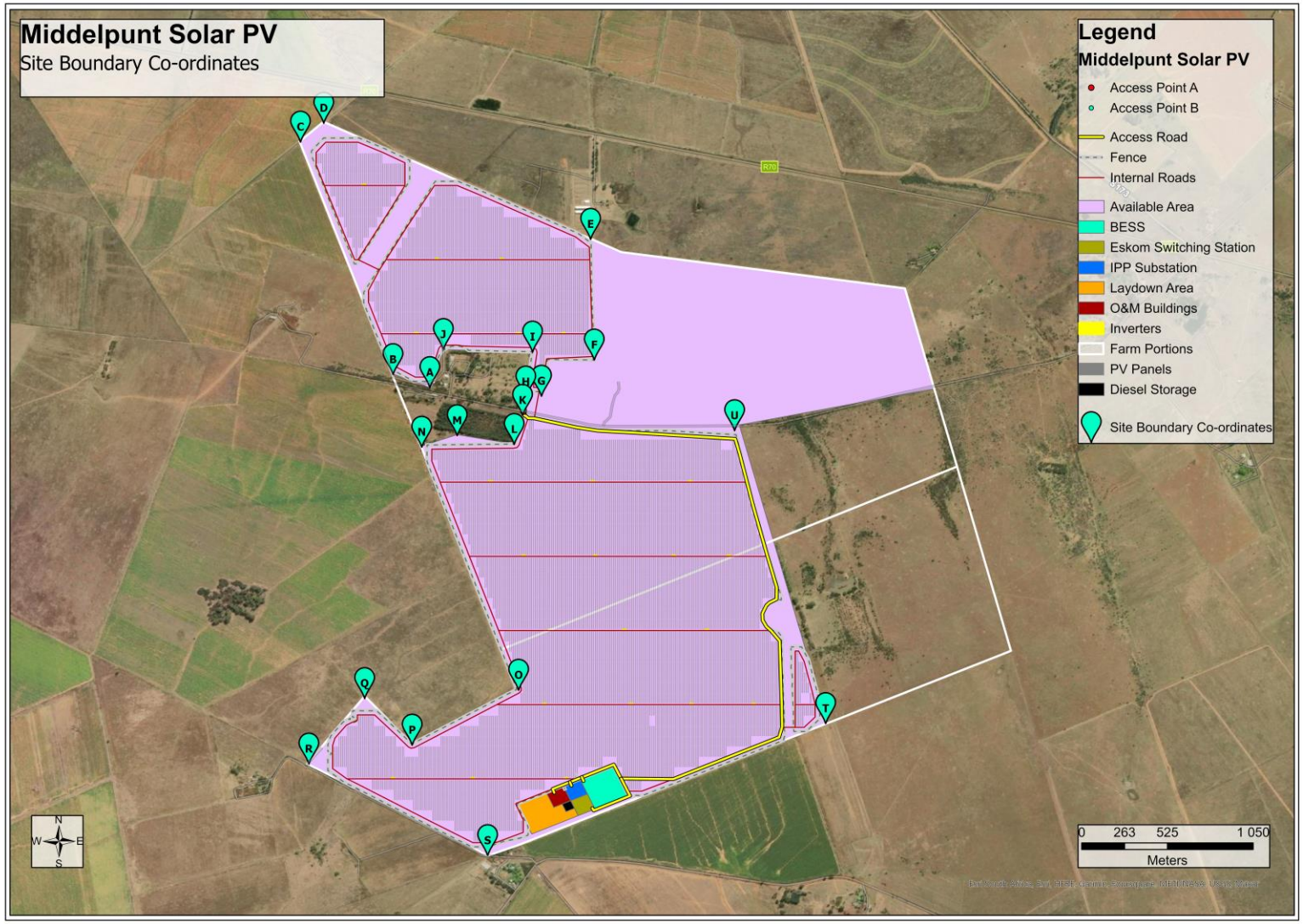


Figure 2. 1: Co-ordinates points of the project boundary

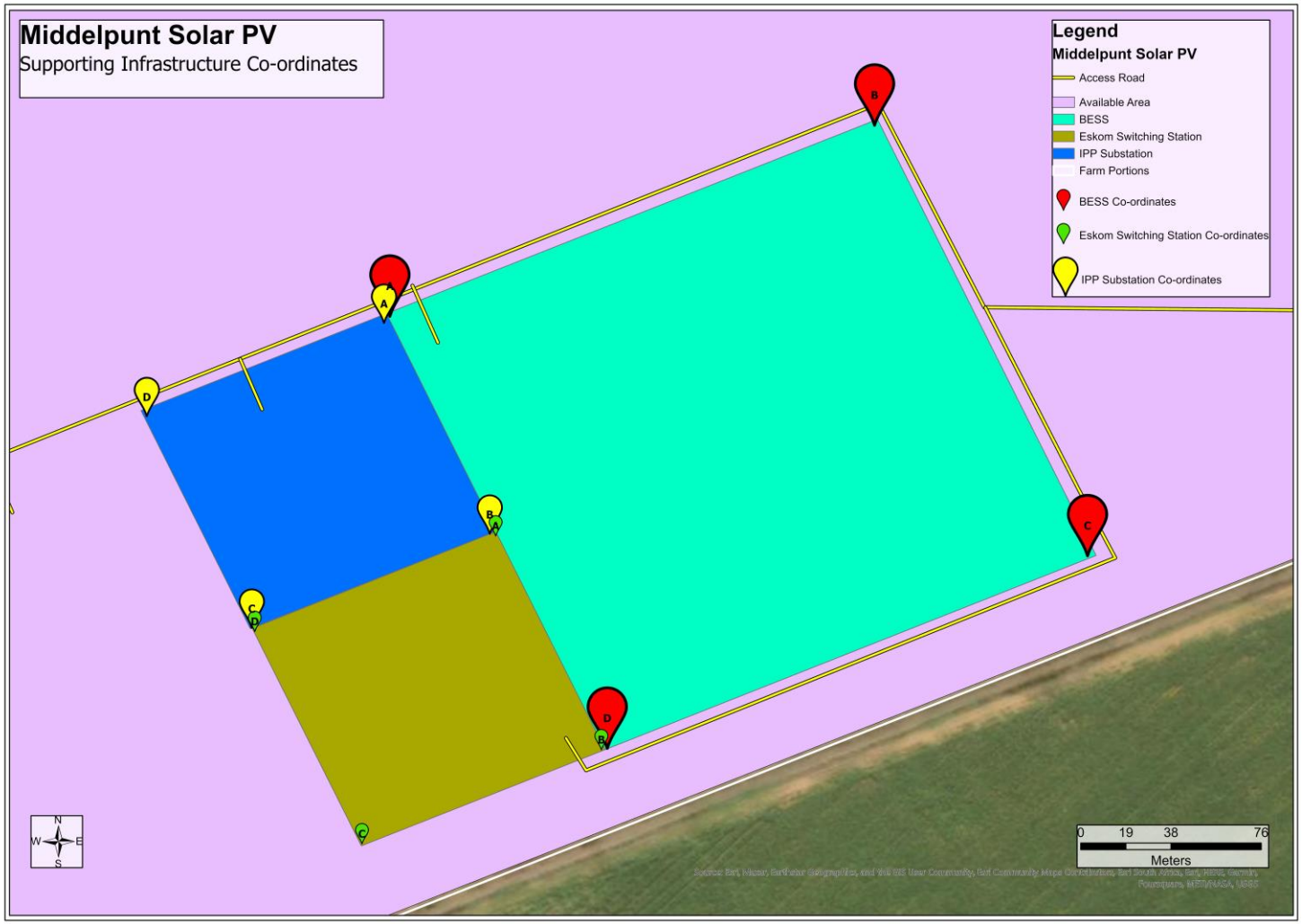


Figure 2. 2: Co-ordinate points of supporting infrastructure

2.5 SERVICES PROVISION

The following sections provide information on services required on the site e.g., water, sewage, refuse removal, and electricity.

2.5.1 Water

Adequate provision of water will be a prerequisite for the development. Three options will be considered, in order of priority by the Developer:

1. Water will be trucked from the nearest municipality water take-off point during construction phase. During the operational phase, supply will be sourced from the Local Municipality (LM). The Developer will approach the Local Municipality to enquire whether they can provide all or part of the total water requirements of the Project. Specific arrangements will be agreed with the Local Municipality in a Service Level Agreement (SLA), following the appointment of preferred bidder during the financial close period.
2. Water will be abstracted from an existing borehole within the affected property, subject to NWA requirements.
3. A new borehole on site, subject to NWA requirements.

The estimated amount of water required during entire construction period (up to 24 months) is up to 80 000m^3. The estimated maximum amount of water required during the operational phase is 1 000m^3 per annum.

2.5.2 Stormwater

To avoid soil erosion, it is recommended that the clearing of vegetation be limited where possible. Stormwater management and mitigation measures will be included in the Environmental Management Programme (EMPr) to be submitted as part of the EIR.

2.5.3 Sanitation

During construction phase, portable chemical toilets will be utilised, that will be serviced privately or by the local municipality. Wastewater will be disposed of at a licensed landfill site.

No effluent will be produced during operation of the facility, except for normal sewage from site and operations staff. Formal sanitation (such as chemical or water borne sanitation facilities) will be provided as far as practically possible.

2.5.4 Solid Waste

During the construction phase, solid waste will mainly be in the form of construction material, hazardous waste (i.e., fuel, grease, etc.), excavated substrate and domestic solid waste. All waste will be disposed of in scavenger proof bins and temporarily placed in a central location for removal

by an appointed contractor and disposed into a registered landfill site. Where possible the re-use and recycling of waste material will be encouraged. Any other waste and excess material will be removed once construction is complete and disposed of at a registered waste facility. During the EIA, the applicant will request confirmation from the municipality that they have sufficient capacity at their registered landfills for the solid waste. During the operational phase household waste will be removed to a licensed landfill site by a private contractor or by the local municipality particularly where re-use and recycling is not practical.

2.5.5 Electricity

Electricity supply during construction will be provided by either on-site diesel generators or arranged with the Local Municipality or Eskom Distribution, via existing powerlines in the local network area. During operation, the electricity will be supplied by the PV facility/ via the main grid connection or via the installed construction supply. Energy efficient electricity appliances will be used as far as possible on site. Where possible, borehole pumps will be powered by solar energy via the project's generation sources.

2.6 DECOMMISSIONING OF THE FACILITY

The operating period will likely be 20 years but could be up to 30 years from the commencement date of the operation phase. Thereafter two rights of renewal periods of 40 years and 20 years will be relevant. It is anticipated that new PV technologies and equipment will be implemented, within the scope of the Environmental Authorisation, when influencing the profitability of the solar facility.

A likely extension of the facility's lifetime would involve putting new, more efficient, solar panels on the existing structures to improve the efficiency of the facility as the technology improves. The specifications of these new panels will be the same as the current panels under consideration, but the conversion efficiency of sunlight to energy will be greater (comparable to new computer chips, that is the same, but faster and more efficient). If, for whatever reason the PV facility halts operations, the Environmental Authorisation and contract with the landowner will be respected during the decommissioning phase.

<u>The decommissioning process will consist of the following steps:</u>

- The PV facility would be disconnected from the Eskom grid.
- The BESS, inverters and PV modules would be disconnected and disassembled.
- Concrete foundations (if used) would be removed and the structures would be dismantled.
- Wastewater storage conservancy tank (if implemented) would be responsibly removed and the area would be rehabilitated.

- The underground cables would be unearthed and removed and buildings would be demolished and removed.
- The fencing would be dismantled and removed.
- The roads can be retained should the landowner choose to retain them, alternatively the roads will be removed and the compaction will be reversed.
- Most of the wires, steel and PV modules are recyclable and would be recycled to a reasonable extent. The Silicon and Aluminium in PV modules can be removed and reused in the production of new modules.
- Any rubble and non-recyclable materials will be disposed of at a registered landfill facility.

The rehabilitation of the site would form part of the decommissioning phase. The aim would be to restore the land to its original form (or as close as possible). The rehabilitation activities would include the following:

- Removal of all structures and rubble;
- Breaking up compaction where required, loosening of the soil and the redistribution of topsoil; and
- Restoration of the surface to the original contours and application of hydro seeding.

3 LEGISLATIVE AND POLICY CONTEXT

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include-

(e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;

3.1 INTRODUCTION

Environmental decision making with regards to solar PV plants is based on numerous policy and legislative documents. These documents inform decisions on project level environmental authorisations issued by the National Department of Forestry, Fisheries and the Environment (DFFE) as well as comments from local and district authorities. Moreover, it is significant to note that they also inform strategic decision making reflected in the IDPs and SDFs. Therefore, to ensure streamlining of environmental authorisations it is imperative for the proposed activity to align with the principles and objectives of key national, provincial and local development policies and legislation. The following acts and policies and their applicability to the proposed development are briefly summarised:

- The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)
- National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA]
- The National Energy Act, 2008 (Act 34 of 2008)
- National Water Act, 1998 (Act No. 36 of 1998)
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
- The National Heritage Resources Act, 1999 (Act No. 25 of 1999)
- Conservation of Agricultural Resources Act, 1983 (Act No. 85 of 1983)
- The National Forests Act, 1998 (Act 84 of 1998)
- The White Paper on the Energy Policy of the Republic of South Africa (1998)
- The White Paper on Renewable Energy (2003)
- Integrated Resource Plan (IRP) for South Africa (2010-2030)
- National Development Plan of 2030

- National Infrastructure Plan of South Africa (2012)
- New Growth Path Framework (2010)
- Climate Change Bill (2018)
- Climate Change Bill (2021) – for public comment
- Strategic Integrated Projects (SIPs) (2010 – 2030)
- Strategic Environmental Assessment (SEA) for wind and solar PV Energy in South Africa (2014)
- Free State Provincial Spatial Development Framework (PSDF) (2012)
- Matjhabeng Municipality Integrated Development Plan (IDP) 2021-2022
- Matjhabeng Municipality Spatial Development Framework (SDF) 2021/22 – 2024/25 (2021)

The key principles and objectives of each of the legislative and policy documents are briefly summarised in Tables 3.1 and 3.2 to provide a reference framework for the implications for the proposed activity.

3.2 LEGISLATIVE CONTEXT

Table 3.1: Legislative context for the construction of photovoltaic solar facilities

LEGISLATION	ADMINISTERING AUTHORITY	DATE	SUMMARY / IMPLICATIONS FOR PROPOSED DEVELOPMENT
The Constitution of South Africa **(Act No. 108 of 1996)**	National Government	1996	The Constitution is the supreme law of the Republic and all law and conduct must be consistent with the Constitution. The Chapter on the Bill of Rights contains a number of provisions, which are relevant to securing the protection of the environment. Section 24 states that "everyone has the right to (a) an environment that is not harmful to their health or well-being and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that – (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. The Constitution therefore, compels government to give effect to the people's environmental right and places government under a legal duty to act as a responsible custodian of the country's environment. It compels government to pass legislation and use other measures to protect the environment, to prevent pollution and ecological degradation, promote conservation and secure sustainable development. The development of the Middelpunt Solar PV and the aspects related thereto considers the creation of an environment which is not harmful or degraded through the implementation of appropriate mitigation measures.
The National Environmental Management Act **(Act No. 107 of 1998)**	National Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the	1998	NEMA provides for co-operative governance by establishing principles and procedures for decision-makers on matters affecting the environment. An important function of the Act is to serve as an enabling Act for the promulgation of legislation to effectively address integrated environmental management. Some of the principles in the Act are accountability; affordability; cradle to grave management; equity; integration; open information; polluter pays; subsidiary;

	Environment) and the Free State Province Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA)		waste avoidance and minimisation; co-operative governance; sustainable development; and environmental protection and justice. The mandate for EIA lays with the National Environmental Management Act (107 of 1998) and the EIA Regulations No. 324, 325, 326, and 327 promulgated in terms of Section 24 of NEMA, as amended on 11 June 2021 (GN 517). The EIA Regulations determine that an Environmental Authorisation is required for certain listed activities, which might have a detrimental effect on the environment. The EIA process undertaken for the Middelpunt Solar PV is in-line with the requirements of NEMA for the Application for Environmental Authorisation.
The National Energy Act **(Act No. 34 of 2008)**	Department of Mineral Resources and Energy	2008	One of the objectives of the National Energy Act was to promote diversity of supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources, including solar: "*To ensure that diverse energy resources are available, in sustainable quantities, and at affordable prices, to the South African economy, in support of economic growth and poverty alleviation, taking into account environmental management requirements (…); to provide for (…) increased generation and consumption of renewable energies…*" (Preamble). Considering that the Middelpunt Solar PV is proposed to make use of PV technology and the solar resource for the generation of electricity, the proposed project is in-line with the Act.
The National Water Act **(Act No. 36 of 1998)**	Department of Water Affairs (now known as Department of Water and Sanitation)	1998	Sustainability and equity are identified as central guiding principles in the protection, use, development, conservation, management and control of water resources. The intention of the Act is to promote the equitable access to water and the sustainable use of water, redress past racial and gender discrimination, and facilitate economic and social development. The Act provides the rights of access to basic water supply and sanitation, and environmentally, it provides for the protection of aquatic and associated ecosystems, the reduction and prevention of pollution and degradation of water resources. As this Act is founded on the principle that National Government has overall responsibility for and authority over water resource management, including the equitable allocation and

			beneficial use of water in the public interest, a person can only be entitled to use water if the use is permissible under the Act. Chapter 4 of the Act lays the basis for regulating water use. There are identified wetlands on the proposed Middelpunt Solar PV site, and within 500m of the site, and a water use license will be required.
National Environmental Management: Waste Act **(Act No. 59 of 2008)**	National Department Environmental Affairs (DEA) (now known as the Department of Forestry, Fisheries and the Environment)	2008	NEMWA has been developed as part of the law reform process enacted through the White Paper on Integrated Pollution and Waste Management and the National Waste Management Strategy (NWMS). The objectives of the Act relate to the provision of measures to protect health, well-being and the environment, to ensure that people are aware of the impact of waste on their health, well-being and the environment, to provide for compliance with the measures, and to give effect to section 24 of the Constitution in order to secure an environment that is not harmful to health and well-being. Regulations No. R921 (of 2013) promulgated in terms of Section 19(1) of the National Environmental Management: Waste Act (59 of 2008) determines that no person may commence, undertake or conduct a waste management activity listed in this schedule unless a license is issued in respect of that activity. It is not envisaged that a waste permit will be required for the proposed development as no listed activities in terms of waste management are expected to be triggered.
National Environment Management: Air Quality Act **(Act No. 39 of 2004)**	National Department Environmental Affairs (DEA) (now known as the Department of Forestry, Fisheries and the Environment)	2004	The object of this Act is to protect the environment by providing reasonable measures for the protection and enhancement of the quality of air in the Republic; the prevention of air pollution and ecological degradation; and securing ecologically sustainable development while promoting justifiable economic and social development. Regulations No. R248 (of 31 March 2010) promulgated in terms of Section 21(1)(a) of the National Environmental Management Act: Air Quality Act (39 of 2004) determine that an Atmospheric Emission License (AEL) is required for certain listed activities, which result in atmospheric emissions which have or may have a detrimental effect on the environment. The Regulation also sets out the minimum emission standards for the listed activities. It is not

			envisaged that an Atmospheric Emission License will be required for the proposed development.
The National Heritage Resources Act **(Act No. 25 of 1999)**	South African Heritage Resources Agency (SAHRA)	1999	The Act aims to introduce an integrated and interactive system for the management of heritage resources, to promote good governance at all levels, and empower civil society to nurture and conserve heritage resources so that they may be bequeathed to future generations and to lay down principles for governing heritage resources management throughout the Republic. It also aims to establish the South African Heritage Resources Agency together with its Council to co-ordinate and promote the management of heritage resources, to set norms and maintain essential national standards and to protect heritage resources, to provide for the protection and management of conservation-worthy places and areas by local authorities, and to provide for matters connected therewith. The Act protects and manages certain categories of heritage resources in South Africa. For the purposes of the Heritage Resources Act, a "heritage resource" includes any place or object of cultural significance. In this regard the Act makes provision for a person undertaking an activity listed in Section 28 of the Act to notify the resources authority. The resources authority may request that a heritage impact assessment be conducted if there is reason to believe that heritage resources will be affected. A case file with reference number 21887 has been opened on SAHRIS for the Middelpunt Solar PV and all relevant documents were submitted for their comments and approval. The Heritage Impact Assessment undertaken for the solar PV facility is included as Appendix E7.
Conservation of Agricultural Resources **Act (Act No. 85 of 1983)**	National and Provincial Government	1983	The objective of the Act is to provide control over the utilisation of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith. Consent will be required from the Department of Agriculture, Land Reform and Rural Development (DALRRD) in order to confirm that the proposed development is not located on

			high potential agricultural land and to approve the long-term lease agreement. A Soils and Agricultural scoping statement have been provided for the Middelpunt Solar PV and included as Appendix E1.
The National Forests Act, 1998 **(Act 84 of 1998)**	Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the Environment)	1998	The purposes of this Act are to: (a) promote the sustainable management and development of forests for the benefit of all; (b) create the conditions necessary to restructure forestry in State forests; (c) provide special measures for the protection of certain forests and trees: (d) promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes. (e) promote community forestry; (f) promote greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination. Section 12(1) read with s15(1) of the NFA stated that the Minister may declare a particular tree, group of trees, woodland; or trees belonging to a particular species, to be a protected tree, group of trees, woodland or species. A list of protected tree species was gazetted in GN 635 of 6 December 2019. The effect of the declaration is that no person may (a) cut, disturb, damage or destroy; or (b) possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, or any forest product derived from a protected tree, except under a license granted by the Minister; or in terms of an exemption published by the Minister in the Gazette. An ecological scoping statement has been undertaken for the Middelpunt Solar PV and is included in Appendix E2.

3.3 POLICY CONTEXT

Table 3.2: Policy context for the construction of photovoltaic solar facilities

POLICY	ADMINISTERING AUTHORITY	DATE	SUMMARY / IMPLICATIONS FOR PROPOSED DEVELOPMENT
The White Paper on the Energy Policy of the Republic of South Africa	Department of Mineral Resources and Energy	1998	The White Paper on the Energy Policy of the Republic of South Africa establishes the international and national policy context for the energy sector, and identifies the following energy policy objectives: • Increasing access to affordable energy services • Improving energy governance • Stimulating economic development • Managing energy-related environmental and health impacts • Securing supply through diversity • Energy policy priorities The White Paper sets out the advantages of renewable energy and states that Government believes that renewables can in many cases provide the least cost energy service, particularly when social and environmental costs are included. The White Paper acknowledges that South Africa has neglected the development and implementation of renewable energy applications, despite the fact that the country's renewable energy resource base is extensive, and many appropriate applications exist. The White Paper notes that renewable energy applications have specific characteristics that need to be considered. Advantages include: • Minimal environmental impacts in operation in comparison with traditional supply technologies; and • Generally lower running costs, and high labour intensities. Disadvantages include: • Higher capital costs in some cases;

			• Lower energy densities; and • Lower levels of availability, depending on specific conditions, especially with sun and wind-based systems. Middelpunt Solar PV is in line with this policy as it proposes the generation of renewable energy from the solar resource.
The White Paper on Renewable Energy	Department of Mineral Resources and Energy	2003	This White Paper on Renewable Energy supplements the *White Paper on Energy Policy*, which recognises that the medium and long-term potential of renewable energy is significant. This Paper sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa. The White Paper notes that while South Africa is well-endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have thus far remained largely untapped. Government's long-term goal is the establishment of a renewable energy industry producing modern energy carriers that will offer in future years a sustainable, fully non-subsidised alternative to fossil fuels. The medium-term (10-year) target set in the White Paper is: *10 000 GWh (0.8 Mtoe) renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro. The renewable energy is to be utilised for power generation and non-electric technologies such as solar water heating and bio-fuels. This is approximately 4% (1667 MW) of the projected electricity demand for 2013 (41539 MW) (Executive Summary, ix).* The Middelpunt Solar PV is in line with this paper as it proposes the generation of renewable energy from the solar resource.
Integrated Resource Plan (IRP) for South Africa	Department of Mineral Resources and Energy	2010-2030	The Integrated Resource Plan for Electricity for South Africa of 2010–2030 (further referred to as the IRP) is a "living plan" which is expected to be revised and updated continuously as necessary due to changing circumstances. According to the Summary of the plan the current IRP for South Africa, which was originally initiated by the Department of Energy (DoE) in June 2010 (the Department is now known as Department of Mineral Resources and Energy), led to the Revised Balanced Scenarios (RBS) for the period 2010–2030.

"*This scenario was derived based on the cost-optimal solution for new build options (considering the direct costs of new build power plants), which was then "balanced" in accordance with qualitative measures such as local job creation".* In addition to all existing and committed power plants, the RBS included 11,4 GW of renewables, which relates to the proposed Middelpunt Solar PV. In 2010 several changes were made to the IRP model. The main changes in the IRP were the disaggregation of renewable energy technologies to explicitly display solar photovoltaic (PV), concentrated solar power (CSP), and wind options (RSA, 2011a).

The summary of the IRP further explains that traditional cost-optimal scenarios were developed based on the previously mentioned changes in the IRP. This resulted in the Policy-Adjusted IRP, which stated that:

"*The installation of renewables (solar PV, CSP and wind) have been brought forward in order to accelerate a local industry*; *To account for the uncertainties associated with the costs of renewables and fuels, a nuclear fleet of 9,6 GW is included in the IRP; The emission constraint of the RBS (275 million tons of carbon dioxide per year after 2024) is maintained; and Energy efficiency demand-side management (EEDSM) measures are maintained at the level of the RBS*" (RSA, 2011a:6).

"The Policy-Adjusted IRP includes the same amount of coal and nuclear new builds as the RBS, while reflecting recent developments with respect to prices for renewables. In addition to all existing and committed power plants (including 10 GW committed coal), the plan includes 9,6 GW of nuclear; 6,3 GW of coal; 17,8 GW of renewables; and 8,9 GW of other generation sources" (RSA, 2011a:6).

The IRP highlights the commitments before the next IRP. The commitments pertaining to the purpose of the proposed project in renewable energy is: "*Solar PV programme 2012-2015: In order to facilitate the connection of the first solar PV units to the grid in 2012 a firm commitment to this capacity is necessary. Furthermore, to provide the security of investment to ramp up a sustainable local industry cluster, the first four years from 2012 to 2015 require firm commitment."*

"*Solar PV 2016 to 2019: As with wind, grid upgrades might become necessary for the second round of solar PV installations from 2016 to 2019, depending on their location. To trigger the associated tasks in a timely manner, a firm commitment to these capacities is necessary in the next round of the IRP at the latest. By then, the assumed cost decreases for solar PV will be confirmed*" (IRP, 2011a:17).

In conclusion the IRP recommends that an accelerated roll-out in renewable energy options should be allowed with regards to the benefits of the localization in renewable energy technologies (RSA, 2011a). It is however important to take note that since the release of the IRP in 2011 there has been a number of developments in the energy sector of South Africa. Therefore, the IRP was updated and was open for comments until March of 2017. The new IRP of 2019 was formally published in October 2019. For the revision scenario, analysis was conducted. The results revealed that for the period ending 2030 that: *"The committed Renewable Energy Independent Power Producers Programme, including the 27 signed projects and Eskom capacity rollout ending with the last unit of Kusile in 2022, will provide more than sufficient capacity to cover the projected demand and decommissioning of plants up to approximately 2025"; "Imposing annual build limits on renewable energy will not affect the total cumulative capacity and the energy mix for the period up to 2030*"; and *"the scenario without renewable energy annual build limits provides the least-cost option by 2030*" (RSA, 2018:34).

Lastly, the draft IRP of 2018 also included the scenario analysis for the period post 2030. Here it was observed that: "*Imposing annual build limits on renewable energy will restrict the cumulative renewable installed capacity and the energy mix for this period; adopting no annual build limits on renewables or imposing a more stringent strategy to reduce greenhouse gas emissions implies that no new coal power plants will be built in the future unless affordable cleaner forms of coal-to-power are available; and the scenario without renewable energy annual build limits provides the least-cost option by 2050*" (RSA, 2018:34–35).

In the final IRP of 2019 key considerations were taken into account together with required actions to be taken for the IRP of 2019 to be credible. In terms of renewable energy technologies like solar and wind, the IRP stated that *"The application of renewable build limits 'smoothes out' the capacity allocations for wind and solar PV which provides a constant pipeline of projects to investment; this addresses investor confidence*". The decision stated against this key consideration is to *"retain the current annual build limits on renewables (wind and PV) pending the finalization of a just transition plan"* (RSA, 2019:46). Hereby the IRP also recognises renewable technologies' potential to diversify the electricity mix, create new industries and job opportunities and localize across the value chain (RSA, 2019:13).

			The Middelpunt Solar PV is in line with this plan as it proposes the generation of renewable energy from the solar resource and will contribute to the energy mix of the country as set out in this plan.
National Development Plan of 2030	The Presidency: National Planning Commission	-	The National Development Plan aims to "*eliminate poverty and reduce inequality by 2030*" (RSA, undated). In order to eliminate or reduce inequality, the economy of South Africa needs to grow faster in order to benefit all South Africans. In May 2010 a Draft National Development Plan was drafted, which highlighted the nine (9) key challenges for South Africa. The highest priority areas according to the plan are considered to be the creation of employment opportunities and to improve the quality of national education. In this regard, the plan sets out three (3) priority areas, namely, to raise employment by a faster growing economy, improve the quality of education, and to build the capability of the state in order to play a more developmental and transformative role. One of the key challenges identified was that the economy is unsustainably resource intensive and the acceleration and expansion of renewable energy was identified as a key intervention strategy to address this challenge. Middelpunt Solar PV will contribute to the intervention strategy as identified within the plan.
National Infrastructure Plan of South Africa	Presidential Infrastructure Coordinating Commission	2012	In the year 2012 the South African Government adopted a National Infrastructure Plan (hereafter referred to as the Plan). The aim of this Plan is to transform the economic landscape, while strengthening the delivery of basic services and creating new employment opportunities. This Plan also supports the integration of African communities, and also sets out the challenges and enablers that our country needs in order to respond to the planning and development of infrastructure with regards to fostering economic growth (RSA, 2012). The Plan has developed eighteen (18) strategic integrated projects (further referred to as SIPs). These SIPs stretch over all nine (9) provinces, covering social and economic infrastructure, and projects that enhances development and growth. Of the eighteen (18), five (5) are geographically focused, three (3) spatial, three (3) energy, three (3) social infrastructure, two (2) knowledge, one (1) regional integration, and one (1) water and sanitation focussed. The three (3) SIPs according to the Plan, which are energy focused and correlate to the proposed project are as follow: • SIP 8: Green energy in support of the South African economy; • SIP 9: Electricity generation to support socio-economic development; and

		• SIP 10: Electricity transmission and distribution for all. SIP 8 according to the Plan "*support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the IRP 2010 and support bio-fuel production facilities*". The purpose of SIP 9 according to the Plan is to "*accelerate the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances*". SIP 9 should also monitor the implementation of major projects such as new power stations like Medupi, Kusile and Ingula. Lastly, SIP 10 aims to "*expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development*" (RSA, 2012:20). The Middelpunt Solar PV is in line with this plan as it proposes the generation of renewable energy from the solar resource which supports socio-economic development and will contribute to meeting the electricity demand of the country as set out in this plan.
New Growth Path Framework	Department of - Economic Development	The New Growth Path was developed after 16 years of South Africa's democracy, to respond to emerging opportunities and risks while building on policies. This framework provides a dynamic vision on how to collectively achieve a more developed, equitable and democratic society and economy. This framework mainly reflects the commitment of the South African Government to create employment opportunities for its people in all economic policies (RSA, 2011b). This framework sets out the markers for job creation and growth and identify where there are viable changes in the character and structure of production, in order to create a more inclusive, greener economy in the long-term. It is stated in the framework that in order for this framework to reach its objectives, the Government is committed to: • Identify the possible areas of employment creation; and • Develop a policy to facilitate employment creation especially with regards to social equity, sustainable employment and growth in the creation of employment activities (RSA, 2011b).

			This framework also identifies investments in five key areas, one of which is energy. This framework also states that the green economy is a priority area, which includes the construction of and investment in renewable energy technologies like solar (RSA, 2011b). In this regard it will also assist creating employment opportunities over the medium- and long-term. Considering that the construction of and investment in renewable energy is a key area identified within the framework, the Middelpunt Solar PV is considered to be in-line with the framework.
Climate Change Bill	National Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the Environment)	2018	On 08 June 2018 the Minister of Environmental Affairs published the Climate Change Bill ("the Bill") for public comment. The Bill provides a framework for climate change regulation in South Africa aimed at governing South Africa's sustainable transition to a climate resilient, low carbon economy and society. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. The following objectives are set within the Bill: • Provide for the coordinated and integrated response to climate change and its impacts by all spheres of government in accordance with the principles of cooperative governance; • Provide for the effective management of inevitable climate change impacts through enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to building social, economic, and environmental resilience and an adequate national adaptation response in the context of the global climate change response; • Make a fair contribution to the global effort to stabilise greenhouse gas concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe and in a manner that enables economic, employment, social and environmental development to proceed in a sustainable manner. The Middelpunt Solar PV comprises a renewable energy generation facility and would not result in the generation or release of emissions during its operation.

Climate Change Bill	National Department of Forestry, Fisheries and the Environment	2021	The Department of Forestry, Fisheries and the Environment has published a new Climate Change Bill for public comment. The bill notes that climate change represents an urgent threat to human societies and the planet, and requires an effective, progressive and incremental response from both government and citizens. It recognises that South Africa has a global responsibility to reduce greenhouse gasses and that the anticipated impacts arising as a result of climate change have the potential to undermine achieving of the country's developmental goals. The main objective of the bill is to enable the development of an effective climate change response and the long-term, just transition to a climate-resilient and lower-carbon economy and society, and to provide for matters connected therewith. The Middelpunt Solar PV comprises a renewable energy generation facility and would not result in the generation or release of emissions during its operation.
Strategic Integrated Projects (SIPs)	The Presidential Infrastructure Coordinating Committee	2010 - 2030	The Presidential Infrastructure Coordinating Committee (PICC) is integrating and phasing investment plans across 18 Strategic Infrastructure Projects (SIPs) which have five core functions: to unlock opportunity, transform the economic landscape, create new jobs, strengthen the delivery of basic services and support the integration of African economies. A balanced approach is being fostered through greening of the economy, boosting energy security, promoting integrated municipal infrastructure investment, facilitating integrated urban development, accelerating skills development, investing in rural development and enabling regional integration. SIP 8 and 9 of the energy SIPs supports the development of the solar energy facility: • SIP 8: Green energy in support of the South African economy: Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010 – 2030) and supports bio-fuel production facilities. • SIP 9: Electricity generation to support socio-economic development: The proposed Middelpunt Solar PV is a potential SIP 9 Project as electricity will be generated and social and economic upliftment, development and growth will take place within the surrounding communities. It would

			become a SIP 9 project if selected as a Preferred Bidder project by the Department of Mineral Resources and Energy. SIP 9 supports the acceleration of the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances. The Middelpunt Solar PV could be registered as a SIP project once selected as a preferred bidder under the REIPPP Programme. The project would then contribute to the above-mentioned SIPs.
Strategic Environmental Assessment (SEA) for wind and solar PV Energy in South Africa	National Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the Environment)	2014	The Department of Forestry, Fisheries and the Environment (DFFE) has committed to contribute to the implementation of the National Development Plan and National Infrastructure Plan by undertaking Strategic Environmental Assessments (SEAs) to identify adaptive processes that integrate the regulatory environmental requirements for Strategic Integrated Projects (SIPs) while safeguarding the environment. The wind and solar photovoltaic (PV) SEA was accordingly commissioned by DEA in support of SIP 8, which aims to facilitate the implementation of sustainable green energy initiatives. This SEA identifies areas where large scale wind and solar PV energy facilities can be developed in terms of SIP 8 and in a manner that limits significant negative impacts on the environment, while yielding the highest possible socio-economic benefits to the country. These areas are referred to as Renewable Energy Development Zones (REDZs). The REDZs also provide priority areas for investment into the electricity grid. Currently one of the greatest challenges to renewable energy development in South Africa is the saturation of existing grid infrastructure and the difficulties in expanding the grid. Proactive investment in grid infrastructure is the likely to be the most important factor determining the success of REDZs. Although it is intended for the SEA to facilitate proactive grid investment in REDZs, such investment should not be limited to these areas. Suitable wind and solar PV development should still be promoted across the country and any proposed development must be evaluated on its own merit. The Middelpunt Solar PV is not located within a REDZ, but the development will contribute to the expansion of renewable energy facilities and infrastructure within the country, and provide the positive opportunities associated with it.

Free State Provincial Spatial Development Framework (PSDF)	Free State Provincial Government	2012

The Free State PSDF is a policy document that promotes a 'developmental state' in accordance with national and provincial legislation and directives. It aligns with the Free State Provincial Growth and Development Strategy which has committed the Free State to 'building a prosperous, sustainable and growing provincial economy which reduces poverty and improves social development'.

The PSDF includes comprehensive plans and strategies that collectively indicate which type of land-use should be promoted in the Province, where such land-use should take place, and how it should be implemented and managed. In broad terms, the PSDF:

- Indicates the spatial implications of the core development objectives of the Free State Provincial Growth and Development Strategy.
- Serves as a spatial plan that facilitates local economic development.
- Lays down strategies, proposals and guidelines as it relates to sustainable development.
- Facilitates cross-boundary co-operation between municipalities, adjoining provinces, and bordering countries.
- Serves as a manual for integration and standardisation of the planning frameworks of all spheres of government in the Province.

The Free State Provincial Growth and Development Strategy states that sustainable economic development is the only effective means by which the most significant challenge of the Free State, namely poverty, can be addressed. The PSDF gives practical effect to sustainable development, which is defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.

The PSDF is prepared in accordance with bioregional planning principles that were adapted to suit the site-specific requirements of the Free State. It incorporates and complies with the relevant protocols, conventions, agreements, legislation and policy at all applicable levels of planning, ranging from the international to the local.

			The PSDF builds upon achievements and learns from mistakes of the past, reacts to the challenges of our time, incorporates the traditional knowledge of the people of the Free State, and builds upon international best-practice and technology. The development of the Middelpunt Solar PV is in-line with the framework based on the contributions and opportunities presented by a development of this nature.
Lejweleputswa District Municipality Integrated Development Plan (IDP)	Lejweleputswa District Municipality	2021-2022	The long-term vision of the Lejweleputswa DM is to be: *"A leader in sustainable development and service delivery to all".* The above stated vision defines what Lejweleputswa District Municipality would like to attain over medium to long-term, and for that achievement to effectively materialize, their mission is: *"Providing sound financial management. Providing excellent, vibrant public participation and high quality local municipal support programmes, maintaining good working relations in the spirit of co-operative governance, and enhancing high staff morale, productivity and motivation"* (IDP, 2021). Of the eighteen (18) SIPs that are contained in the National Infrastructure Plan (NIP), there are eight which impacts on the Lejweleputswa DM and thus need to be recognized and where appropriate; the municipality's plans will be aligned with these SIPs to respond to national government's service delivery initiatives. Furthermore, work is to be done to align key cross-cutting areas, namely human settlement planning and skills development in line with each of the Strategic Infrastructure Projects, especially: o Green Energy in support of the South African economy (SIP 8): Supporting sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010). o Electricity Generation to support socio-economic development (SIP 9): acceleration of the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy; and addressing historical imbalances. The development of the Middelpunt Solar PV is in line with the plan, considering the alignment of the SIPs with their municipal plans.

Matjhabeng Municipality Integrated Development Plan (IDP)	Matjhabeng Local Municipality	2023-2024	Focusing on the identified needs, development issues, priorities and predetermined objectives that are aligned to the National Development Plan and climate change policy framework, the common aspirations and local identity of all concerned parties which gives a form of a picture of the "preferred future", a statement that describes how the future will look like if the municipality achieves its ultimate aims and is reflected in the following shared vision statement that drives us towards a compelling future: "By being a benchmark developmental municipality in service delivery excellence" A statement of the overall purpose of the municipality, it describes what municipality, for whom the municipality do it, and the benefit they derive, and is reflected in the following shared mission: • By being a united, non-racial, non-sexist, transparent, responsible municipality. • By providing municipal services in an economic, efficient, and effective way. • By promoting a self-reliant community through the promotion of a culture of entrepreneurship. • By creating a conducive environment for growth and development. • Climate Resilient Municipality The Executive Mayor in his inaugural address to council made strategic commitments to improve service delivery and expedite developments, key to the address what the outline of the below Mayoral priorities. Significant progress has been made in the pursuit of these priorities anchored on the need to build internal capacity as well as the procurement of necessary equipment (tools of trade) as enablers for the achievement of rest of the priorities. • Road maintenance; • Local economic Development; • Replacement of Ageing Infrastructure (Water and Sanitation); • Achieve housing accreditation;

			• Build internal Capacity and Professionalize the municipality; • Develop Climate Change Strategy, adaptation, and mitigation; • Improve Private-Public Partnerships for growth and development; • Economic Corridors linking six towns; • Economic Infrastructure and Investment The development of the Middelpunt Solar PV is in line with the plan, considering the relevant Key Performance Area stated in the IDP.
Matjhabeng Municipality Spatial Development Framework (SDF)	Matjhabeng Local Municipality	2021	In order to guide the Matjhabeng LM's Vision and Mission statements, several objectives were identified. The following objectives will ensure that the municipality succeeds in their main purpose: • Stimulate development and growth where there is proven demand. • Use future growth and development to consolidate and improve municipal performance. • To ensure sustainable use of environmental resources, their enhancement and replenishment. • Capitalise on the valuable role of environmental resources. • Enhance the uniqueness, ecological sustainability, and liveability of the municipal area. • Meet community needs and promote community values and aspirations. • Ensure that the municipal structure has timeless qualities and that it does not short-sightedly respond to the mere current needs, circumstances, and fashion. • Create new social and economic opportunities and to improve access to the existing ones. • Promote the viability of public transport. • Promote all aspects of spatial integration. • Enrich people's lives, as well as to enhance uniqueness and identity of municipality by means of a readable municipal form. • Enhance the functionality of all the elements constituting the municipal area. • Create healthy, comfortable and safe living and working environments for all.

	• Instil business confidence in the municipal area as a whole by providing an enabling spatial framework that supports development. • Manage development and the rehabilitation of dilapidated areas. • Provide access to basic services and social facilities. • Create employment opportunities. • Upgrading and rehabilitation of infrastructure to support the growing transport services and new development initiatives. • Targeted agriculture enterprises with community, private sector and Public-Private Community Partnerships in identified areas of opportunity. • Establish enterprises linked to tourism packages, tourism and heritage routes and attractions within the municipal area and surrounds. The development of the Middelpunt Solar PV will contribute to the goals of the area, albeit to a limited extent.

3.4 OTHER LEGISLATION

Other legislation mainly refers to the following:

- Planning legislation governing the rezoning process and approval of the layout plan.
- Design standards and legislation for services provision such as water, sewerage, electricity, etc.
- Municipal bylaws related to building plans, building regulations, etc.

3.5 RELEVANT GUIDANCE

The following guidance was considered in conducting the EIA:

- The Equator principles III (2020)[1]
- World Bank Group Environmental, Health and Safety General Guidelines (EHS Guidelines) (2007)
- Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution (2007)
- International Finance Corporation's Policy on Environmental and Social Sustainability (2012)
- DEA. (2013). Draft National Renewable Energy Guideline. Department of Environmental Affairs, Pretoria, South Africa
- DEA, (2012), Guideline 5 – Final companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010
- DEA, (2012), Guideline 7 – Public participation in the Environmental Impact Assessment process
- DEA, (2012), Guideline 9 – Need and desirability
- DEA, (2006), Guideline 3 – General guide to the Environmental Impact Assessment Regulations
- DEAT, (2006), Guideline 4 – Public participation in support of the Environmental Impact Assessment Regulations
- DEAT, (2006), Guideline 5 – Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations
- BirdLife, (2017). Best Practise Guidelines Birds & Solar Energy: Guidelines for assessing and monitoring the impact of solar power generating facilities on bird in southern Africa.

[1] Although this report is not written in terms of the Equator Principles (EPs), it fully acknowledges that the EPs will need to be complied should funding for the project be required.

3.6 CONCLUSION

The S&EIR process was undertaken in accordance with the EIA Regulations (as amended) published in GNR 326, in terms of Section 24(5) and 44 of the NEMA as amended as well as all relevant National legislation, policy documents, national guidelines, the World Bank EHS Guidelines, the IFC Performance Standards, and the Equator Principles.

The legislative and policy context plays an important role in identifying and assessing the potential social impacts associated with the proposed development, as well as an indication of the need and desirability of the proposed development from a national, provincial and local level. For this reason, the proposed development project will be assessed in terms of its fit with the key legislative, policy and planning documents discussed above.

The main findings of the review of the policy documents on all spheres of Government indicated that strong support was given towards renewable energy, specifically PV solar energy and therefore it is concluded that there is support for the development of the Middelpunt Solar PV. The White Paper on the Energy Policy of the Republic of South Africa of 1998 stated that due to the fact that renewable energy resources operate from an unlimited resource base, i.e., the sun, renewable energy can increasingly contribute towards a long-term sustainable energy supply for future generations. This policy further highlights that due to the unlimited resources base of renewable energy in South Africa, renewable energy applications, like PV solar energy and associated infrastructure, are more sustainable in terms of social and environmental costs. The Integrated Resource Planning for Electricity for South Africa of 2010–2030, the National Infrastructure Plan of South Africa and the New Growth Path Framework all support the development of the renewable energy sector. In particular, the IRP also indicated that 43% of the energy generation in South Africa is allocated to renewable energy applications. On a District and Local level limited attention is given explicitly to renewable sources like PV solar energy, however the documents reviewed do make provision for such developments and efficiency in improving the quality of lives in terms of efficient physical infrastructure as well as socio-economic growth. At Provincial, District and Local level the policy documents support the applications of renewables.

The review of the relevant policies and documents related to the energy sector therefore indicate that renewables, like solar energy and the establishment of solar energy facilities and associated infrastructure, are supported on all spheres of Government. The proposed Middelpunt Solar PV is therefore supported by the related policy and planning documents reviewed in this section of the report.

4 THE NEED AND DESIRABILITY

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include – (f) a motivation for the need and desirability of the activity in the context of the preferred location.

4.1 THE NEED FOR THE PROPOSED ACTIVITY

The proposed activity is a direct result of the growing demand for electricity and the need for renewable energy in South Africa. According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand, fuelled by increasing economic growth and social development, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmentally responsible development, the impacts of climate change and the need for sustainable development.

Over 90% of South Africa's electricity generation is coal based, the World bank estimates that this results in an annual, per capita carbon emission of ~8.9 tons per person. Based on 2008 fossil-fuel CO_2 emissions statistics released by the Carbon Dioxide Information Analysis Centre, South Africa is the 13th largest carbon dioxide emitting country in the world and the largest emitter in Africa (Boden, et al. 2011). In August 2021 an article confirmed that South Africa is the 12th highest greenhouse gas emitter in the world (source: https://www.news24.com/fin24/economy/eskom-will-only-able-to-meet-global-air-quality-standards-by-2050-owing-to-financial-woes-20210818).

The proposed project is intended to form part of the Department of Mineral Resources and Energy's (DMREs) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or any other appropriate energy generation programmes/opportunities. The REIPPP Programme aims to secure 14 725 Megawatts (MW) of new generation capacity from renewable energy sources, while simultaneously diversifying South Africa's electricity mix. According to the 2021 State of the Nation Address, Government will soon be initiating the procurement of an additional 11 800 MW of power from renewable energy, natural gas, battery storage and coal in line with the Integrated Resource Plan 2019 and fulfilling their commitments under the United Nations Framework Convention on Climate Change and its Paris Agreement which include the reduction of greenhouse gas emissions. Eskom, the largest greenhouse gas emitter of South Africa, has committed in principle to net zero emission by 2050 and to increase its renewable capacity.

During the 2022 State of the Nation Address it was indicated that during the past year the government had taken "firm steps" to bring additional generation capacity online as quickly as possible to close the shortfall in terms of electricity. As a result, it was confirmed that several new generation projects will be coming online over the next few years. During the recent 2023 State of the Nation Address, the government has embarked upon allowing private developers to generate electricity. There are now more than 100 projects, which are expected to provide over 9 000 MW of new capacity over time. A number of companies that have participated in the renewable energy programme will soon enter construction and deliver a total of 2 800 MW of new capacity. Through the Just Energy Transition Investment Plan, R1.5 trillion will be invested in our economy over the next five years in new frontiers such as renewable energy, green hydrogen and electric vehicles. A number of projects are already underway, including the development of a new facility by Sasol at Boegoebaai in the Northern Cape,

the Prieska Power Reserve in the Free State, and the Hydrogen Valley initiative in Limpopo, Gauteng and KwaZulu-Natal.

Besides capacity additions, several assumptions have changed since the promulgation of IRP 2010–2030. Key assumptions that changed include the electricity demand projection, Eskom's existing plant performance, as well as new technology costs. These changes necessitated the review and update of the IRP which resulted in the draft IRP 2018 that was made available for comment and updated to the draft IRP 2019 as per table 4.1 below:

Table 4.1: Published Draft IRP 2019 (Approved by Cabinet for Consultation)

	Coal	Coal (Decommissioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	Gas & Diesel	Other (Distributed Generation, CoGen, Biomass, Landfill)
Current Base	37 149		1 860	2 100	2 912	1 474	1 980	300	3 830	499
2019	2 155	-2373					244	300		Allocation to the extent of the short term capacity and energy gap.
2020	1 433	-557				114	300			
2021	1 433	-1403				300	818			
2022	711	-844			513	400 1000	1600			
2023	750	-555				1000	1600			500
2024			1860				1600		1000	500
2025						1000	1600			500
2026		-1219					1600			500
2027	750	-847					1 600		2000	500
2028		-475				1000	1 600			500
2029		-1694			1575	1000	1 600			500
2030		-1050		2 500		1 000	1 600			500
TOTAL INSTALLED CAPACITY by 2030 (MW)	33364		1860	4600	5000	8288	17742	600	6380	
% Total Installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52	22.53	0.76	8.1	
% Annual Energy Contribution (% of MWh)	58.8		4.5	8.4	1.2*	6.3	17.8	0.6	1.3	

Installed Capacity
Committed / Already Contracted Capacity
Capacity Decommissioned
New Additional Capacity
Extension of Koeberg Plant Design Life
Includes Distributed Generation Capacity for own use

According to the South African Energy Sector Overview (2021), there is currently 1 723 MW of installed PV capacity, while an additional 2 600 MW and 860 MW from wind and solar has been rewarded as part of Bid window 5 and 6, respectively (latter announced in 2022).

4.2 THE DESIRABILITY OF THE PROPOSED ACTIVITY

The facility's contribution towards sustainable development and the associated benefits to society in general is discussed below:

- Lesser dependence on fossil fuel generated power - The deployment of the facility will have a positive macro-economic impact by reducing South Africa's dependence on fossil fuel generated power and assisting the country in meeting its growing electricity demand.

- Increased surety of supply - By diversifying the sources of power in the country, the surety of supply will increase. The power demands of South Africa are ever increasing and by adding solar power this demand can be met, even exceeded without increasing pollution in relation to the use of fossil fuels. The project has the potential of "securing" economic activity by assisting in removing supply constraints if Eskom generation activities result in a supply shortfall. When supply is constrained, it represents a limitation to economic growth. When a supply reserve is available, it represents an opportunity for economic growth.
- Local economic growth - The proposed project will contribute to local economic growth by supporting industry development in line with provincial and regional goals and ensuring advanced skills are drawn to the Free State Province. The project will likely encounter widespread support from government, civil society and businesses, all of whom see potential opportunities for revenues, employment and business opportunities locally. The development of the solar PV facility will in turn lead to growth in tax revenues for local municipalities and sales of carbon credits, resulting in increased foreign direct investment. The location of the proposed development within the Matjhabeng Local Municipality is desirable since the overall municipal unemployment rate was found to be 21.2% (Matjhabeng IDP, 2023/2024).
- Lower costs of alternative energy - An increase in the number of solar facilities commissioned will eventually reduce the cost of the power generated through solar facilities. This will contribute to the country's objective of utilising more renewable energy and less fossil fuel-based power sources. It will assist in achieving the goal to generate 14 725 MW of electricity from renewable energy as per the Renewable Energy Independent Power Producer Procurement (REIPPP) Programme of the Department of Mineral Resources and Energy. The Government will be initiating the procurement of an additional 11 800 MW of renewable energy as stated during the 2021 State of the Nation Address.
- Reduction in greenhouse gas emissions - The additional power supplied through solar energy will reduce the reliance on the combustion of fossil fuels to produce power. The South African electricity grid is predominantly coal-fired and therefore GHG emissions intensive (coal accounts for more than 92% of the fuel used in South Africa's electricity generation). The reduction of GHG emissions as a result of the project implementation will be achieved due to reduction of CO_2 emissions from combustion of fossil fuel at the existing grid-connected PV facilities and plants which would likely be built in the absence of the project activity.
- CDM Project - A solar energy facility also qualifies as a Clean Development Mechanism (CDM) project (i.e., a financial mechanism developed to encourage the development of renewable technologies).
- Climate change mitigation - On a global scale, the project contributes to greenhouse gas emission reduction and therefore contributes toward climate change mitigation.
- Reduced environmental impacts - The reduction in non-renewable electricity consumed from the grid will not only result in a reduction in greenhouse gas emissions, but also the prevention of negative impacts associated with coal mining. For example, coal power requires high volumes of water, in areas of South Africa where water supply is already over-stretched and water availability is highly variable. Photovoltaic solar energy technology also does not produce the sulphur emissions, ash or coal mining concerns associated with conventional coal

fired electricity generation technologies resulting in a relatively low level of environmental impacts. It is a clean technology which contributes toward a better-quality environment for employees and nearby communities.

- Social benefits - The project activity is likely to have significant long-term, indirect positive social impacts that may extend to a regional and even national scale. The larger scale impacts are to be derived in the utilization of solar power and the experience gained through the construction and operation of the PV facility. In future, this experience can be employed at other similar solar installations in South Africa.
- Provision of job opportunities - The main benefit of the proposed development operating in the area is that local companies or contractors will be hired for the duration of the construction period. The operational phase will provide permanent job opportunities to the local communities from the surrounding area since security guards and general labourers will be required on a full-time basis. Approximately 300 employment opportunities will be created during the construction phase and up to 25 permanent employment opportunities during the operational phase.
- Indirect socio-economic benefits - The increase in the demand for services such as accommodation, transportation, security, general maintenance and catering will generate additional indirect socio-economic benefits for the local community members.
- Effective use of resources – The predominant land use of the site is limited to grazing and some crop fields. The proposed development in this specific area will generate alternative land use income through rental for the proposed energy facility, which will have a positive impact on agriculture. It will provide the farming enterprise with increased cash flow and rural livelihood, and thereby improve the financial sustainability of agricultural activities.
- Increased access to electricity: Despite the abundant availability of coal, electricity generation and the development of related infrastructure has been inadequate in providing access to electricity for entire population of approximately 60 million people. South Africa has been described as a country with an energy-deprived population with more than 1.5 million households comprising approximately 5 million people that are without electricity. The national electricity crises of 2010 and the resultant effects on South African residents and the economy has highlighted how highly reliant we are on electricity as a source of energy. Government has committed to developing measures to promote energy saving, reduce energy costs to the economy, and reduce the negative impact of energy use on the environment.
- Cumulative impacts of low to medium significance – Limited cumulative impacts with a high residual risk have been identified. In terms of the desirability of the development of sources of renewable energy therefore, it may be preferable to incur a higher cumulative loss in such a region as this one, than to lose land with a higher environmental value elsewhere in the country.

5 DESCRIPTION OF ENVIRONMENTAL ISSUES

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include-

(h) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including –

(i) details of all the alternatives considered;

(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;

(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.

(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

(ix) the outcome of the site selection matrix;

(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and

(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;

5.1 CONSIDERATION OF ALTERNATIVES

The DEAT 2006 guidelines on 'assessment of alternatives and impacts' proposes the consideration of four types of alternatives namely, the no-go, location, activity, and design alternatives. It is, however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. It also recognizes that the consideration of alternatives is an iterative process of feedback between the developer and EAP, which in some instances culminates in a single preferred project proposal. An initial site screening was conducted by the developer the affected properties and the farm portions were found favorable due to its proximity to grid connections, solar radiation, ecology and relative flat terrain. These factors were then taken into consideration and avoided as far as possible.

The following alternatives were considered in relation to the proposed activity and all specialists should also make mention of these:

<u>No-go alternative</u>

This alternative considers the option of 'do nothing' and maintaining the status quo. The site is currently zoned for agricultural land uses. Should the proposed activity not proceed, the site will remain unchanged and will continue to be used for agricultural purposes. The potential opportunity costs in terms of alternative land use income through rental for energy facility and the supporting social and economic development in the area would be lost if the status quo persist.

Location alternatives

No other possible sites were identified on the Farm Vredesverdrag No. 427 and Farm Middelpunt No. 769. This site is referred to as the preferred site. The Everest Substation is located approximately 11 km from the preferred site. Connection to the grid plays a vital role in the site location for renewable energy facilities. The location of the preferred site shortens the length of the required grid connection in order to evacuate energy into the national grid. There are some limited sensitive features that occur on the site. However, the size of the site makes provision for the exclusion of any sensitive environmental features that may arise through the EIA process and will ensure that potential impacts are adequately mitigated – refer to Figure 5.1 for the assessment area.

Battery storage facility

It is proposed that a Battery Storage Facility for grid storage would be housed in stacked containers, or multi-storey building, with a maximum height of 5m with associated operational, safety and control infrastructure. Three types of battery technologies are being considered for the proposed project: Lithium-ion, Sodium-sulphur or Vanadium Redox flow battery. The preferred battery technology is Lithium-ion.

Battery storage offers a wide range of advantages to South Africa including renewable energy time shift, renewable capacity firming, electricity supply reliability and quality improvement, voltage regulation, electricity reserve capacity improvement, transmission congestion relief, load following and time of use energy cost management. In essence, this technology allows renewable energy to enter the base load and peak power generation market and therefore can compete directly with fossil fuel sources of power generation and offer a truly sustainable electricity supply option.

Design and layout alternatives

Design alternatives will be considered throughout the planning and design phase and specialist studies are expected to inform the final layout of the proposed development.

Technology alternatives

There are several types of semiconductor technologies currently available and in use for PV solar panels. Two, however, have become the most widely adopted, namely crystalline silicon (Mono-facial and Bi-facial) and thin film. The technology that (at this stage) proves more feasible and reasonable with respect to the proposed solar facility is crystalline silicon panels, due to it being non-reflective, more efficient, and with a higher durability. However, due to the rapid technological advances being made in the field of solar technology the exact type of technology to be used, such as bifacial panels, will only be confirmed at the onset of the project.

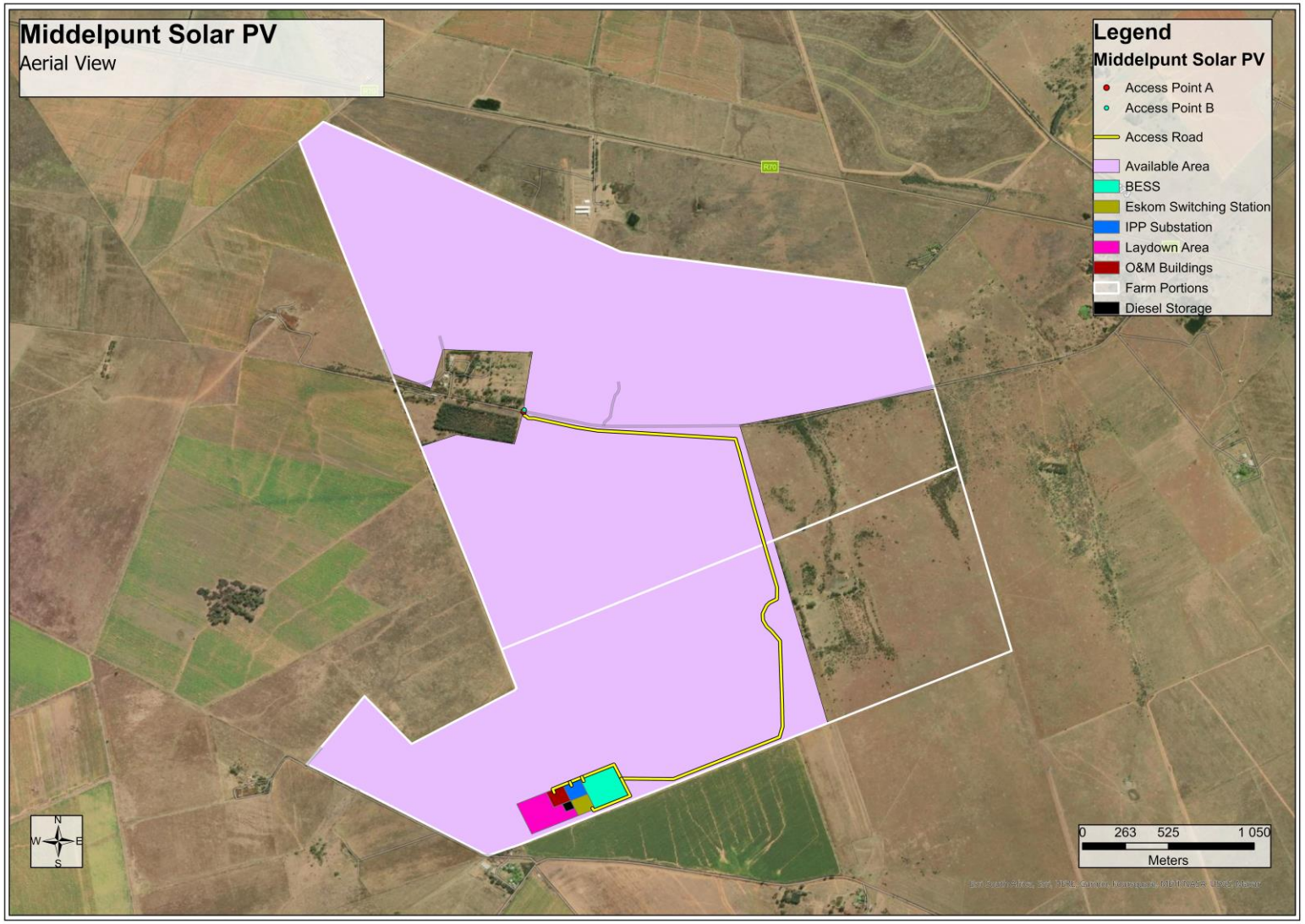


Figure 5. 1: Location of the single preferred assessment area or location alternative

5.1.1 Activity Alternatives

The scoping process also needs to consider if the development of a solar PV facility would be the most appropriate land use for the particular site.

- Photovoltaic (PV) solar facility – Middelpunt Solar PV (Pty) Ltd is part of a portfolio of solar PV projects throughout South Africa.
- Wind energy facility - Due to the local climatic conditions a wind energy facility is not considered suitable as the area does not have the required wind resource. Furthermore, the applicant has opted for the generation of electricity via solar power rather than the use of wind turbines based on the renewable energy resource available for the area. This alternative is therefore regarded as not feasible and will not be evaluated further in this report.
- Concentrated solar power (CSP) technology - CSP technology requires large volumes of water, and this is a major constraint for this type of technology considering the water challenges and limitation experienced not only in the country but also within the local area. While the irradiation values are high enough to generate sufficient solar power (refer to Figure 5.2), the water constraints render this alternative not feasible. It must also be noted that the IRP no longer includes the use of CSP as part of the energy mix of the county. Therefore, this alternative will not be considered further in this report.

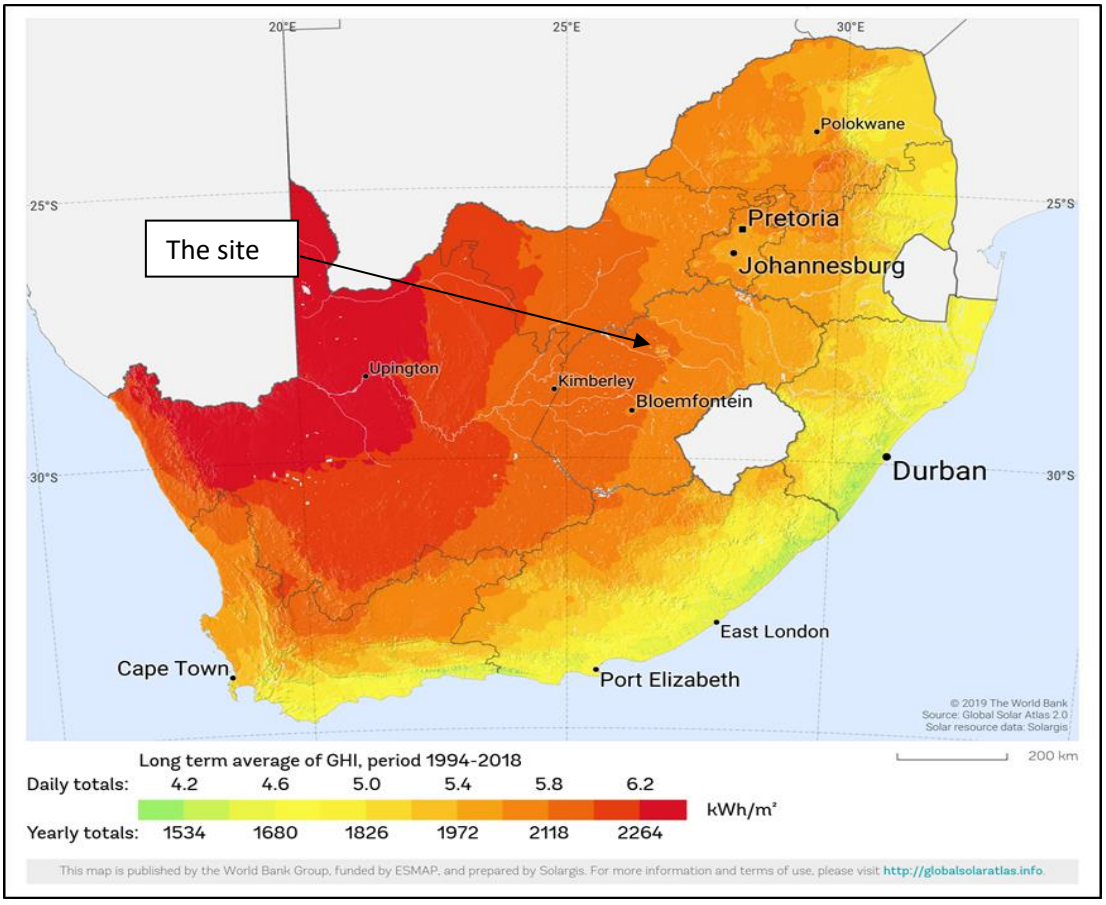


Figure 5. 2: Global horizontal irradiation values for South Africa (Solar GIS, 2021) and the Middelpunt Solar PV development footprint

5.1.2 Design and Layout Alternatives

Design alternatives were considered throughout the planning and design phase (i.e., what would be the best design option for the development?). In this regard discussions on the design were held between the EAP and the developer, which also included the consideration of the technical constraints as a part of the Draft Scoping Report. The draft layout plan is included as Figure C and in Figure 5.3 below, but it should be noted that the final layout plan will be submitted as part of the EIA Report.

The draft layout considers technical constraints as a part of this scoping process. The limitations of the site and aspects such as environmental sensitive areas (supported by specialist input), areas under cultivation, roads, fencing and servitudes will be further considered and investigated during the detailed EIA phase. The total surface area proposed for layout options include the PV panel arrays spaced to avoid shadowing, access and maintenance roads and associated infrastructure (buildings, power inverters, power lines, BESS and perimeter fences). With regards to the structure orientation, the panels will either be fixed to a single-axis horizontal tracking structure where the orientation of the panel varies according to the time of the day, as the sun moves from east to west or tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun.

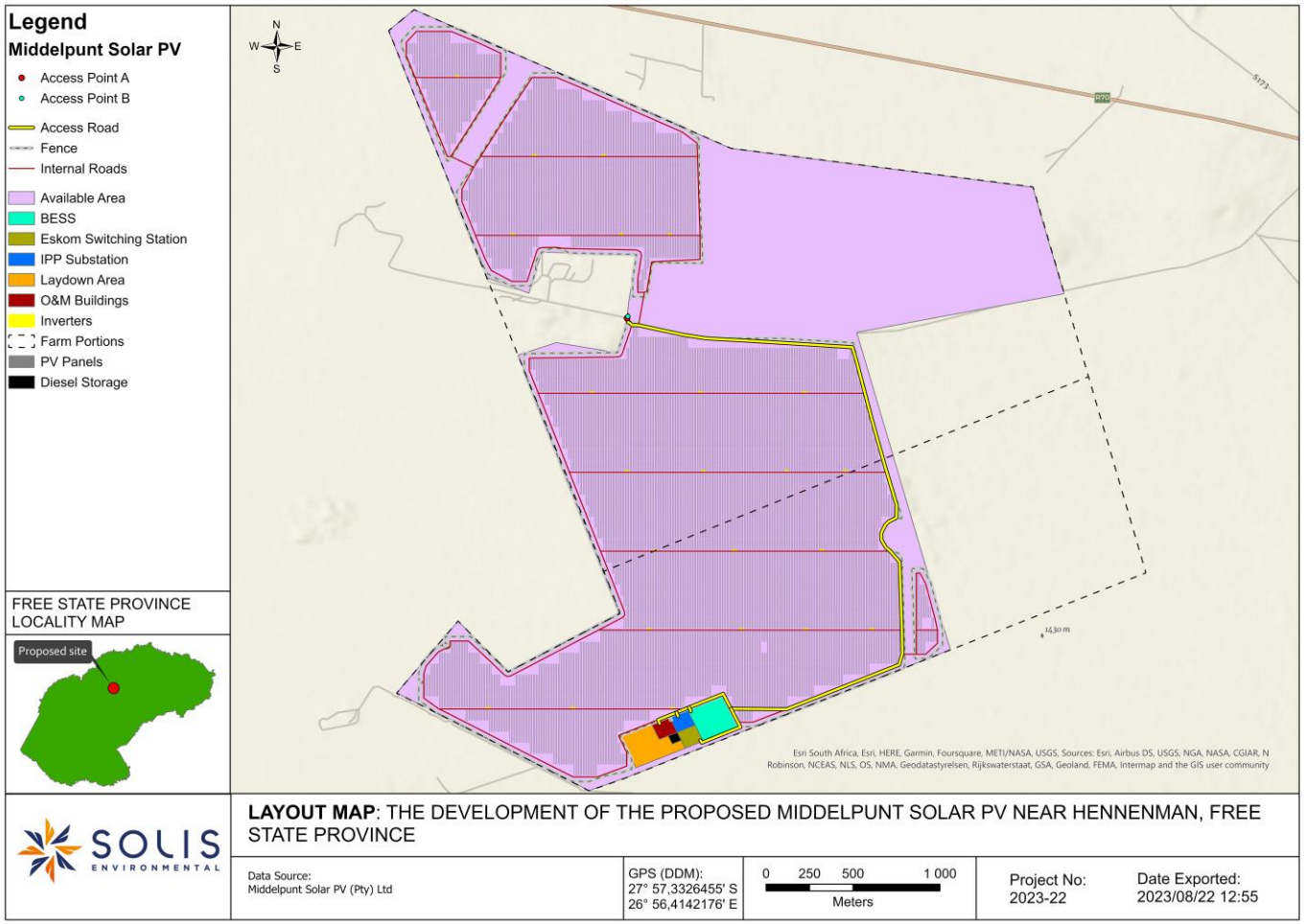


Figure 5. 3: Draft layout plan for the Middelpunt Solar PV

Note: It is customary to develop the final/detailed construction layout of the solar PV facility only once an Independent Power Producer (IPP) is awarded a successful bid under the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). An alternative programme, or in a private off-take process, after which major contracts are negotiated and final equipment suppliers identified. For the purpose of the Environmental Impact Assessment (EIA), site layout alternatives will not be comparatively assessed, but rather a single layout will be refined as additional information becomes available throughout the EIA process (e.g., specialist input, additional site surveys, ongoing stakeholder engagement).

The development area presented in the Scoping Report has been selected as a practicable option for the facility, considering technical preference and constraints, as well as initial No-Go layers informed by specialist site surveys. Following further site screening by the specialists (scheduled to take place during the EIA phase), the development footprint will be finalised for impact assessment.

5.1.3 Technology Alternatives

Battery Energy Storage Facility (BESS):

It is proposed that a Battery Storage Facility for grid storage would be housed in stacked containers, or multi-storey building, with a maximum height of 5m with associated operational, safety and control infrastructure. Three types of battery technologies are being considered for the proposed project: Lithium-ion, Sodium-sulphur or Vanadium Redox flow battery. The preferred battery technology is Lithium-ion.

Battery storage offers a wide range of advantages to South Africa including renewable energy time shift, renewable capacity firming, electricity supply reliability and quality improvement, voltage regulation, electricity reserve capacity improvement, transmission congestion relief, load following and time of use energy cost management. In essence, this technology allows renewable energy to enter the base load and peak power generation market and therefore can compete directly with fossil fuel sources of power generation and offer a truly sustainable electricity supply option.

PV Panels:

With regards to the structure orientation, the panels will either be fixed to a single-axis horizontal tracking structure where the orientation of the panel varies according to the time of the day, as the sun moves from east to west or tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun.

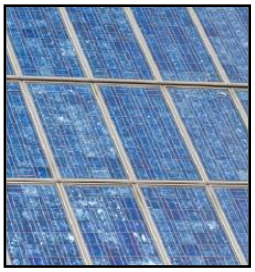
There are several types of semiconductor technologies currently available and in use for PV solar panels. Two, however, have become the most widely adopted, namely crystalline silicon and thin film. These technologies are discussed in more detail below:

- Crystalline (high efficiency technology at higher cost):

  Crystalline silicon panels are constructed by first putting a single slice of silicon through a series of processing steps, creating one solar cell. These cells are then assembled together in multiples to make a solar panel. Crystalline silicon, also called wafer silicon, is the oldest and the most widely used material in commercial solar panels. Crystalline silicon modules

represent 85-90% of the global annual market today. There are two main types of crystalline silicon panels that can be considered for the solar facility:

- Mono-crystalline Silicon - mono-crystalline (also called single crystal) panels use solar cells that are cut from a piece of silicon grown from a single, uniform crystal. Mono-crystalline panels are among the most efficient yet most expensive on the market. They require the highest purity silicon and have the most involved manufacturing process.



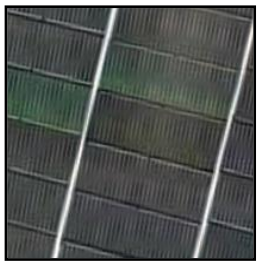
- Poly-crystalline Silicon – poly-crystalline panels use solar cells that are cut from multifaceted silicon crystals. They are less uniform in appearance than mono-crystalline cells, resembling pieces of shattered glass. These are the most common solar panels on the market, being less expensive than mono-crystalline silicon. They are also less efficient, though the performance gap has begun to close in recent years (First Solar, 2011).

- <u>Thin film (low-cost technology with lower efficiency):</u>

Thin film solar panels are made by placing thin layers of semiconductor material onto various surfaces, usually on glass. The term *thin film* refers to the amount of semiconductor material used. It is applied in a thin film to a surface structure, such as a sheet of glass. Contrary to popular belief, most thin film panels are not flexible. Overall, thin film solar panels offer the lowest manufacturing costs, and are becoming more prevalent in the industry. Thin films currently account for 10-15% of global PV module sales. There are three main types of thin film used:

- Cadmium Telluride (CdTe) - CdTe is a semiconductor compound formed from cadmium and tellurium. CdTe solar panels are manufactured on glass. They are the most common type of thin film solar panel on the market and the most cost-effective to manufacture. CdTe panels perform significantly better in high temperatures and in low-light conditions.

- Amorphous Silicon - Amorphous silicon is the non-crystalline form of silicon and was the first thin film material to yield a commercial product, first used in consumer items such as calculators. It can be deposited in thin layers onto a variety of surfaces and offers lower costs than traditional crystalline silicon, though it is less efficient at converting sunlight into electricity.



- Copper, Indium, Gallium, Selenide (CIGS) - CIGS is a compound semiconductor that can be deposited onto many different materials. CIGS has only recently become available for small commercial applications, and is considered a developing PV technology (First Solar, 2011).

- Bifacial panels:

As the name suggests, bifacial solar panels have two faces, or rather, they can absorb light from both sides of the panel. A lot of potential energy transfer is lost in traditional solar cells when the light hits the back of a solar panel. Most bifacial solar panels use monocrystalline cells, whereas traditional cells use polycrystalline materials. The monocrystalline materials, alongside the clear light pathway on both sides of the panel, enable the light to be absorbed from either side of the cell, and it is thought that the overall efficiency of these cells can be up to 30% greater in commercial applications. Although, the exact amount is variable depending on the surface that they are installed on. The front side of the solar panel still absorbs most of the solar light, but the back side of the solar panel can absorb between 5-90% of the light absorbed by the front of the solar panel. Refer to Figure 5.4 for an illustration of Bifacial versus Monoficial Solar Panel absorption.

Traditional solar panels use an opaque back sheet. By comparison, bifacial solar panels either have a clear/reflective back sheet or have dual panes of glass. Most of these solar panels are frameless so any issues with potential-induced degradation (PID) are reduced. To efficiently convert light into electricity from both sides, bifacial solar cells have selective-area metallization schemes that enable light to pass between the metallized areas, rather than the conventional thick metal collectors as seen with monofacial solar panels.

The technology that (at this stage) proves to be most feasible and reasonable with respect to the proposed solar facility is crystalline silicon panels, due to it being non-reflective, more efficient, and with a higher durability. However, due to the rapid technological advances being made in the field of solar technology the exact type of technology to be used, such as bifacial panels, will only be confirmed at the onset of the project.

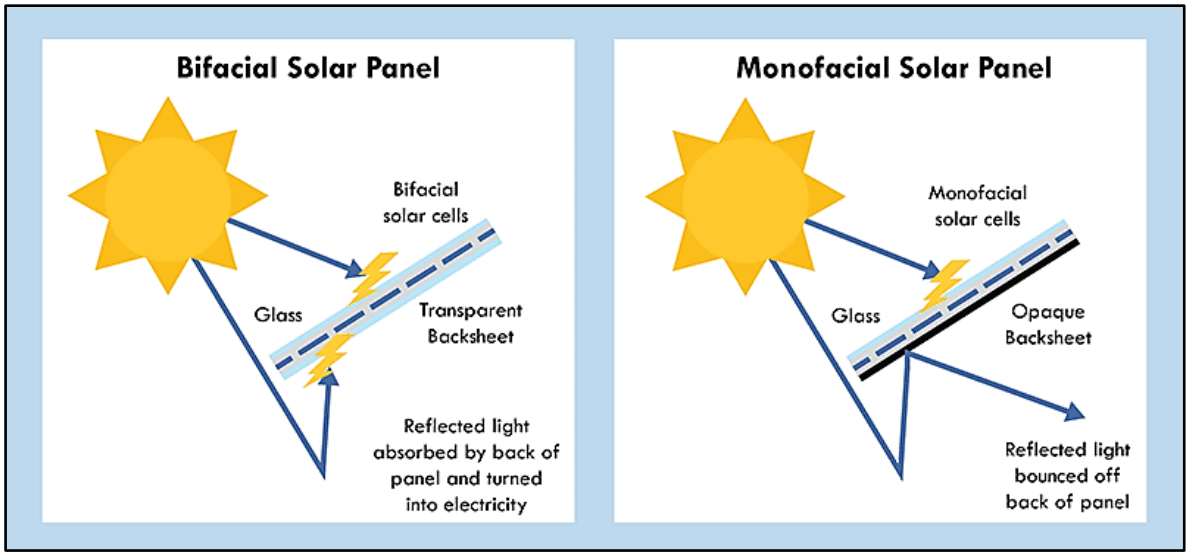


Figure 5. 4: Bifacial vs Monoficial Solar Panel absorption.

PUBLIC PARTICIPATION PROCESS

The following sections provide detailed information on the public participation process conducted in terms of Regulations 39 to 44.

5.1.4 General

The following three categories of variables were taken into account when deciding the required level of public participation:

- The scale of anticipated impacts;
- The sensitivity of the affected environment and the degree of controversy of the project; and
- The characteristics of the potentially affected parties.

Since the scale of anticipated impacts is low, the general land use of the area is related to mining and agriculture, the limited environmental sensitivity of the site and the fact that no conflict was foreseen between potentially affected parties, no additional public participation mechanisms are considered at this stage of the process. The following actions have already been undertaken:

- Site notices
  Site notices (size 60cm x 42cm) were placed on site in Sesotho, Afrikaans and English on 8 June 2023 to inform surrounding communities and immediately adjacent landowners of the proposed development and the commencement of the S&EIR process. I&APs were given the opportunity to raise comments by 10 July 2023. Photographic evidence of the site notices is included in Appendix C2.

- Newspaper advertisement
  An advertisement was placed in English in the Vista Local Newspaper on 8 June 2023 (see Appendix C1) notifying the public of the S&EIR process and the proposed application for Environmental Authorisation. The advertisement invited Interested and Affected Parties (I&APs) to register on the project I&AP database and submit any comments to Solis-Environmental Environmental Consultants. I&APs were given the opportunity to raise comments within 30 days

of the advertisement (i.e., up until 10 July 2023). Since the proposed development is unlikely to result in any impacts that extend beyond the municipal area where it is located, it was deemed sufficient to advertise in a local newspaper.

- Background Information Document (BID)
  The release of a BID providing information on the proposed development, the Scoping process and inviting Interested and Affected Parties (I&APs) to register on the project's I&AP database was sent to the identified I&APs, including the adjacent landowners, key stakeholders and relevant organs of state on 14 June 2023.

- Direct notification of identified I&APs
  Identified I&APs, including key stakeholders representing various sectors, were directly informed of the EIA process on 8 June 2023 via registered post, telephone calls, WhatsApp's and emails (as relevant). The BID was distributed with the notification. For a complete list of I&APs with their contact details see Appendix C3 to this report. It was expected from I&APs to provide their inputs and comments by 14 July 2023.

- Direct notification of surrounding landowners and occupiers
  Written notices were also provided via registered post, WhatsApp or email (as relevant) to all surrounding landowners and occupiers on 14 June 2023. The surrounding landowners were given the opportunity to raise comments within 30 days. For a list of surrounding landowners see Appendix C3.

- Circulation of Draft Scoping Report
  Copies of the draft Scoping report were provided to all I&APs via courier, Dropbox and/or email (as relevant). Hard copies of the report were made available on request and where an I&AP did not have the resources to view the report on an online platform. I&AP's and organs of state were requested to provide their comments on the report by 24 August 2023. The comments were documented and compiled into a Comments and Response Report to be included as part of the Final Scoping Report for decision-making.

5.1.5 Consultation Process

Regulation 41 requires that the landowner, surrounding landowners, municipality, relevant ward councillor, any organ of state having jurisdiction in respect of any aspect of the activity should be given written notice of the activity. A complete list of all the consultees who received written notice as well as proof of correspondence is attached as Appendices C4 and C5. Refer to Figure 5.5 for the location of the surrounding landowners.

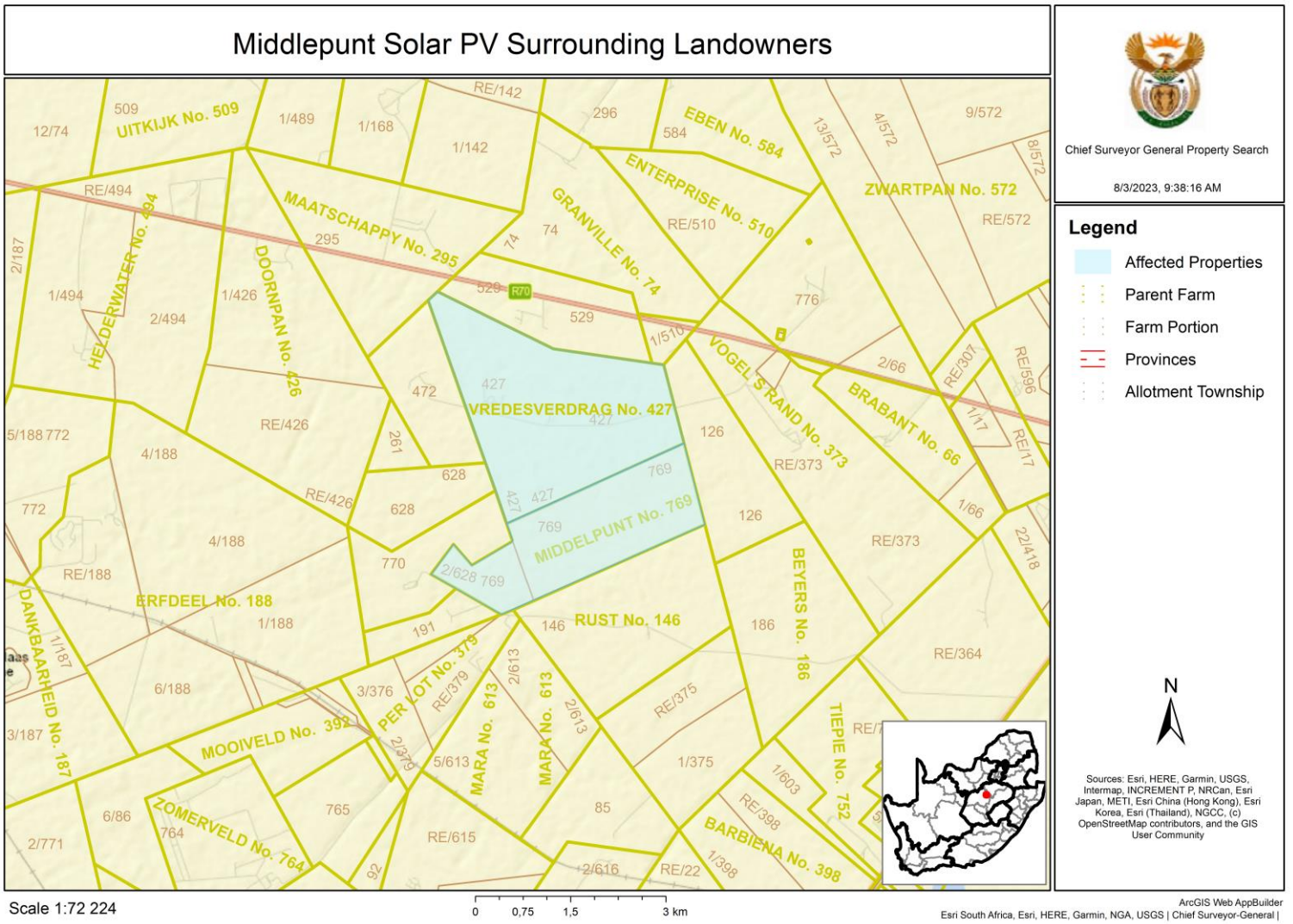


Figure 5. 5: Affected properties (Blue) in relation to surrounding landowners

5.1.6 Registered I&APs

I&APs include all stakeholders who deem themselves affected by the proposed activity. According to Regulation 43(1) "*A registered interested and affected party is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application*."

This report is the Draft Scoping Report which was made available to all potential and/or registered I&APs and State Departments. They were provided with a copy of the Draft Scoping Report and were requested to provide written comments on the report within 30 days. All issues identified during the review period was documented and compiled into a Comments and Response Report to be included as part of the Final Scoping report.

All comments received prior to the release of the Draft Scoping Report for the 30-day review and comment period have been included in this report as Appendix C4, Appendix C5 and Appendix C6 to provide I&APs an opportunity to confirm that their comments raised during the initial public participation phase had been included and considered as part of the EIA process.

5.1.7 Issues Raised by I&APs and Consultation Bodies

To date no comments were received, any comments received during the circulation of the draft Scoping Report will be summarised in the final Scoping Report. The full wording and original correspondence will be included in Appendix C5.

5.2 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PREFERRED ALTERNATIVE

The following sections provide general information on the biophysical and socio-economic attributes associated with the preferred alternative (i.e., the location of the development footprint within the affected property).

5.2.1 Biophysical Environment

The biophysical environment is described with specific reference to geology, soils, agricultural potential, vegetation and landscape features, climate, biodiversity, heritage features (in terms of archaeology and palaeontology), the visual landscape and the social environment to be affected. A number of specialists were consulted to assist with the compilation of this chapter of the report – refer to Table 1.1.

The area surrounding the proposed Middelpunt Solar PV is characterised mostly by agricultural development which varies from cultivated fields (sunflowers and maize) to grazing fields.

5.2.1.1 Agricultural Potential

A Site Sensitivity Verification and Agricultural Compliance Statement (attached as Appendix E1) was undertaken for the Middelpunt Solar PV Project site. The report addresses the agricultural production potential of the project site.

According to Lanz (2023) the agricultural sensitivity is a direct function of the capability of the land for agricultural production. The different categories of agricultural sensitivity indicate the priority by which land should be conserved as agricultural production land. The agricultural sensitivity of the site, as given by the web-based environmental screening tool (DFFE, 2023), is shown in Figure 5.6. The screening tool classifies agricultural sensitivity according to only two independent criteria, both of which are indicators of the land's agricultural production potential:

1. whether the land is classified as cropland or not, and
2. its land capability rating

Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rain-fed agricultural production. It is rated by the Department of Agriculture's updated and refined, country-wide land capability mapping, released in 2016. The higher land capability values (≥8 to 15) are likely to be suitable as arable land for crop production, while lower values (<8) are only likely to be suitable as non-arable grazing land. The direct relationship between land capability rating and agricultural sensitivity is shown in Table 5.1 below.

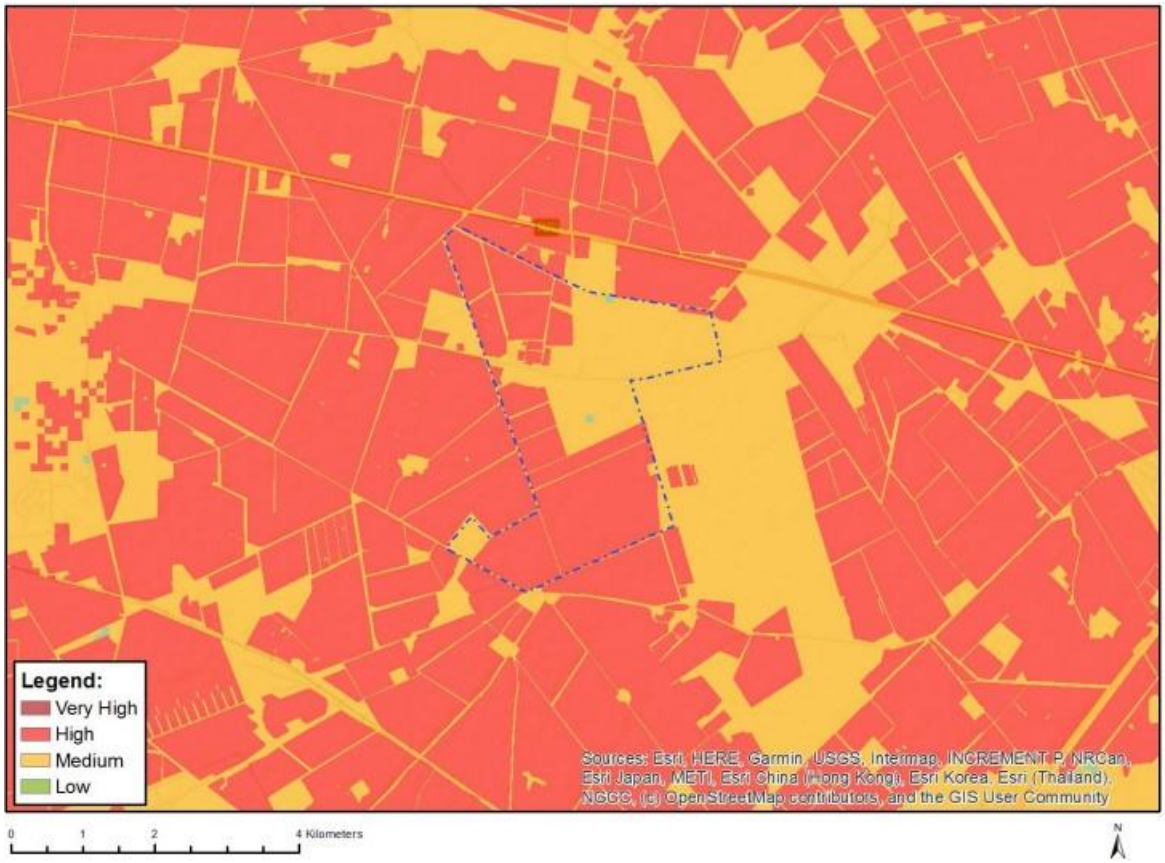


Figure 5. 6: Agricultural Sensitivity (DFFE, 2023)

Table 5.1: Relationship between land capability and agricultural sensitivity as given by the screening tool

Land capability value	Agricultural sensitivity
1 - 5	low
6 - 8	medium
9 - 10	high
11 - 15	very high

The site falls within an area that is classified as a Protected Agricultural Area. A Protected Agricultural Area is a demarcated area in which the climate, terrain, and soil are generally conducive for agricultural production and which, historically, has made important contributions to the production of the various crops that are grown across South Africa. Within Protected Agricultural Areas, the protection, particularly of arable land, is considered a priority for the protection of food security in South Africa. However, according to Lanz (2023) the proposed project site is not considered a high sensitivity site, as per the screening tool but rather a site with moderate sensitivity. The reasoning is

because the cropping potential of the site is limited by the combination of climate (fairly low rainfall) and soil constraints. The soils on site are predominantly constrained by limited depth, but also by limited drainage and susceptibility to erosion of the sandy material overlying the clay. The limited depth, in combination with the low rainfall, provides an insufficient moisture reservoir to carry a crop through the season, other than in years with exceptionally good rainfall. Although rain-fed cropping has been done on parts of the site in the past, it is no longer economically viable on the site. The limited agricultural potential of the site limits its viable agricultural use to grazing only.

5.2.1.2 Terrestrial Biodiversity

An impact assessment (attached as Appendix E2) was undertaken for the proposed project which discusses the vegetation, topography as well as the landscape features identified within the project area. The Middelpunt Solar PV is situated within the Vaal-Vet Sandy Grassland Bioregion. The topography is mainly flat to rolling, but also includes mountainous regions and the Escarpment (Mucina & Rutherford, 2006). The Vaal-Vet Sandy Grassland is considered Endangered but unfortunately approximately 63% of this bioregion has been transformed primarily for cultivation of commercial crops, only 0.3% is statutorily conserved in the Bloemhof Dam, Schoonspruit, Sandveld, Faan Meintjies, Wolwespruit and Soetdoring Nature Reserves, the remaining percentage is used for grazing. The dominant vegetation type in this area is the grass species *Themeda triandra* which is associated with grazing fields. The herb, *Lessertia phillipsiana*, is endemic to the area. Refer to Figure 5.7 below.

Ecosystem Threat Status

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. According to the spatial dataset the proposed project site overlaps an EN ecosystem as per Figure 5.8 below.

Ecosystem Protection Level

This is an indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The proposed PAOI overlaps with a NP ecosystem as per Figure 5.9 below.

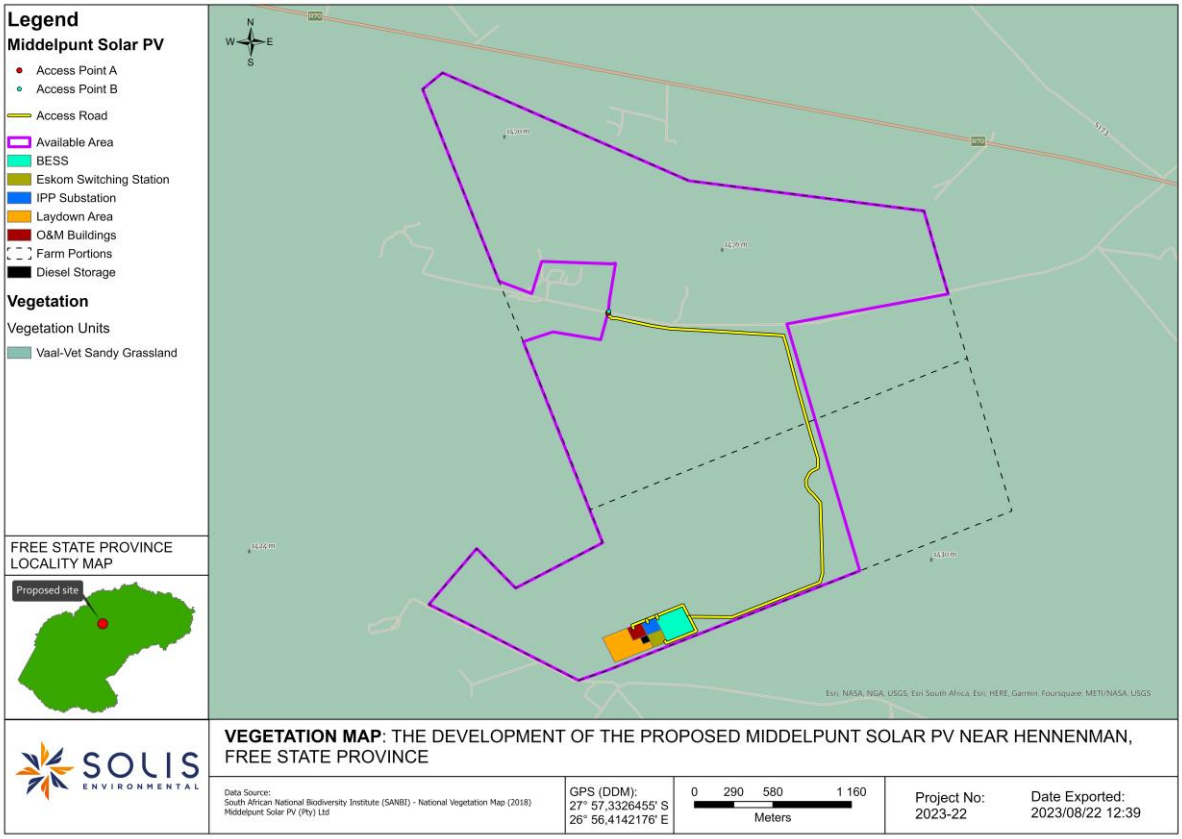


Figure 5. 7: Map illustrating the vegetation types associated with the Middelpunt Solar PV Solar PV.

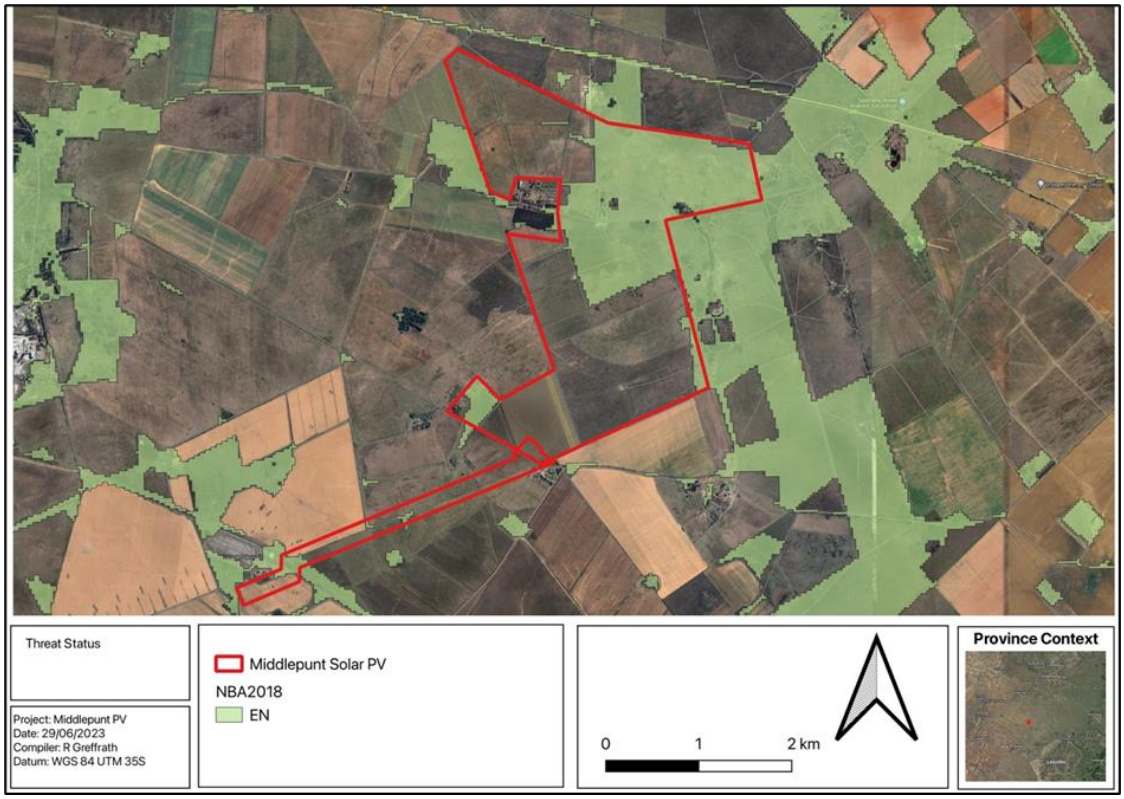


Figure 5. 8: Map illustrating the ecosystem threat status associated with the Middelpunt Solar PV Project

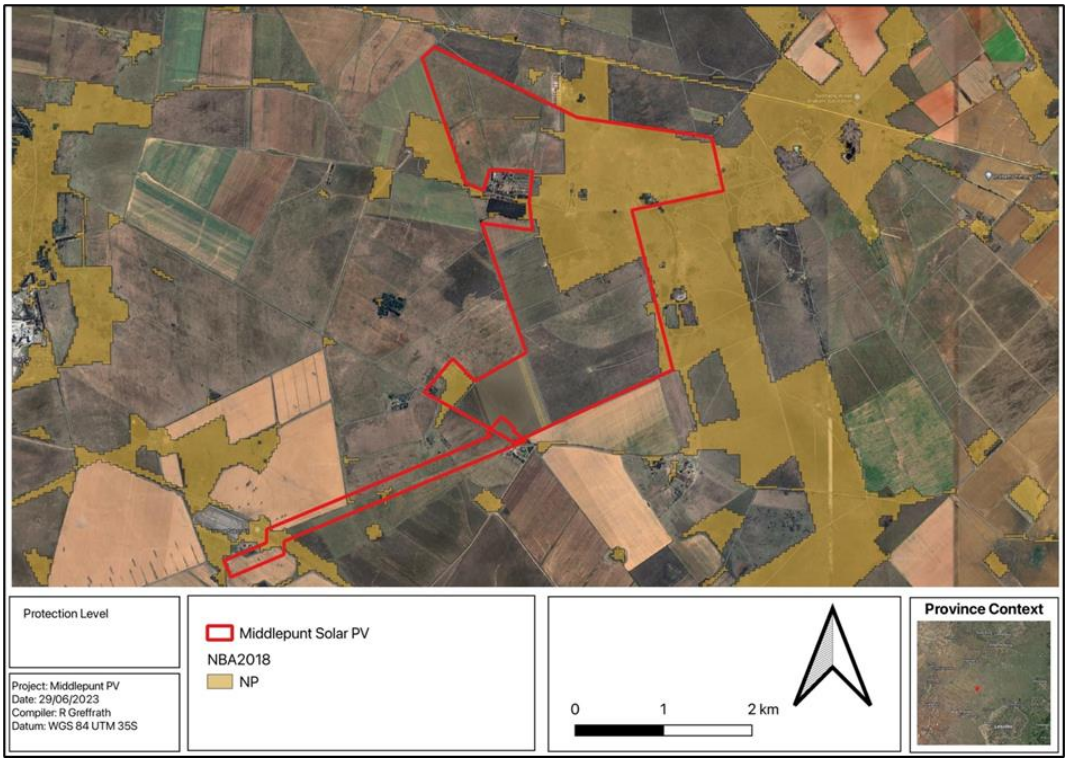


Figure 5. 9: Map illustrating the ecosystem protection level associated with the Middelpunt Solar PV Project

Protected Areas, Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA)

The Free State Province Biodiversity Plan classifies areas within the province on the basis of their contributions to reaching the associated conservation targets within the province. These areas are primarily classified as either Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs). These biodiversity priority areas, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species, as well as the long-term ecological functioning of the landscape as a whole.

- CBAs are areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and healthy functioning of important species and ecosystems and the delivery of ecosystem services. Thus, if these areas are not maintained in a natural or near natural state then provincial biodiversity targets cannot be met (SANBI, 2017).
- ESAs are areas that are not essential for meeting biodiversity representation targets but play an important role in supporting the ecological functioning of ecosystems as well as adjacent Critical Biodiversity Areas, and/or in delivering ecosystem services that support socio-economic development (SANBI, 2017).

Provincial CBAs and ESAs are often further classified into sub-categories, such as CBA1 and CBA2 or ESA1 and ESA2. These present fine scale habitat and biodiversity area baseline requirements and associated land management objectives or outcomes. The highest categorisation level is often referred to as a CBA1 'Irreplaceable Critical Biodiversity Area' which usually represents pristine natural habitat that is very important for conservation. Figure D shows the project area superimposed on the conservation plan. The project area overlaps with areas predominantly classified as Irreplaceable Critical Biodiversity Area, Other Natural Areas and Degraded Areas.

The South Africa Protected Areas Database (SAPAD) contains spatial data pertinent to the conservation of South African biodiversity. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection. SAPAD is updated on a continuous basis and forms the basis for the Register of Protected Areas, which is a legislative requirement under the National Environmental Management: Protected Areas Act, Act 57 of 2003. According to the protected area spatial datasets from SAPAD (2023) and SACAD (2023), the project area occurs within 5 km of a protected area as per Figure E below.

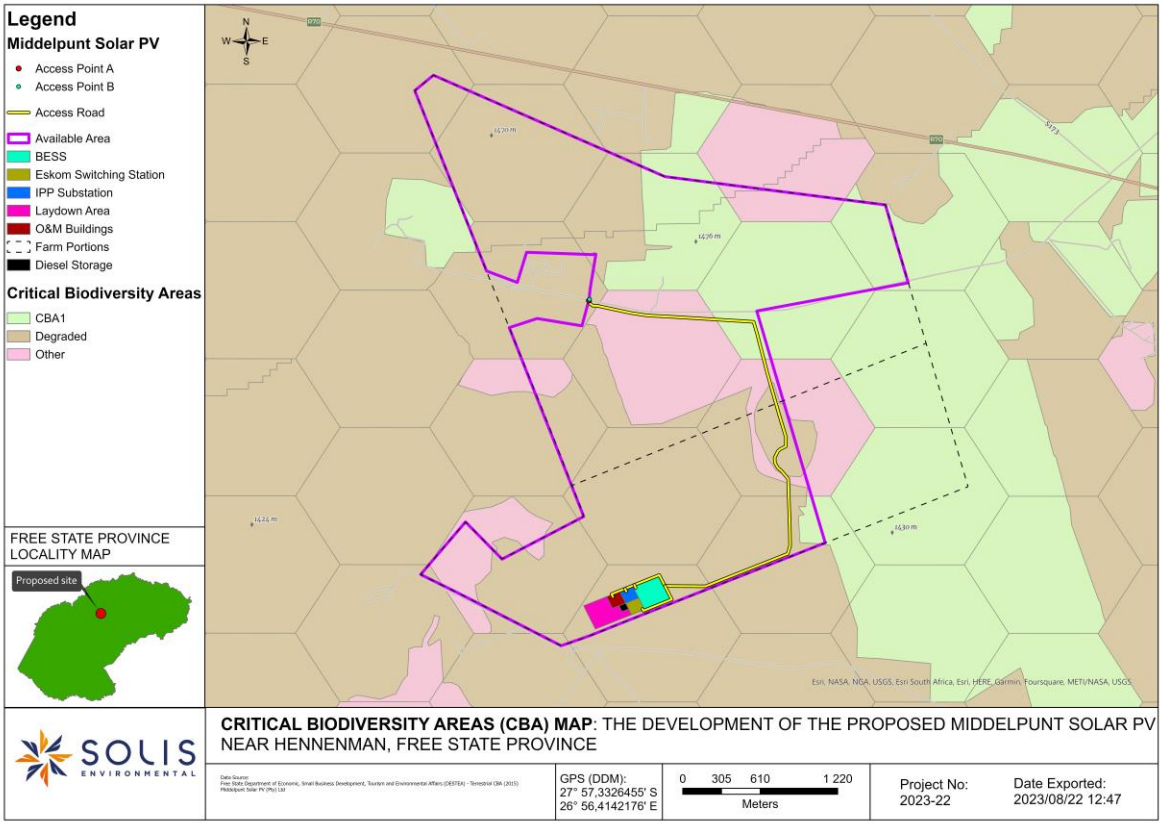


Figure D: Map illustrating the ecosystem protection level associated with the Middelpunt Solar PV Project

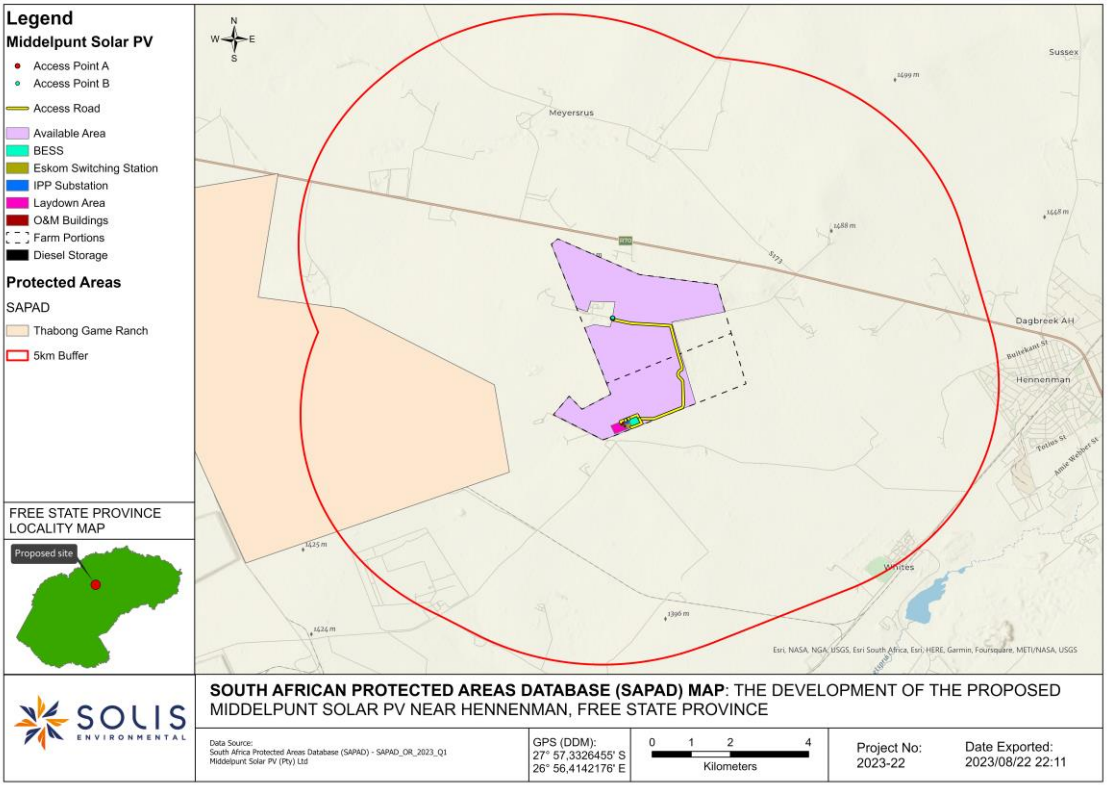


Figure E: Map illustrating protected areas that are located within 5km of Middelpunt Solar PV

National Protected Area Expansion Strategy

National Protected Areas Expansion Strategy (NPAES) provides spatial information on areas that are suitable for terrestrial ecosystem protection. These focus areas are large, intact and unfragmented and therefore, of high importance for biodiversity, climate resilience and freshwater protection.

National Protected Area Expansion Strategy 2018 (NPAES) areas were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with a strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for fine scale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2018). The project area does not overlap with NPAES areas. However it is worth noting that the Middelpunt Solar PV does fall within 5km of NPAES PA (Protected Areas) Negotiated Focus Areas 2018.

Flora Assessment

Five main vegetation habitat units were identified in the project area, Secondary Grassland A, Secondary Grassland B, Rocky Outcrops/Ridges, Woodland Savannah, Agricultural/Transformed/Pastures Vegetation, refer to Figure 5.10.

<u>The Secondary Grassland A:</u>

The Secondary Grassland A areas have been impacted by historic grazing and to certain degree mismanagement, certain portions are being utilised as a game camp for wild game. This area are not entirely transformed but in a constant disturbed state, as the vegetation cannot recover to a more natural state due to ongoing disturbances and impacts received from grazing from cattle and edge effects from the adjacent land use. Although the habitat units are not entirely transformed, ongoing and historic disturbances have resulted in the plant community no longer being fully representative of the reference vegetation.

The main ecological characteristics of these grasslands include (SANBI, 2013):

- Climate; with warm, wet summers and cold winters, that results in a longer growing season and higher grassland productivity, producing tall and heavy plants;
- Grasslands that are used to fire, and this is the most important ecosystem process that can be managed to maintain biodiversity and productivity in these ecosystems.
- Grazing, if moderately stocked, these grasslands are well adapted to manage the pressure;
- Life-history strategies; due to the environmental conditions, the plants persist mainly through being long-lived, sporadically replacing themselves through seeds or vegetative reproduction;
- Geology; The underlying geology correlates to high levels of plant species richness and endemism.

The secondary grassland B:

areas represented grassy plains in terrestrial areas with a species assemblage that was typical of impacted vegetation. The most prominent disturbances observed during the field visit include overgrazing, with certain areas representative of fallow fields that have returned to a poor form of grassland. Fire will also play a role in the landscape, fire in grasslands is a natural phenomenon, being responsible for maintaining a grassland landscape, however frequent burning results in a variety of grassland species, (forbs, bulbs ad grasses) being excluded from the environment due to unsuitable conditions that have been created. When habitat is overutilized, certain species will increase in abundance, whilst others will decrease. The site experiences frequent overgrazing from cattle. Plant diversity in this habitat was generally poor, primarily due to the current land use. Erosion susceptibility was high therefore, as well as the general dominance of invasive species such as Themeda triandra (Red Grass).

Rocky Outcrops/Ridges:

Ridges as biodiversity hotspots and future refuges - Varied topography is recognised as one of the most important influences contributing to the high biodiversity of southern Africa. The interplay between topography and climate over a long period of time has led to the evolution of a rich biodiversity (Samways & Hatton, 2000). Landscapes composed of spatially heterogeneous abiotic conditions provide a greater diversity of potential niches for plants and animals than do homogeneous landscapes. The richness and diversity of flora has been found to be significantly higher in sites with high geomorphological heterogeneity and it can reasonably be assumed that associated faunal communities will also be significantly more diverse in spatially heterogeneous environments (Burnett et al., 1998). Ridges are characterised by high spatial heterogeneity due to the range of differing aspects (north, south, east, west and variations thereof), slopes and altitudes all resulting in differing soil (e.g. depth, moisture, temperature, drainage, nutrient content), light and hydrological conditions.

The rocky outcrops were limited to the higher lying areas central to the secondary grassland A. These exposed rocky areas were found to harbour a variety of epilithic (growing on the surface of rock) plant species that are characteristic of rocky habitats. Floral growth forms such as herbs, sedges and reeds were all represented. Trees were absent with the exception of shrubs that prefer this habitat type. Grasses were found on the periphery of the rocky outcrops and these most often were grassland species pioneer subclimax and climax species were found in equal numbers.

The habitat sensitivity of the rocky outcrops is regarded as high, due to floral and faunal species recorded as well as the role of this intact habitat to biodiversity within a very fragmented local landscape.

Observed plants including woody plants: Blue Bush (*Diospyros lycoides*) and an understorey layer comprised of grasses: mostly Common Thatching Grass (*Hyparrhenia hirta*), Red Grass (*Themeda triandra*) and Common Turpentine Grass (*Cymbopogon excavatus*).

Woodland Savannah:

In lower lying areas a more open Savanna bushveld associated with *Vachellia karoo-Asparagus africanus* woodland on deeper sands of the plateaus were encountered. These areas were accessible to livestock and farming activities and suffered as a result from excessive grazing ad trampling. The

sandy areas were found to be impacted on by agricultural practices as well as grazing by livestock. Variations within this habitat type was mainly due to severity of land use impacts, with areas cleared of vegetation being a transformation to a grassland plans habitat type

Agricultural/Transformed/Pastures

Transformed areas represents all totally transformed areas in the study area, which mainly includes currently and old cultivated lands, major road infrastructure, and farm homesteads. Other than small, fragmented pockets, individual trees and some areas where natural vegetation has spontaneously rehabilitated, no natural vegetation remains in in this vegetation type. Most lands are currently cultivated with a monoculture of summer grain crops such as maize (Zea mays), others have been planted with perennial grazing crops such as Common Finger Grass (*Digitaria eriatntha*) or Weeping Love Grass (*Eragrostis curvula*), or a combination of fodder crops. Farmyards and homesteads generally have a high variety of plant species and unfortunately exotics plants, many of them declared weeds or invaders, dominate these areas. Tall exotic trees such as *Eucalyptus camaldulensis*, species, *Melia azedarach*, *Populus deltoides, Schinus molle*, and many more, are common in these areas. Likewise, in the case of herbaceous vegetation many exotics also occur in a variety of dominance that differ from one area to the next, which makes it difficult to describe from a floristic point of view. This vegetation type scored a very low sensitivity rating.

The vegetation habitat types also had Invasive Alien Plant (IAPs) species. These IAPs tend to dominate or replace indigenous flora, thereby transforming the structure, composition and functioning of ecosystems. During the site inspection thirteen (13) IAP species were recorded within the PAOI. These species are listed under the Alien and Invasive Species List 2020, Government Gazette No. GN1003 as Category 1b, Category 2 and Not Indigenous (Exotic) respectively. There are eight (8) species that must be controlled by implementing an IAP Management Programme, in compliance of Section 75 of the NEMBA, refer to the specialist report (Appendix E2) for the list of species.

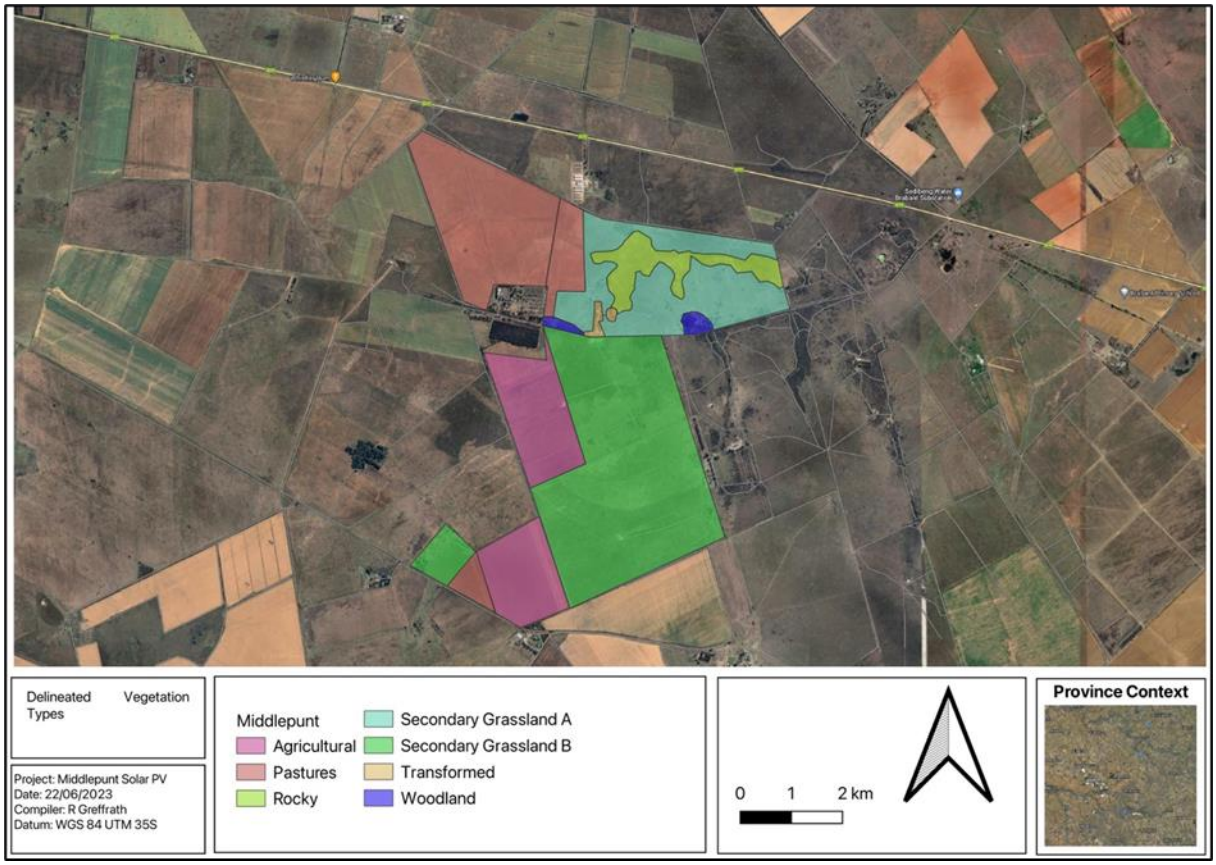


Figure 5. 10: Map illustrating the vegetation habitat types within the Middelpunt Solar PV Project area

Faunal Assessment

According to the field assessment conducted by the Biodiversity Company (2023), there are two (2) species of reptile and no amphibian species within the Middelpunt Solar PV project area, refer to Table 5.2 below. However, there is a possibility of more species being present, as certain reptile species are secretive and require long-term surveys to ensure capture. One of the reptile species found on site, *Smaug giganteus,* is classified as vulnerable under the IUCN Red Listing Criteria.

Table 5.2: List of reptiles found on the Middelpunt Solar PV Project area

Family	Scientific Name	Common Name	Conservation Status	
			Regional	Global
		Reptiles		
Cordylidae	*Smaug giganteus*	Sungazer/Giant Girdled Lizard	**Protected,**	**VU, App.2**
Gekkonidae	*Lygodactylus capensis*	Common Dwarf Gecko	LC	Unlisted

There are policy measures that have been put into place to protect the *Smaug giganteus*. These measures include the international protection under CITES Appendix 2 and the national protection through TOPS (Threatened or Protected Species). There is also research being done by different research institutions and NGOs on how to better protect and manage this species.

The species environmental guidelines SANBI (2020) indicate that specific directives contained within a Biodiversity Management Plan (BMP) must take precedence as mitigation measures. According to

the guidelines, SANBI (2020), there is a BMP currently in development for the IUCN VU Sungazer (*Smaug giganteus*) that specifically states that: 'Destruction of intact habitat with extant Sungazer populations is not permitted'. Therefore, avoidance mitigation and not minimisation mitigation would be applicable in such a case. Additionally, the protocols advise a minimum buffer of 250 meters, to up to 400 m buffer to be applied around the periphery of Sungazer colonies. There are no mitigation measures that can described in this report that will reduce the significance of the risk to an acceptable level for this species, and hence no impact significance rating will be conducted. The development within the buffer area is considered 'No-Go".

During the field investigation four (4) mammal species were recorded within the Middelpunt Solar PV project area, refer to Table 5.3 below.

Table 5.3: List of mammal species found on the Middelpunt Solar PV Project area

Family	Scientific Name	Common Name	Conservation Status	
			Regional	Global
Bovidae	*Sylvicapra grimmia*	Common duiker	LC	LC
Canidae	*Lupulella mesomelas*	Black-backed jackal	LC	LC
Hystricidae	*Hystrix africaeaustralis*	Cape Porcupine	LC	LC
Leporidae	*Lepus saxatilis*	Scrub Hare	LC	LC

Site Ecological Importance (SEI)

Based on the assessment and field investigation, seven (7) main terrestrial habitat types were delineated within the PAOI. All habitats within the assessment area of the proposed project were allocated a sensitivity category. The sensitivities of the habitat types delineated are illustrated in Figure 5.11. The project area comprises transformed areas and areas of indigenous vegetation. It supports several indigenous fauna and flora species, including Species of Conservation Concern (SCC). A High Sensitivity value was given to Rocky Areas and the Secondary Grassland A, with a moderate sensitivity for the Secondary Grassland B/Woodland and low sensitivity for the Agricultural Areas, Pastures, Transformed fields.

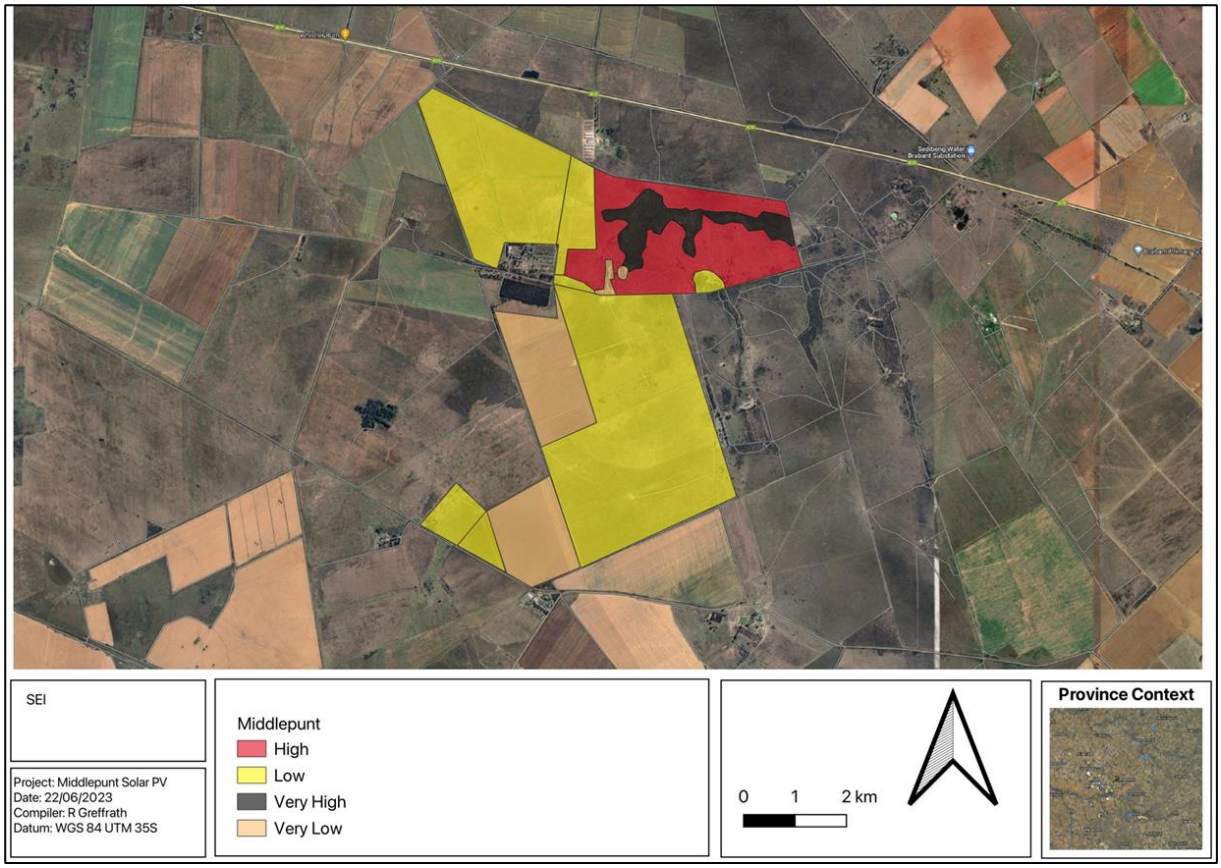


Figure 5. 11: Map illustrating the ecological sensitivity of the Middelpunt Solar PV Project area

Completion of the terrestrial biodiversity assessment led to partially disputing of the 'Very High' classification for the terrestrial biodiversity theme sensitivity as allocated by the National Environmental Screening Tool. The rocky outcrops portion of the classification is in agreement, however a sensitivity of 'Very Low' for all transformed areas, and only secondary grassland A, sensitivity of 'High', primarily due to the presence of reptile SCC. refer to Table 5.4 below.

Table 5.4: Summary of the screening tool vs the specialist's assigned sensitivity

Screening Tool Theme	Screening Tool	Specialist	Tool Validated or Disputed by Specialist - Reasoning
Animal Theme	**Medium**	**Very High**	Disputed – Habitat is disturbed and secondary in nature, however SCC were recorded.
Plant Theme	**Low**	**Low**	Confirmed – Habitat is disturbed and secondary in nature. No SCC were recorded, nor expected.
Terrestrial Theme	**Very High**	**High**	Confirmed –EN ecosystem, Very High habitat present and disturbed CBA 1 present.

Terrestrial Biodiversity Assessment

According to the Biodiversity Company (2023) the ecological integrity, importance and functioning of the High sensitive areas play a crucial role as a water resource system and an important habitat for various fauna and flora. The preservation of these habitats is the most important aspect to consider for the proposed project and must therefore be protected.

When considering the possible impacts the Middelpunt Solar PV Project will have on the terrestrial biodiversity, the following main impacts are expected, refer to Table 5.5 below for a more detailed list of the proposed impacts:

- Destruction, fragmentation and degradation of habitats and ecosystems;
- Spread and/or establishment of alien and/or invasive species;
- Direct mortality of fauna;
- Reduced dispersal/migration of fauna;
- Environmental pollution due to water runoff, spills from vehicles and erosion;
- Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust, heat radiation and light pollution; and
- Staff and others interacting directly with fauna (potentially dangerous) or poaching of animals

The possible impacts and implication to the project will be discussed in detail during the Environmental Impact Assessment Phase of the project.

5.2.1.3 Wetlands and Riparian Features

A South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was established during the National Biodiversity Assessment of 2018. It is a collection of data layers that represent the extent of the river and inland wetland ecosystem types as well as pressures on these systems. Strategic Water Source Areas (SWSAs) are defined as areas of land that supply a quantity of mean annual surface water runoff in relation to their size and therefore, contribute considerably to the overall water supply of the country. These are key ecological infrastructure assets and the effective protection of surface water SWSAs is vital for national security because a lack of water security will compromise national security and human wellbeing. National Freshwater Ecosystem Priority Area (NFEPA) database provides strategic spatial priorities for conserving the country's freshwater ecosystems and associated biodiversity as well as supporting sustainable use of water resources.

The Ecosystem Threat Status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), or Least Concern (LC), with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer et al., 2019; Skowno et al., 2019).

A Baseline and Impact Assessment report (attached as Appendix E3) was undertaken by The Biodiversity Company (2023) for the proposed Middelpunt Solar PV Project area. According to The Biodiversity Company (2023) the delineated project area comprises of three (3) wetland types, namely two seepages, three wetland flats and one depression, refer to Figure F for the illustration of the wetlands. Only the depression wetland was within the confines of the project boundary itself, however The Biodiversity Company noted that it was not identified to be a wetland during the field surveys. The depression wetland was classified to have a "C – Moderately Modified" condition. The eastern wetland flats, together with the seepage wetlands are known to be dams as per the Inland Water Areas dataset and were classified to have "Z3 – Critically Modified" conditions. The western wetland flat was classified to have a "Z1 – Extensively Modified" condition.

The topographical inland and river line data for “2726” quarter degree was used to identify potential wetland areas within the project area. This data set indicates two inland water areas located in the PAOI, which were classified as dams, and one feature within the southwestern project area which was classified as a non-perennial pan. Furthermore, three non-perennial drainage features were identified within the northeastern project boundary. Refer to Figure G for the topographic river line and wetlands located in the project area map.

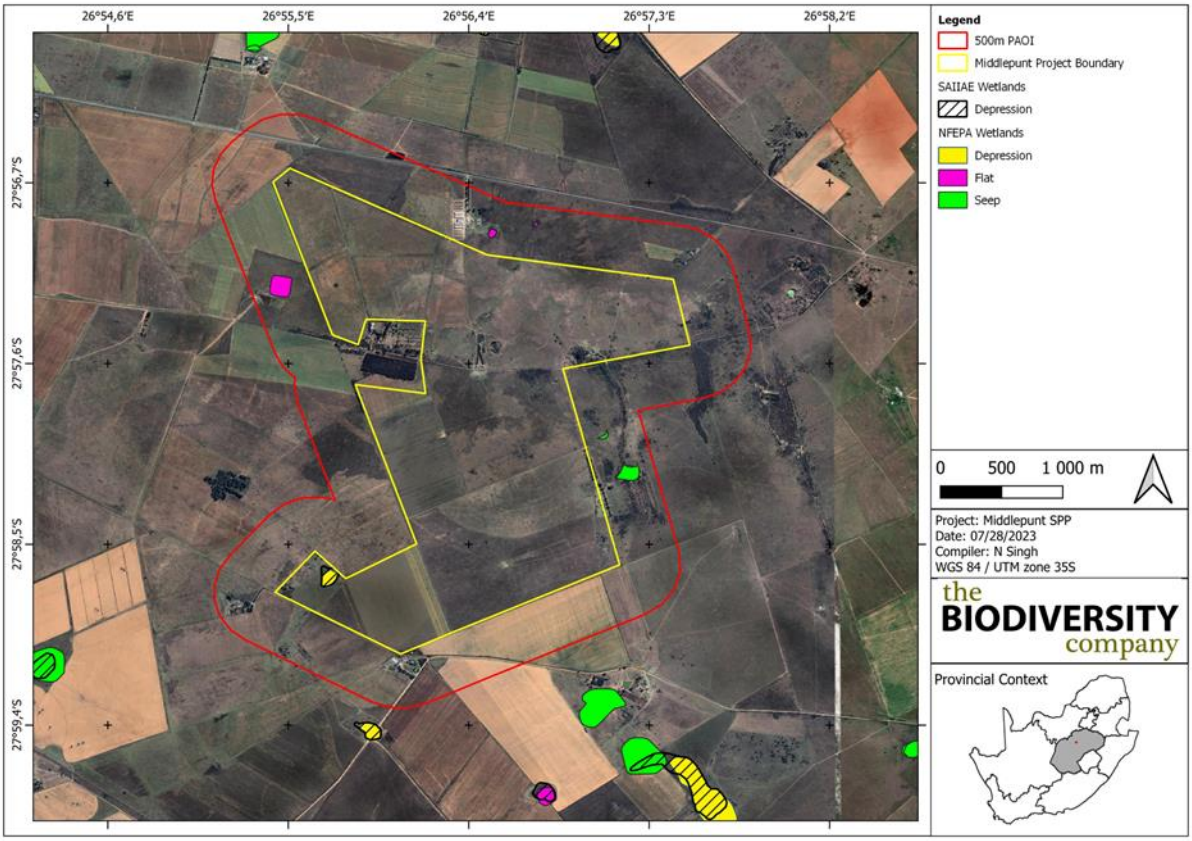


Figure F: Map illustrating the SAIIAE and NFEPA wetlands located within the Middelpunt Solar PV area

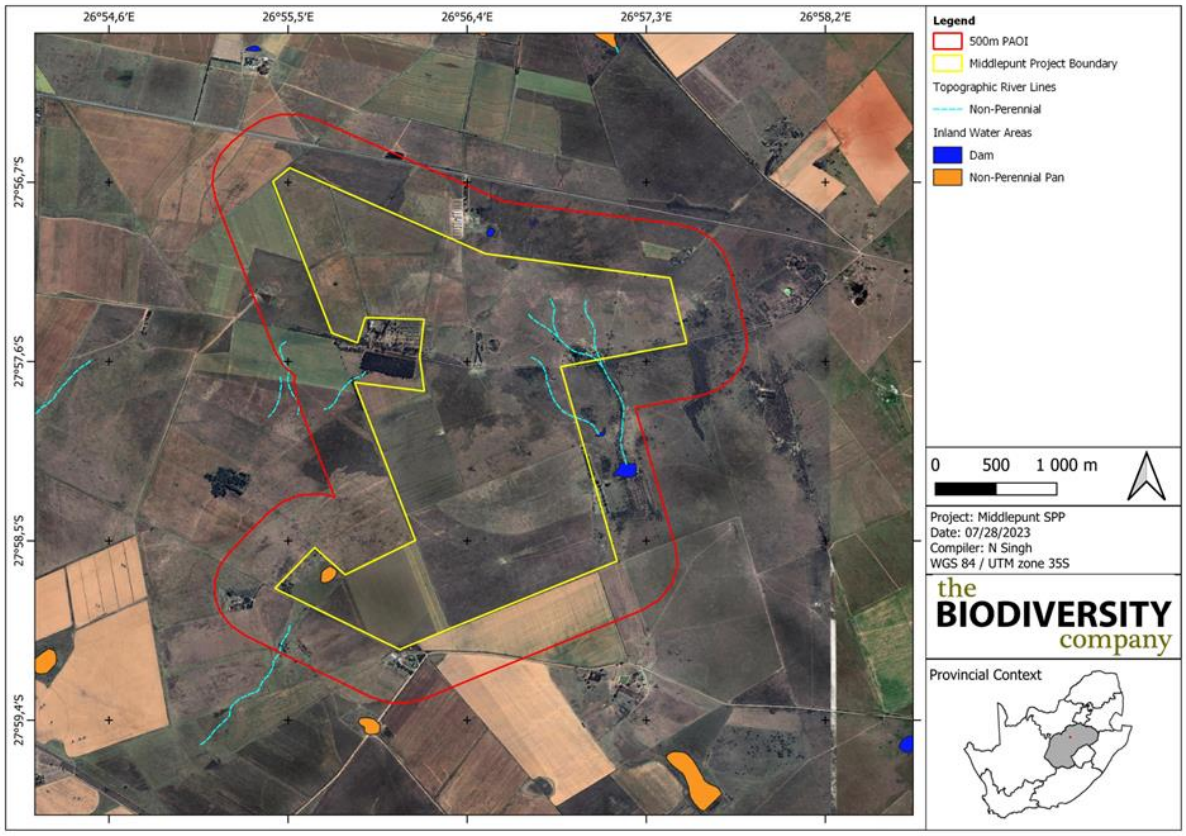


Figure G: Topographic River Line and wetlands located in the Middelpunt Solar PV area

Wetland Impact Assessment

A key consideration for the scoping level impact assessment is the presence of the water resources located in proximity to the project area. The available data suggests the presence of several wetlands within the project area, with several drainage lines also expected for the area. A Zone of Regulation (ZoR) of 500m is applicable for any wetland system that is present beyond the project boundary. According to the field investigation undertaken by The Biodiversity Company there are two (2) hydrogeomorphic (HGM) units within the project area (including the 500m ZoR), refer to Figure 5.12 below, HGM 9 consists of one depression wetland and HGM 10 consist of a one seepage wetland. The HGM units as well as the impacts and implication to the project will be discussed in detail during the

Environmental Impact Assessment Phase of the project. Anticipated impacts on wetlands are summarised in Table 5.6 below.

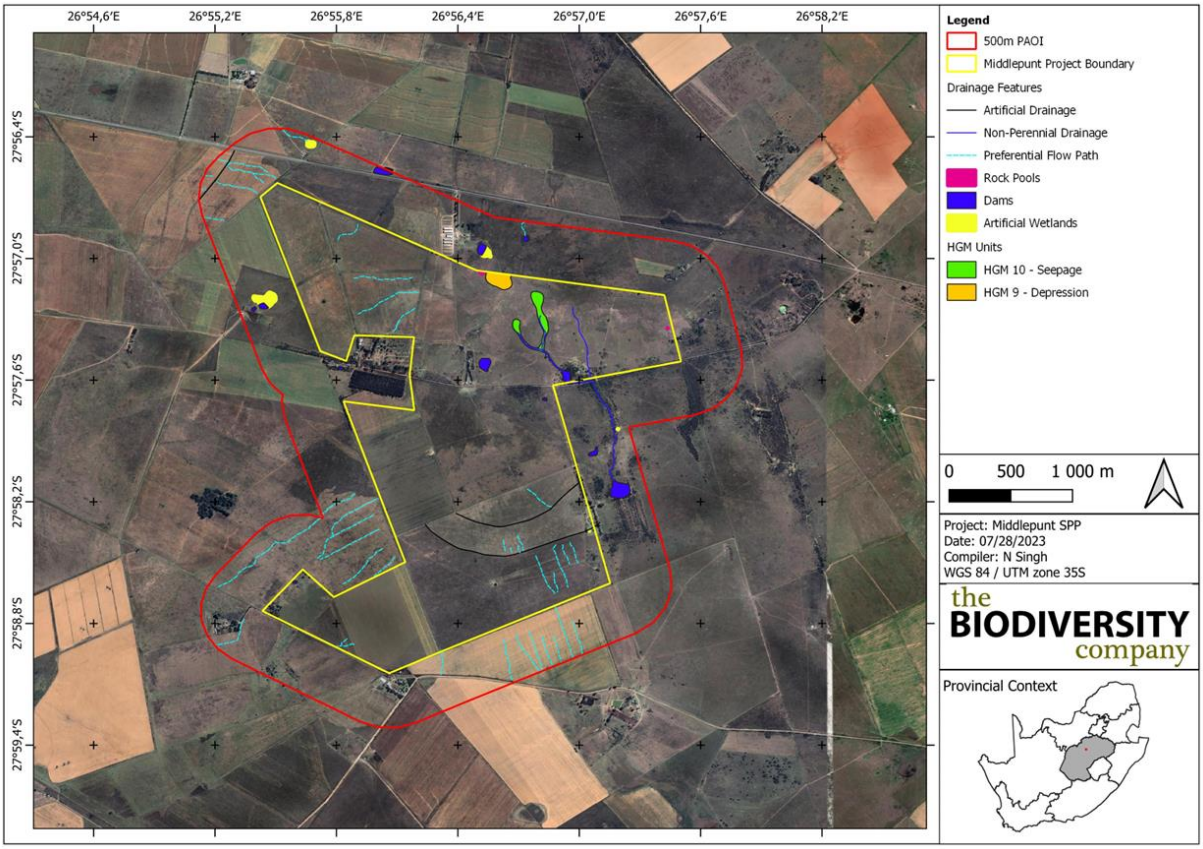


Figure 5. 12: Delineation and location of the different wet areas within the Middelpunt Solar PV Project area

Table 5.5: Scoping evaluation table summarising the impacts identified to wetlands

Impact **Wetland disturbance**			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Disturbance / degradation to wetland soils or vegetation due to the construction of the facility and associated infrastructure, such as crossings	Direct impacts: » Disturbance / degradation to wetland soils or vegetation Indirect impacts: » Loss of ecosystem services	Local	None identified at this stage
Increased erosion and sedimentation & contamination of resources	Direct impacts: » Erosion and structural changes to the systems Indirect impacts:	Local	None identified at this stage

	» Sedimentation & contamination of downstream reaches		

A key consideration for the impact assessment is the presence of the identified water resources in relation to the project area. Several wetlands within the project area, with several drainage lines also expected for the area. A Zone of Regulation (ZoR) of 500 m is applicable for any wetland system that is present beyond the project boundary.

Construction could result in the encroachment into water resources and result in the loss or degradation of these system, most of which are functional and provide ecological services. These disturbances could also result in the infestation and establishment of alien vegetation, which would affect the functioning of the systems. Leaks and/or spillages could result in contamination of the receiving water resources. Contaminated water resources are likely to influence the associated biota. An increase in stormwater runoff could result in physical changes to the receiving systems caused by erosion, run-off and sedimentation, and the functional changes could result in changes to the vegetative structure of the systems.

5.2.1.4 Climate

This region is characterised as a summer-rainfall region, with Mean Annual Precipitation (MAP) around 530 mm. Much of the rainfall is of convectional origin. High summer temperatures are common for this region with severe frost occurring throughout the winter (Mucina and Rutherford, 2006). Major macroclimatic traits that characterise the Grassland Biome include:

- Summer to strong summer rainfall and winter drought; and
- Frost is common, and fog is found on the upper slopes of the Great Escarpment and seaward scarps (Mucina & Rutherford, 2006).

5.2.1.5 Avifauna

The primary cause of loss of biological diversity is habitat degradation and loss (IUCN, 2004; Primack, 2006). In the case of this study special attention was given to the identification of sensitive species or animal life and birds on site. The following section will discuss the state of avifauna biodiversity on the site in more detail.

Avifauna

A site sensitivity verification report (attached as Appendix E4) was undertaken for the entire Everest Solar PV Project, which discusses the avifauna identified within the project area and identifies concerns specifically related to the individual projects such as the Middelpunt Solar PV Project. The delineated project area comprises of nine (09) project sites located in close proximity to one another (assessed via independent and concurrent S&EIR processes).

According to The Biodiversity Company (2023) seven (07) habitat types were identified within the broader Project Area, namely Grasslands, Rocky Outcrops, Woodlands, Planted Pastures, Agriculture, Transformed and Water Resources. These habitat types were assigned Site Ecological Importance (SEI)

categories based on their ecological integrity, conservation value and the presence of species of conservation concern, refer to Table 5.7 below and Figure 5.14 for the illustration.

Table 5.6: Habitat types identified and the SEI values.

Habitat	Description	SCC possibly (or recorded) occurring there	Site Ecological Importance (SEI)	Photographs
Secondary Grasslands	Natural secondary grassland currently used for rotational grazing by livestock. Some sections are less disturbed than others.	Some of the SCCs that could occur here include, Secretary Bird and Blue Korhaan	Medium	
Rocky Outcrops	These rocky areas are in a mostly natural condition. These areas are a unique habitat in the grater landscape and will host a different composition of avifauna species.	SCC species are likely to roost in this area.	Medium	 

Habitat	Description	SCC possibly (or recorded) occurring there	Site Ecological Importance (SEI)	Photographs
Woodlands	This habitat type consisted of mainly invasive trees, with a few indigenous trees such as sweet thorn found in between.	It is unlikely that the SCCs would roost in these trees.	Very Low	
Water Resources	This habitat provides crucial habitat for waterbirds, but is also a water source for more terrestrial species. Some of the water resources are natural while others are artificial, from an avifauna perspective both are important.	This habitat would be important to all the SCC species expected. SCCs such as Black-winged Particle and Caspian Tern are likely to occur here. African Grass Owl was recorded in this habitat.	High	

Habitat	Description	SCC possibly (or recorded) occurring there	Site Ecological Importance (SEI)	Photographs
Agriculture	No natural vegetation types are present within this habitat type. Alien and invasive vegetation as well as crops dominate these areas. This predominantly includes areas previously or actively utilised for agricultural practices.	SCC species such as the Secretarybird and Blue Korhaan will make use of this habitat type. The areas where active planting has been seized for a few seasons has a higher potential of hosting SCC species.	Low	 
Planted Pastures	Planted pastures for grazing, this habitat gets disturbed on a set cycle. It does however provide more habitat than what the agricultural monocultures would.	It could likely host SCC species known to be found in grassland habitat	Medium	

During the field assessment, The Biodiversity Company confirmed one Secretary bird nest in close proximity to the Middelpunt Solar PV Project, a further two were also marked inside the Middelpunt Solar PV Project area. One was indicated by the farmer as the previous location of a secretary bird

nest while the other, anecdotal evidence was found that could suggest the presence of a nest inside the project area. A 2 km buffer was placed around the known nest on site as per Birdlife guidelines.

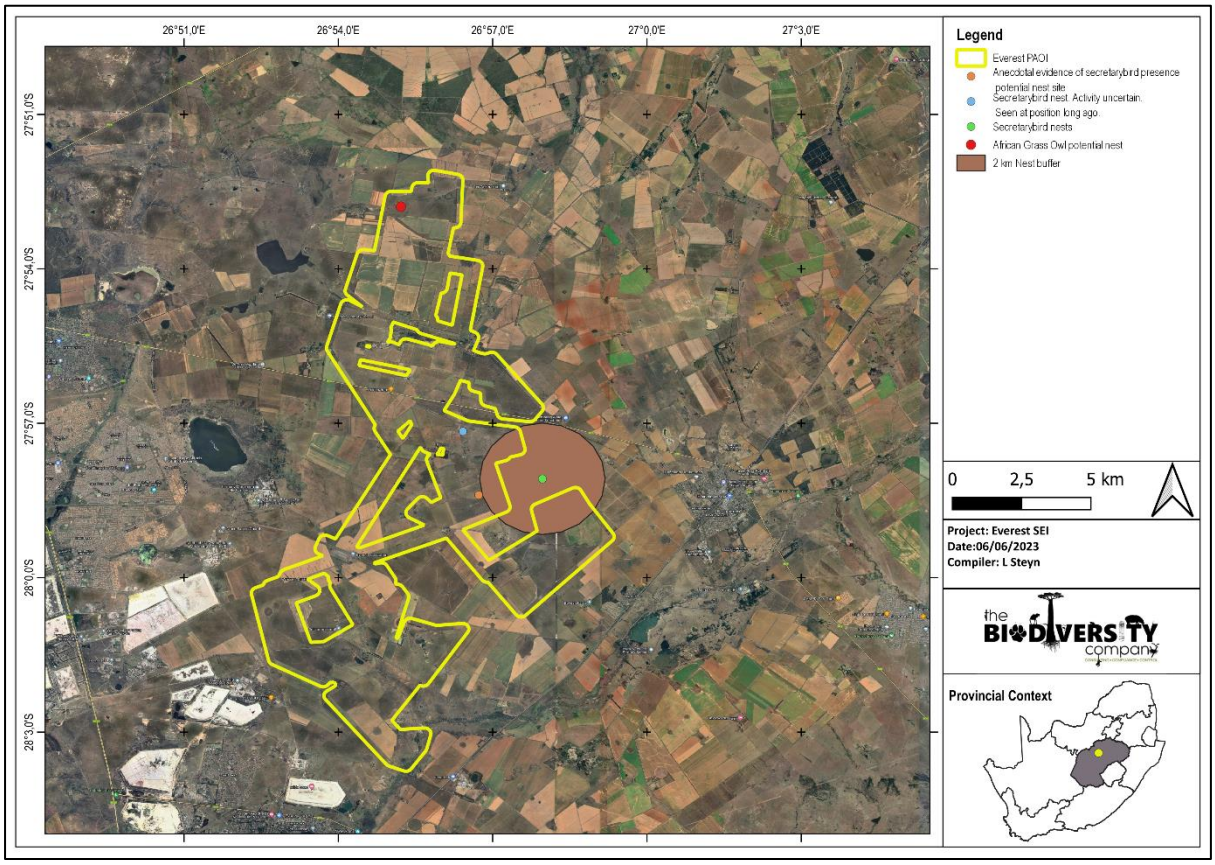


Figure 5. 13: Map illustrating the location of the nests and potential SCC nests.

Avifauna Impact Assessment

Anthropogenic activities drive habitat destruction causing displacement of fauna and flora and possibly direct mortality. Land clearing destroys local wildlife habitat and can lead to the loss of local breeding grounds, nesting sites and movement/flight corridors. The removal of natural vegetation may reduce the habitat available for avifauna species and may reduce the species compositions within the area. The main impacts associated with avifauna is the loss of habitat, collision and electrocution risks. Table 5.8 below summarises avifauna impacts identified.

Table 5.7: Scoping evaluation table summarising the impacts identified to avifauna

Impact **Biodiversity loss/disturbance**			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Destruction, fragmentation and	<u>Direct impacts:</u>	Regional	2 km buffer placed around the

degradation of habitats and ecosystems	» Disturbance / degradation / loss to vegetation and habitats » Ecological corridors are disrupted » Habitat fragmentation <u>Indirect impacts:</u> » Erosion risk increases » Fire risk increases » Increase in invasive alien species		known secretary bird nest
Direct mortality of avifauna	<u>Direct impacts:</u> » Loss of SCC species » Loss of avifauna diversity due to amongst others collisions and electrocutions <u>Indirect impacts:</u> » Loss of diversity and species composition in the area. » Possible impact on the food chain	Regional/International	2 km buffer placed around the known secretary bird nest
Reduced migration of avifauna	<u>Direct impacts:</u> » Loss of genetic diversity <u>Indirect impacts:</u> » Reduced seed dispersal » Loss of ecosystem services	Regional/National	2 km buffer placed around the known secretary bird nest
Environmental pollution due to water runoff, PV cleaning products, spills from vehicles and erosion	<u>Direct impacts:</u> » Pollution in nearby waterbodies and the surrounding environment » Avifaunal mortality (direct and indirectly) <u>Indirect impacts:</u> » Ground water pollution » Loss of ecosystem services	Regional	2 km buffer placed around the known secretary bird nest
Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust, heat radiation and light pollution.	<u>Direct impacts:</u> » Disruption/alteration of ecological life cycles due to noise » Avifaunal mortality due to light pollution (nocturnal	Regional	2 km buffer placed around the known secretary bird nest

	species becoming more visible to predators) » Heat radiation could lead to the displacement of species Indirect impacts: » Loss of ecosystem services		
Staff and others interacting directly with avifauna (potentially dangerous) or poaching of birds/eggs	Direct impacts: » Loss of SCCs species Indirect impacts: » Loss of ecosystem service » Loss of genetic diversity	Regional	2 km buffer placed around the known secretary bird nest

5.2.1.6 Visual Landscape

Visual impacts occur when changes in the landscape are noticeable to viewers looking at the landscape from their homes or from parks and conservation areas, highways and travel routes, and important cultural features and historic sites.

Visual Receptors

According to the Visual Impact Assessment (attached as Appendix E5), visual receptors can be defined as: *"Individuals, groups or communities who are subject to the visual influence of a particular project"*. Possible visual receptors identified within the 10km radius landscape, which due to its land use could be sensitive to landscape change. They include:

- **Nature Reserves and National Parks** which include:
  - Thabong Game Ranch Private Nature Reserve 1km south west – Activities within the borders of this private nature reserve include mining, agriculture and residential developments
- **Human Settlements and Farmsteads** which include:
  - Riebeeckstad, a suburb of Welkom.
  - Thabong, a more informal suburb of Welkom.
  - The town of Hennenman.
  - A very small community called Whites.
- **Scenic Routes and Arterial Roads** which include:
  - No scenic routes.
  - The R70 and R34 regional roads fall within the 10km radius.

Zone of Theoretical Visibility (ZTV) Model

A Zone of Theoretical Visibility (ZTV) is a Geographic Information System (GIS)-generated tool to identify the likely (or theoretical) extent of visibility of a development. The tool used in this model does not take existing screening into account but only the above mean sea level of the landscape.

Table 5.8: ZTV Assumptions

Radius	Visibility rating in terms of proximity
0-1km	Very High
1-3km	High
3-5km	Medium
5-10km	Low

Table 5.10 below reflects the visibility rating in terms of proximity on sensitive receptors of the proposed solar PV facility. The ZTV map will give a clearer understanding of areas susceptible to line of sight to the solar PV facility and both grid alternatives within a 10 km radius, refer to Figure 5.16.

Table 5.9: ZTV rating in terms of proximity to the solar PV facility

Radius	Visual Receptors	Visibility rating in terms of proximity
0-1km	- One farmstead	Very High
1-3km	- Two farmsteads - One school	High
3-5km	- Three farmsteads of which one is the Whistler Rum distillery - R70 regional road - One earth dam	Medium
5-10km	- R70 regional road - R34 regional road - Thabong Game Ranch - Newlands Game Ranch - Riebeeckstad - Thabong - Five farmsteads	Low

Based on the VIA report's assessment score, the visual impact of the proposed development will be a "Negative Medium Impact" after mitigation and might be visible within a 3km radius of the Middelpunt Solar PV Project area. The only receptors likely to be impacted by the proposed development are the nearby property owners, the Thabong Game Ranch Private Nature Reserve, goldfiels masimong, the local communities (Whites local community and Masimong local community), and nearby roads. The impact assessment will form part of the Environmental Impact Assessment Phase and further impacts on visual receptors will be discussed during this phase.

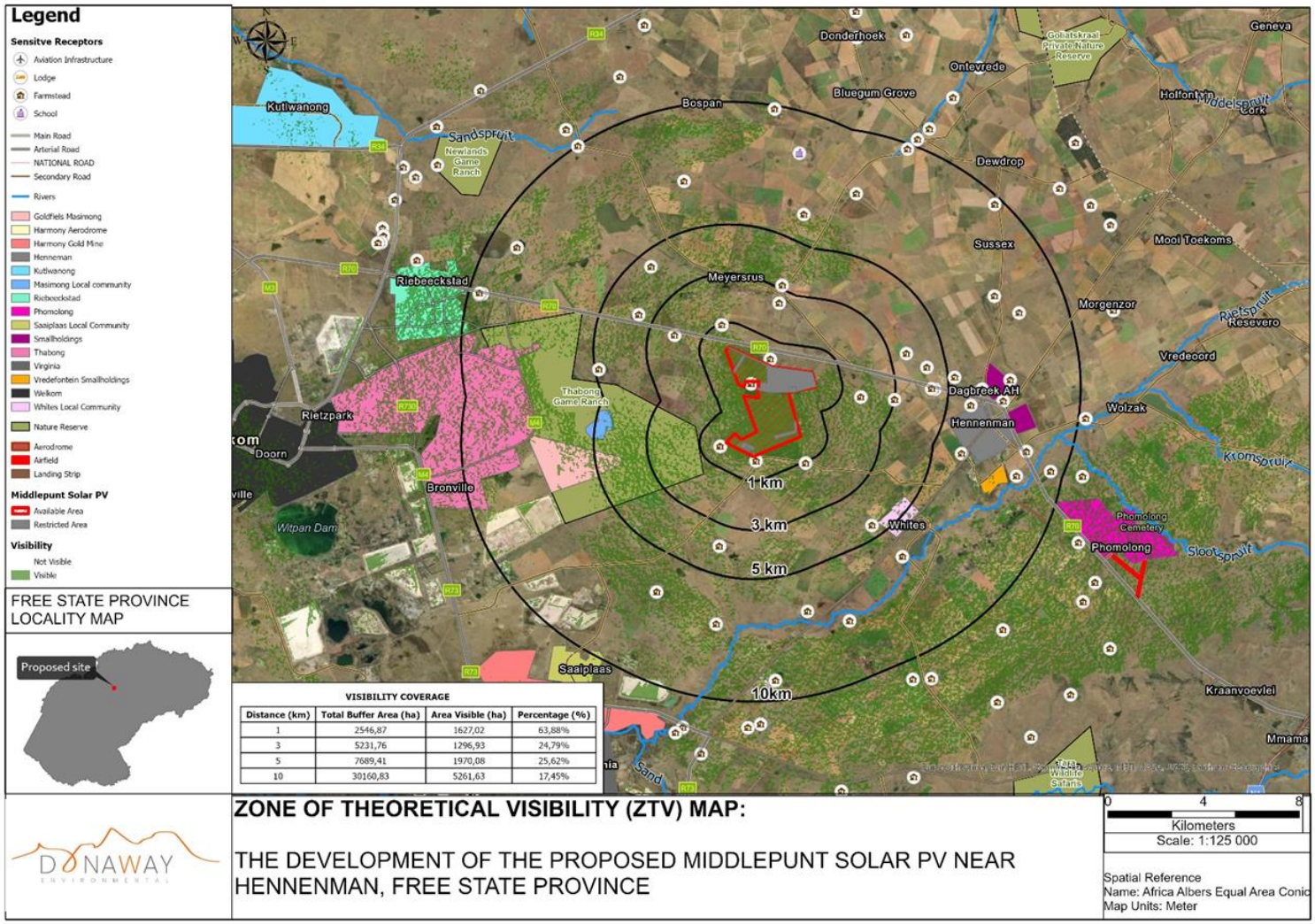


Figure 5. 14: Zone of Theoretical Visibility (ZTV) of the solar PV facility, satellite view

5.2.1.7 Traffic Consideration

Site access alternatives

The preferred access to the Middelpunt Solar Power Plant will be via the R70. There is also an alternative access connecting to the R730. Information supporting the choice is illustrated under Chapter 3: Transportation Routes. Only two access routes have been identified for the buildable area, as shown on Figure 5.15 below.

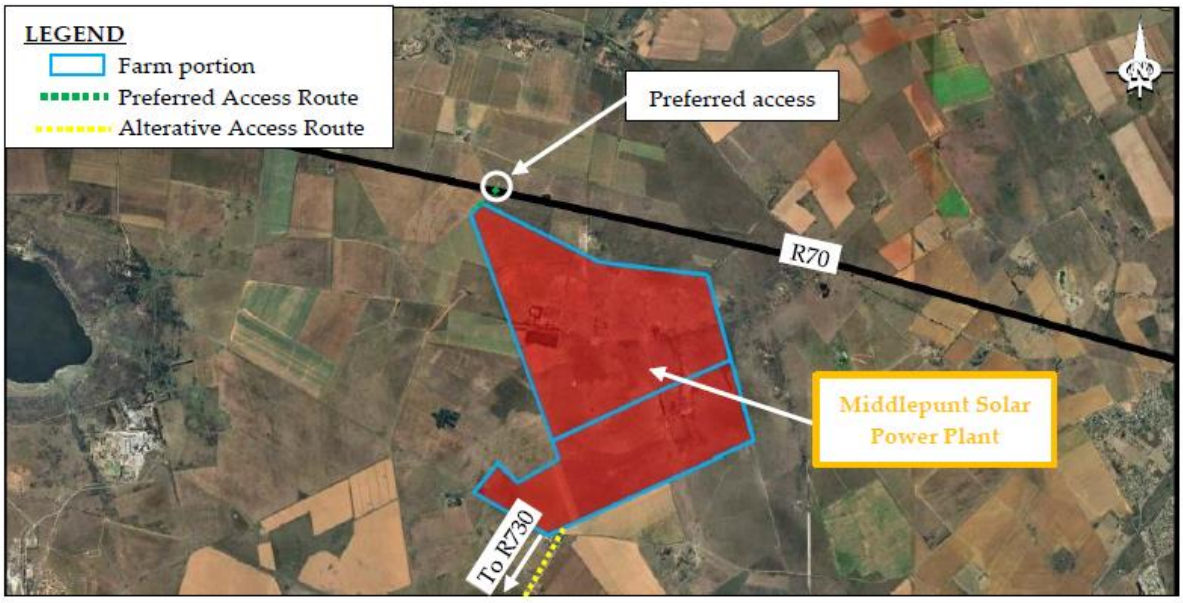


Figure 5. 15: Site access alternatives

A wayleave application for the site access will need to be lodged with the Matjhabeng Local Municipality. The formalisation of this access to the standard (Annexure B), will in all probability be a requirement as part of the wayleave approval.

The Traffic Impact Assessment (refer to Annexure E8) recommended that the preferred site access point should serve the Middelpunt Solar Power Plant. This recommendation is based on the fact that this access is an existing gravel road currently being utilized and comply with the minimum spacing requirement of 260 m. In addition to the above, no sight distance issues are foreseen at the preferred access.

The preliminary site layout will be developed in further phases of the project. The internal roads layout is dependent on the solar module layout; however, it is anticipated that approximately 16.2 km of internal roads will be required. Furthermore, smaller tracks may be required, for cleaning and maintenance of the solar modules.

Trip Generation

The proposed Middelpunt Solar Power Plant will generate additional traffic on the surrounding road network in three distinct phases, namely: *construction*, *operation & maintenance*, and *decommissioning*. As mentioned before, the construction phase of the Middelpunt Solar Power Plant is expected to take place over a period of eighteen (18) months, during which regional and local traffic will be affected. The trip generation, during the construction phase, are summarised in Table 5.11 below. It was assumed that a month consists of 22 working days and that staff / workers will only work

one shift.

Table 5.10: Trip generation (Construction Phase)

VEHICLE TYPE		STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
		SITE ESTABLISHMENT & CIVILS	DELIVERY OF SOLAR MODULES & STRUCTURES	CONSTRUCTION OF TRACKERS & MOUNTING MODULES	ELECTRICAL WORKS	SIGN-OFF & COMMISSIONING
1	Staff	1 718	7 731	21 476	15 033	6 013
2	Machinery & equipment	691	1 238	1 584	768	0
3	Interlinks (*for steel structures*)	0	172.8	288	144	0
4	Super links (*for PV panels*)	0	490	816	288	0
5	Abnormal load vehicles (*for inverters/ transformers*)	0	0	0	48	0
TOTAL TRIPS		2 409	9 632	24 164	16 329	6 013

The Middelpunt Solar Power Plant is expected to have a lifespan of 25 years, during which local traffic will be affected. The trip generation, during the operation and maintenance phase, are summarised in Table 5.12 below.

Table 5.11: Trip generation (Operations and Maintenance Phase)

DESCRIPTION	STAGE 6
	OPERATIONS & MAINTENANCE
1. Staff	32 214
2. Machinery & equipment	0
3. Interlinks (*for steel structures*)	0
4. Super links (*for PV panels*)	0
5. Abnormal load vehicles (*for inverters/ transformers*)	0
TOTAL TRIPS	32 214

The decommissioning phase of the Middelpunt Solar Power Plant is expected to take place over a period of two months, during which local traffic will be affected. The trip generation, during the decommissioning phase, are summarised in Table 5.13 below.

Table 5.12: Trip generation (Decommissioning Phase)

DESCRIPTION	STAGE 7
	DECOMMISSIONING
1. Staff	859
2. Machinery & equipment	4896
3. Interlinks (*for steel structures*)	0
4. Super links (*for PV panels*)	0
5. Abnormal load vehicles (*for inverters/ transformers*)	0
TOTAL TRIPS	5 755

5.2.2 Description of the Socio-Economic Environment

The socio-economic environment is described with specific reference to social, economic, heritage and cultural aspects.

5.2.2.1 Socio-Economic Conditions

The Social Impact Assessment (attached as Appendix E6) explains that the Free State Province is located in the central part of South Africa and bordered by six of the nine provinces, with Gauteng, Mpumalanga and North West bordering to the north, Northern Cape to the west, KwaZulu-Natal to the east, and Eastern Cape to the south. The remaining border section of the province is shared with the independent state of Lesotho, providing an important transportation route for Lesotho.

The Free State Province is the third largest province in South Africa covering an area of 129 825 km^2, while only accommodating the second lowest population and density, with 2 834 714 people at a population density of only 5.1%. The judicial capital of the country Bloemfontein is situated in the heart of the province, with other major towns including Welkom, Kroonstad, Sasolburg and Bethlehem.

Topographically the province is situated on a plateau rising to elevation of 1 800 m above mean sea level in the east, sloping down to the west at the Orange River around 1 200 m above mean sea level. The Orange River and Vaal River form the majority of the boundaries of the province, with the first delineating from the southern and second the northern boundary.

Agriculture, mining and manufacturing dominate the economic sector within the province, with 90% of the geographical area used for agricultural activities. Approximately 34% of maize, 37% of wheat, 33% of potatoes, 53% of sorghum, 30% of groundnuts, 18% of red meat and 15% of wool of South Africa's produce is produced in the province. Mining is another major economic driver with the province, specifically with the province identified as the fifth-largest gold producer in the world, additionally the mining sector is a major employer in the province. The province also hosts a leader in the chemical manufacturing industry with Sasol as a gigantic synthetic-fuel industry.

One of South Africa's UNESCOs World Heritage sites is situated within the province, known as the Vredefort Dome which is the largest verified impact structure on Earth. The Maluti Mountains and Golden Gate Highlands National Park are other distinct geographical and tourism features within the province.

Lejweleputswa District Municipality

The Lejweleputswa District Municipality (DM) is a Category C municipality situated in the western central part of the Free State Province. It shares borders with all other DMs in the province, with the Fezile Dabi DM and Thabo Mofutsanyana DM to the north-east and the Mangaung Metropolitan Municipality and Xhariep DM to the south. The Northern Cape Province shares the western border, while the North West Province shares the northern border. The district municipality is the third largest of the five district municipalities, encompassing a quarter of the province's geographical area. Major towns within the district include Bothaville, Bultfontein, Hoopstad, Theunissen, Welkom, and Wesselsbron.

The region covers around 32 286 km^2 and has a population of 646 920 people, accounting for 23% of the provincial population. From 2001 to 2011, the district's population declined from 657 012 to 627 626, but increased from 2011 to 2016. The N1 national route, which connects most major cities in South Africa, passes through the district municipality and is a vital transportation route for South Africa.

The Lejweleputswa DM takes its name from "grey rock," reflecting the area's rich history of gold mining and prospecting. It contributes significantly to the Free State Province's goldfields. The Willem Pretorius Game and Nature Reserve, Soetdoring and Sandveld Nature Reserve, and the annual NAMPO Harvest Day, which brings together the farming industry and farmers once a year, drive the province's tourism sector.

The Lejweleputswa DM is subdivided into five local municipalities, namely Masilonyana LM, Tokologo LM, Matjhabeng LM, Tselopele LM, and Nala LM.

Matjhabeng Local Municipality

Matjhabeng Local Municipality (LM) is a Category B municipality located in the western part of the Lejweleputswa District Municipality within the Free State Province of South Africa. The name "Matjhabeng" translates to "Where nations meet" in Sesotho, reflecting the diverse communities living in the area. The municipality shares its north-western border with Nala LM, the western border with Tswelepele LM, and the southern border with Masinonyana LM, all within the Lejweleputswa DM. Its north-eastern border is shared with Fezile Dabi DM, and the eastern border with Thabo Mofutsayana DM, both within the Free State Province. The major towns within the region include Allanridge, Hennenman, Odendaalrus, Ventersburg, Virginia, and Welkom.

The main economic driver in Matjhabeng LM is gold mining, which has earned the region the nickname "Gold Fields." However, there has been a decline in mining activities as major mining companies like AngloGold Ashanti and Gold Fields have sold or closed most of their mines in the area to focus on regions with lower production costs.

The municipality is characterized by a variety of vegetation types, including Bloemfontein Karroid Shrubland, Central Free State Grassland, Highveld Salt Pans, Vaal-Vet Sandy Grassland, Western Free State Clay Grassland, and Windburg Grassy Shrubland. While the region boasts a diverse range of biodiversity, there is only one land-based protected area, the Willem Pretorius Nature Reserve. This reserve features contrasting landscapes, with rocky ridges and ravines in the northern region and undulating plains and grasslands in the southern region. Notably, the reserve is home to the largest black wildebeest population in the world.

The Matjhabeng LM is known for its Vaal-Vet Sandy Grassland, which is an endangered ecosystem covering approximately 11% of the region. The municipality is traversed by both the N1 and N5 national routes, providing important transportation connections.

The proposed Middelpunt Solar PV development will be located on the remaining extent of the farm Vredesverdrag No. 427 and Remaining Extent of Farm Middelpunt No. 769, situated in the Matjhabeng LM a subdivision of the Lejweleputswa DM, located in the Free State Province. The proposed Middelpunt Solar PV is located approximately 7km north-west from the town of Hennenman, adjacent to the R70 regional road, approximately 11.4km north-east of the R750 region road and approximately 11km north of the R73 regional road.

5.2.3 Cultural and Heritage Environment

In order to determine the feasibility of the project, a cultural heritage assessment was done for the proposed Middelpunt Solar PV Project, in order to determine if there would be any red flag issues on the project site.

From a review of the available old maps and aerial photographs it can be seen that the project area has always been open space, with the main activity being agricultural fields.

Historic Background

The proposed Middelpunt Solar PV facility and associated grid infrastructure is located west of the town of Hennenman in the Free State Province. Hennenman, which was built as a single railway station, was formerly denoted as Ventersburg Road. In 1927, it was renamed after local Afrikaner P.F. Hennenman, from Swartpan Farm. In 1944, black South Africans were confined to a segregated enclave in southern Hennenman. During apartheid, this area was cleared by order of the government and nearly all then-residents relocated to a new township some fifteen kilometres away, Vergenoeg (Afrikaans for "Far enough", now Phomolong). An area located immediately adjacent to the PV development was previously assessed by Van der Walt (2013) as part of a different development application for the Everest PV Facility. Van der Walt (2013) describes the development area as “extremely flat and is utilised for extensive agricultural purposes (crop farming). The entire study area used to be cultivated land. No structures or farming infrastructure occur within the development footprint. The study area falls within the bioregion described by Mucina et al (2006) as the Dry Highveld Grassland Bioregion with the vegetation described as Vaal-Vet Sandy Grassland within a Grassland Biome. Land use in the general area is characterised by mining and agriculture, dominated by crops and cattle farming. The study area is characterised by deep sandy to loamy soils based on the extensive agricultural activities.”.

Archaeology

In his summary of the archaeological heritage of the area, Rossouw (2019) notes that “The archaeological footprint in the region is primarily represented by Stone Age surface occurrences, structural remnants dating back to the Anglo Boer War and its aftermath, graveyards and other historical structures older dating more than 60 years ago.” The Stone Age archaeological record of the broader area spans back to the early Middle Stone Age. Prehistoric archaeological remains previously recorded in the region include stone tools and mammal fossil remains from sealed and or exposed contexts.

Tomose (2013) notes that the earliest evidence of Iron Age communities in the Free State is documented in the south-eastern region of the Free State where they came into contact with the San people. Most of the existing evidence about the Iron Age communities in the Free State dates to the 16th and 18th when they moved across the Vaal River coming into contact with the San hunter-gather people (Klatzow 1994). Numerous stone wall structures and pottery dating to this period have been recorded and lie on the frontier zone where the San people come into contact with agro-pastoralist (Thorp 1996). Stonewalls are one major characteristic of the Iron Age people. However, they are not the only characteristic features of the Iron Age. Huffman (1982) described cattle dug, both vitrified and unverified, as one of the Iron Age traits. He also included pits and burials, with some located inside the cattle kraals (ibid)."

Archaeological sites spanning the Earlier, Middle and Later Stone Age have been found in the region despite the extensive agricultural transformation of the area. However, no heritage resources of significance were identified by Van der Walt (2013) in his assessment of the adjacent farm. Additionally, no significant archaeological sites have been recorded in the vicinity of the project area on SAHRIS. Van der Walt (2013) notes that "some MSA finds might be possible around pans on the farm. It is important to note that the lack of sites can be attributed to a lack of sustainable water sources (no pans exist in the development footprint) in the development area as well as the lack of raw material for the manufacturing of stone tools. No Sites dating to the Early or Middle Iron Age have been recorded or are expected for the study area. The same goes for the Later Iron Age period where the study area is situated outside the western periphery of distribution of Late Iron Age settlements in the Free State. However, to the north of the study area, ceramics from the Thabeng facies belonging to the Moloko branch of the Urewe tradition were recorded at Oxf 1 and Platberg 32/71 (Maggs 1976, Mason 1986). Similarly, to the east Makgwareng ceramics belonging to the Blackburn Branch of the Urewe tradition were recorded (Dreyer 1992 and Maggs 1976). There is however a low likelihood of finding sites dating to this period in the study area."

In a recent heritage assessment completed by CTS Heritage (2022) for an adjacent PV Facility, no evidence of Stone or Iron Age archaeology was identified. No graves were identified within the survey and visibility was reasonably good for stone structures, so the latter finding could be considered comprehensive. However, the substantial grass cover and soil formation across the entire footprint was a pertinent constraint to documenting stone artefacts and other smaller potential surface remains such as ceramics.

The field assessment produced nearly 40 observations across the entire assessment area which extends beyond the area proposed for this development. These results are important as they provide the context within which the relevant resources are located. The identified resources mainly included ruins and structures that are related to the 20th century farming and mining occupation of the area. In many instances the ruins were from workers' cottages that have been abandoned as the viability of smaller farms decreased when larger corporate farms bought these over. In other areas old chalk mines have been closed and the associated labourers' quarters have fallen into disrepair.

The most significant heritage resource lies at the Ferreirasrust farm where a Provincial Heritage Site was declared (formerly a National Monument) in 1988. The main homestead was built in the 1890s by Thomas Minter and has impressive sandstone walls and most of the original features still intact (ceilings, cornices, floors etc). This site is located well away from the area proposed for the Middelpunt SPP development.

A total of 10 graveyards, some informal and unfenced, were also documented on the various farms within the project area. The koppie at Vredesverdrag (or Peace Agreement) farm was the site of a skirmish between Boer and British soldiers in May 1900 that resulted in at least 20 deaths.

"In the action on the Zand River on 10 May 1900, a squadron of the 6th Dragoons, one of the 2nd Dragoons, one of Australian Horse and two troops of the 6th Dragoon Guards were sent to attack Boer positions on a ridge which commanded a wide area. Although the crest of the southern end was gained, the force retired in the face of a strong counterattack. The position was taken later in the day when Maj-Gen Dickson's 4th Cavalry Brigade turned its flank and the burghers were forced to retire".[2] The owner took us to the location of some of the graves that had apparently been dug up for reburial In a formal cemetery elsewhere. The Middelpunt Solar PV Project had six siting, 2 graves, 2 ruins, 2 historic/modern structures that must stay protected with a mitigation buffers. All the sittings must be protected with 100m buffers except for one of the ruins which is a historical oven built from stone that must be protected with a 250m buffer. Refer to Figure 5.16 below illustrating the significant Heritage Resources found during the site inspection. The impact assessment will be discussed as part of the Environmental Impact Assessment Phase.

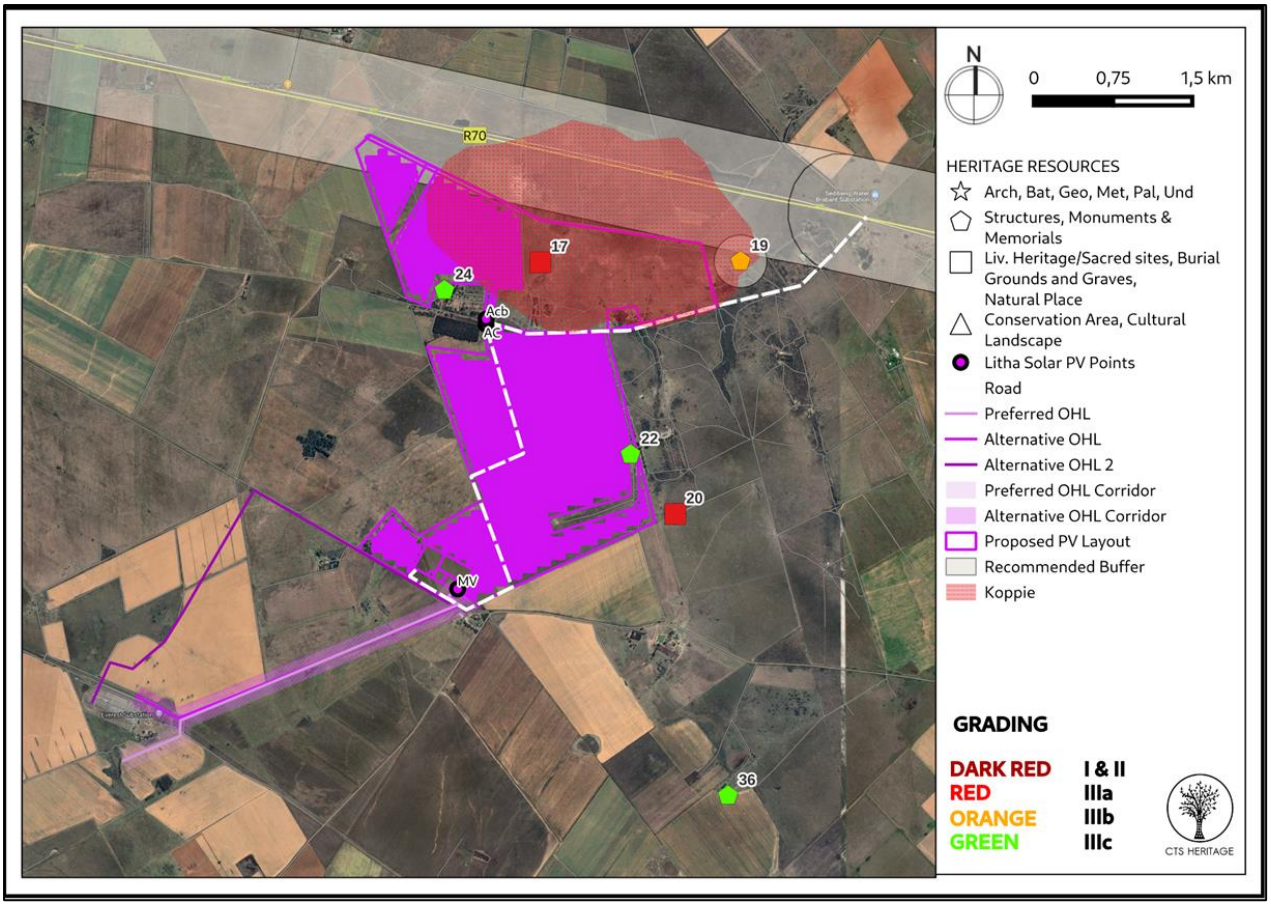


Figure 5. 16: Illustration of the significant Heritage Resources found during the site inspection

[2] https://www.angloboerwar.com/forum/5-medals-and-awards/28158-medals-to-the-6th-dragoon-guards accessed on 18 May 2023

Palaeontology

According to the Palaeontological Impact Assessment (refer to Appendix E7), the proposed Middelpunt Solar PV is underlain by Quaternary deposits with small areas underlain by Jurassic dolerite and the Adelaide Subgroup (Beaufort Group, Karoo Supergroup). The Quaternary deposits is represented by very small areas underlain by alluvium near the Rietspruit while the rest of the Quaternary deposits comprise of sand and calcrete. Outcrops of the Permian aged sandstone and shale of the Adelaide Subgroup is present in the south as well as the western area of the development. According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) the Palaeontological Sensitivity of Quaternary alluvium is Moderate, that of the Jurassic dolerite is Zero as it is igneous in origin and that of the Adelaide Subgroup (Beaufort Group) is Very High (Almond and Pether, 2009; Almond et al., 2013, Groenewald et al 2014).

Updated Geology (Council of Geosciences) refined the geology and indicate that the proposed development is mainly underlain by alluvium, colluvium, elluvium and gravel, calcrete, surface limestone and hardpan, as well as the Balfour Formation (Adelaide Subgroup, Beaufort Group), and the Volksrust Formation (Ecca Group). A site-specific field survey was undertaken, and no fossiliferous outcrop was detected in the proposed development. This could be attributed to the lack of outcrops as well as the lush grassy vegetation in the area. Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the Middelpunt Solar PV Project footprint is rare. This is in contrast with the High Sensitivity allocated to the development area by the SAHRIS Palaeosensitivity Map and Screening Tool, refer to Figure 5.17 for the PaleoMap.

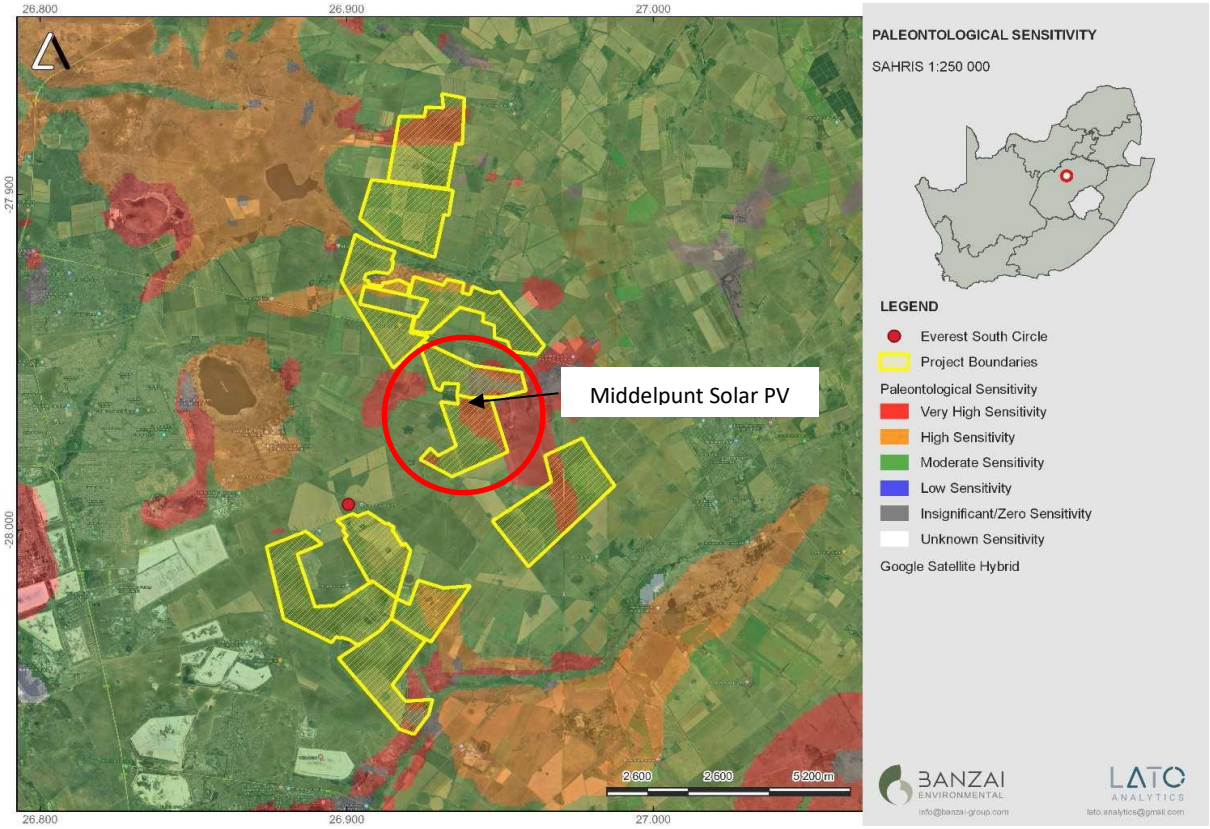


Figure 5. 17: Illustration of the finding according to the 1:250 000 PaleoMap.

5.3 SITE SELECTION MATRIX

Due to the nature of the proposed development, the location of the solar PV facility is largely dependent on technical and environmental factors such as solar irradiation, climatic conditions, topography of the site, access to the grid and capacity of the grid. Studies of solar irradiation worldwide indicate that the Free State Province has a high potential for the generation of power from solar.

The receptiveness of the site to Middelpunt Solar PV includes the presence of optimal conditions for the sitting of a solar energy facility due to high irradiation values and optimum grid connection opportunities (i.e., the grid connection points are located within the affected property which minimises the length of power line development and consolidates the overall impacts and disturbance of the project within the affected property). The remaining extent of the farm Vredesverdrag No. 427 and Remaining Extent of Farm Middelpunt No. 769 where the project is proposed to be located is considered favorable and suitable from a technical perspective due to the following characteristics:

- Climatic conditions: Climatic conditions determine if the project will be viable from an economic perspective as the solar PV facility is directly dependent on the annual direct solar irradiation values of a particular area. The Free State receives high averages of direct normal and global horizontal irradiation daily. This is an indication that the regional location of the project includes a low number of rainy days and a high number of daylight hours experienced in the region. The Global Horizontal Radiation value is around 2118 kWh/m^2 per annum is relevant in the area.

- Topographic conditions: The surface area on which the proposed facility will be located has a favourable level topography, which facilitates work involved with construction and maintenance of the facility and ensures that shadowing on the panels do not occur. The topographic conditions, which are favourable, minimises the significance of the impact that will occur during the clearing and leveling of the site for the construction activities.

- Extent of the site: A significant portion of land is required to evacuate up to 240 MW and space is a constraining factor in PV facility installations. Provision was made to assess a larger area than is required for the facility to make provision for any other environmental or technical constraints that may arise and avoiding those areas. Larger farms are sought after to make provision for any constraints imposed by the Department of Agriculture on the extent of land that may be used for such facilities per farm, as well as the opportunities presented for the avoidance of sensitive environmental features present. the remaining extent of the farm Vredesverdrag No. 427 and Remaining Extent of Farm Middelpunt No. 769, and the development footprint assessed therein is considered to provide an opportunity for the successful construction and operation of a solar PV facility with a capacity of up to 240 MW, as well as opportunities for the avoidance and mitigation of impacts on the affected environment and sensitive environmental features.

- Site availability and access: The land is available for lease by the developer. Reluctant farm owners or farmers over capitalising hamper efforts to find suitable farms. Access to the site is most likely to be obtained via the R70 (Provincial Road) and existing farm roads.

- Grid connection: In order for the PV facility to connect to the national grid the facility will have to construct an on-site substation, Eskom switching station and a power line from the project site to connect to the Eskom grid. Available grid connections are becoming scarce and play a huge role when selecting a viable site. The proposed Middelpunt Solar PV overhead power line route will connect directly into the existing Everest Substation. Two (02) grid alternatives have been identified based on the location of the connection point into the national grid in relation to the proposed solar PV facility. These alternatives are however discussed in more detail in the Impact Assessment for the gridlines, in a separate BAR process, but is however addressed in cumulative impacts.

- Environmental sensitivities: From an environmental perspective the proposed site is considered highly desirable in terms of geology, agricultural potential, vegetation and landscape features, climate, biodiversity and the visual landscape despite some of the environmental sensitivities identified (refer to Section 5.3.1 of this report). The area proposed for development exclusively consists of land used for agriculture, but wetland features are located within the broader project area, as well as crop fields on or in close proximity to the site and a historic homestead. These environmental sensitive features will need to be considered by the developer for the placement of the facility infrastructure within the development footprint.

It is evident from the discussion above that the remaining extent of the farm Vredesverdrag No. 427 and Remaining Extent of Farm Middelpunt No. 769, may be considered favourable and suitable in terms of the site and environmental characteristics. As mentioned previously, no alternative areas on the property have been considered for the placement of the development footprint as the assessed development footprint will aim to avoid areas that are under cultivation within the affected property. The development footprint of this project will cover a significant portion of the farm; however, provision will be made to exclude any sensitive areas from the facility layout to be developed within the development footprint.

5.4 CONCLUDING STATEMENT ON ALTERNATIVES

When considering the information provided by the specialists with regards to the site selection criteria, the site is identified as preferred due to fact that the opportunities presented on the site to develop the project in such a way which avoids the areas and features (including the associated buffers) of high environmental sensitivity.

Therefore, development of the up to 240 MW Middelpunt Solar PV on the remaining extent of the farm Vredesverdrag No. 427 and Remaining Extent of Farm Middelpunt No. 769 is the preferred option.

The draft layout considers technical constraints as a part of this scoping process. Where specific features of environmental sensitivity are identified by the independent specialists as part of the Scoping Phase, these areas and the associated required buffers will be considered by the developer during the EIA phase to ensure that the facility layout is appropriate considering the sensitive features present. Refer to Figure I for the draft layout proposed for development.

6 DESCRIPTION OF THE IMPACTS AND RISKS

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include-

(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 these impacts-

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be avoided, managed or mitigated;

(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;

(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 geographical, physical, biological, social, economic, heritage and cultural aspects;

(viii) the possible mitigation measures that could be applied and level of residual risk;

6.1 SCOPING METHODOLOGY

The contents and methodology of the scoping report aims to provide, as far as possible, a user-friendly analysis of information to allow for easy interpretation.

- Checklist (see section 6.1.1): The checklist consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts.
- Matrix (see section 6.1.2): The matrix analysis provides a holistic indication of the relationship and interaction between the various activities, development phases and the impact thereof on the environment. The method aims at providing a first order cause and effect relationship between the environment and the proposed activity. The matrix is designed to indicate the relationship between the different stressors and receptors which leads to specific impacts. The matrix also indicates the specialist studies that have been conducted to address the potentially most significant impacts.

6.1.1 Checklist Analysis

The Environmental Assessment Practitioner (EAP) conducted a site visit on 23 February 2023. The site visit was conducted to ensure a proper analysis of the site-specific characteristics of the study area. Table 6.1 provides a checklist, which is designed to stimulate thought regarding possible consequences of specific actions and to assist scoping of key issues. It consists of a list of structured questions related

to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts. The table highlights certain issues, which are further analysed in matrix format in section 6.2.

Table 6.1: Environmental checklist

QUESTION	YES	NO	UN-SURE	DESCRIPTION
1. Are any of the following located on the site earmarked for the development?				
I. A river, stream, dam or wetland	✕			Based on the Baseline Assessment there are several wetlands / wet areas located on site and within the 500m Regulation Zone.
II. A conservation or open space area	✕			The project area overlaps with areas predominantly classified as CBA 1 , Other Natural Areas and Degraded Areas.
III. An area that is of cultural importance	X			Based on the archaeological assessment there are 2 graves, 2 ruins, 2 historic/modern structures found within the Middelpunt Solar PV Project site. A recommended buffer of 100m must be included as per the recommended mitigation measures for all the sites except for one of the ruins which is a historical oven built from stone that must be protected with a 250m buffer.
IV. Site of geological significance		✕		None.
V. Areas of outstanding natural beauty		✕		None.
VI. Highly productive agricultural land		✕		Although there are crop fields they were not considered to have high productivity.
VII. Floodplain		✕		None.
VIII. Indigenous Forest		✕		None.
IX. Grass land	✕			The project area is situated within the Grassland Biome.
X. Protected bird nesting sites		✕		None.
XI. Red data species	✕			The Terrestrial Biodiversity Assessment identified *Smaug giganteus*.
XII. Tourist resort		✕		None.

2. Will the project potentially result in potential?				
I. Removal of people		✕		None.
II. Visual Impacts	✕			Based on the VIA report's assessment score, the visual impact of the proposed development will be a "Negative Medium Impact" after mitigation and might be visible within a 3km radius of the Middelpunt Solar PV Project area.
III. Noise pollution	✕			Construction activities will result in the generation of noise over a period of 20 months. The noise impact is unlikely to be significant.
IV. Construction of an access road	✕			Access is most likely to be obtained via the R70 Provincial Road and existing farm roads. Internal access roads linking the various components will also be required.
V. Risk to human or valuable ecosystems due to explosion/fire/ discharge of waste into water or air.		✕		None.
VI. Accumulation of large workforce (>50 manual workers) into the site.	✕			Approximately 300 employment opportunities will be created during the construction phase and up to 25 permanent employment opportunities during the operational phase.
VII. Utilisation of significant volumes of local raw materials such as water, wood etc.	✕			The estimated amount of water required during construction is up to 80 000m^3. The estimated maximum amount of water required during the operational phase is 1 000m^3 per annum.
VIII. Job creation	✕			Approximately 300 employment opportunities will be created during the construction phase and up to 25 permanent employment opportunities during the operational phase.
IX. Traffic generation			✕	The estimated trip generation during the construction phase will include normal heavy load (solar panels); normal heavy load (construction materials); and Private vehicles (staff).

X. Soil erosion	×			The site will need to be cleared or graded to a limited extent, which may potentially result in a degree of dust being created, increased runoff and potentially soil erosion. The time that these areas are left bare will be limited to the construction phase, since vegetation will be allowed to grow back after construction.
XI. Installation of additional bulk telecommunication transmission lines or facilities		×		None.
3. Is the proposed project located near the following?				
I. A river, stream, dam or wetland	×			Based on the Baseline Assessment there are several wetlands / wet areas located on site and within the 500m Regulation Zone.
II. A conservation or open space area	×			The project area is located 5km from Thabong Game Ranch Private Nature Reserve. Middelpunt Solar PV does fall within 5km of NPAES PA (Protected Areas) Negotiated Focus Areas 2018
III. An area that is of cultural importance	×			Based on the archaeological assessment there are approximately 40 findings within the broader area surrounding the Middelpunt SPP.
IV. A site of geological significance		×		None.
V. An area of outstanding natural beauty		×		None.
VI. Highly productive agricultural land	×			Numerous areas identified as crop fields are located around the project area.
VII. A tourist resort		×		None.
VIII. A formal or informal settlement	×			Hennenman is located approximately 7km southeast of the proposed project site.

6.1.2 Matrix Analysis

The matrix describes the relevant listed activities, the aspects of the development that will apply to the specific listed activity, a description of the environmental issues and potential impacts, the significance and magnitude of the potential impacts and possible mitigation measures. The matrix also highlights areas of particular concern (see Table 6.2) for more in-depth assessment during the EIA process. An indication is provided of the specialist studies being conducted and which informed the

initial assessment. Each cell is evaluated individually in terms of the nature of the impact, duration and its significance – should no mitigation measures be applied. This is important since many impacts would not be considered insignificant if proper mitigation measures were implemented.

In order to conceptualise the different impacts, the matrix specify the following:

- **Stressor**: Indicates the aspect of the proposed activity, which initiates and cause impacts on elements of the environment.
- **Receptor**: Highlights the recipient and most important components of the environment affected by the stressor.
- **Impacts**: Indicates the net result of the cause-effect between the stressor and receptor.
- **Mitigation**: Impacts need to be mitigated to minimise the effect on the environment.

Please refer to **Appendix E** (specialist studies) for a more in-depth assessment of the potential environmental impacts.

Table 6.2: Matrix analysis

For ease of reference the significance of the impacts is colour-coded as follow:

Low significance	Medium significance	High significance	Positive impact

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY		POTENTIAL IMPACTS		SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES / INFORMATION
			Receptors	Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
CONSTRUCTION PHASE															
Activity 11(i) (GNR 327): *"The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."* Activity 14 (GNR 327): *"The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good,*	Site clearing and preparation Certain areas of the site will need to be cleared of vegetation and some areas may need to be levelled. Civil works The main civil works are: • Terrain levelling if necessary– Levelling will be minimal as the potential site chosen is relatively flat. • Laying foundation- The structures will be connected to the ground through cement pillars, cement slabs or metal screws. The	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	• Direct habitat destruction • Habitat fragmentation • Increased soil erosion and sedimentation • Soil and water pollution • Spread and establishment of alien invasive species • Negative effect of human activities on fauna and road mortalities		-	R	P	D/	PR	SL	Yes	- See Table 6.4	L	Terrestrial Biodiversity Impact Assessment (Appendix D1)
			Wetland/ Riparian areas	• Increase soil erosion and sedimentation. • Disturbance of watercourse habitat and fringe vegetation • Soil and water pollution • Spread and establishment of alien invasive species	-		S	L	D	CR	NL	Yes	- See Table 6.4	L	Wetland Impact Assessment (Appendix D8)
			Avifauna	• Loss of priority avian species from important habitats • Loss of resident avifauna through increased disturbance • Long-term or permanent degradation and modification of the receiving environment resulting to in the loss of important avian habitats		-	L	L	D	PR	SL	Yes	- See Table 6.4	L	Avifaunal Impact Assessment (Appendix D2)

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY		POTENTIAL IMPACTS		SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES / INFORMATION
			Receptors	Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres." <u>Activity 24 (ii) (GN.R 327):</u> *"The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters"* <u>Activity 28 (ii) (GN.R 327):</u> *"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where*	• exact method will depend on the detailed geotechnical analysis. • Construction of access and inside roads/paths – existing paths will be used were reasonably possible. Additionally, the turning circle for trucks will also be taken into consideration. <u>Transportation and installation of PV panels into an Array</u> The panels are assembled at the supplier's premises and will be transported from the factory to the site on trucks. The panels will be mounted on metal structures which are fixed into the ground either through a concrete foundation or a deep-seated screw. The		Air	• Air pollution due to the increase of traffic of construction vehicles and the undertaking of construction activities. • Ecosystem damage due to pollutants and dust		-	R	S	D	CR	SL	Yes	- A speed limit should be enforced on dirt roads (preferably 30-40km/h). - Implement standard dust control measures, including periodic spraying (frequency will depend on many factors including weather conditions, soil composition and traffic intensity and must thus be adapted on an on-going basis) of construction areas and access roads, and ensure that these are continuously monitored to ensure effective implementation.	L	Terrestrial Biodiversity Impact Assessment (Appendix D1)
			Soil and Agriculture	• Loss of land capability during the construction phase – PV Facility • Loss of land capability during the construction phase – Grid Connection	-		S	S	Pr	CR	NL	Yes	- See Table 6.4	L	Soil and Agricultural Impact Assessment (Appendix D4)
			Existing services infrastructure	• Generation of waste that needs to be accommodated at a licensed landfill site. • Generation of sewage that need to be accommodated by the local sewage plant. • Increase in construction vehicles on existing roads.	-		L	S	D	PR	ML	Yes	-	L	Confirmation from the Local Municipality required to confirm capacity for services
			Groundwater	• Pollution due to construction vehicles and the storage and handling of dangerous goods.	-		S	S	Pr	CR	ML	Yes	- Monitoring boreholes should be securely capped (where used), and must be fitted with a suitable sanitary seal to prevent surface	L	-

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS		SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES / INFORMATION
		Receptors	Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
the total land to be developed is bigger than 1 hectare." Activity 56 (ii) (GN.R 327): *"The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres…"* Activity 1 (GN.R 325): *"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more."* Activity 15 (GN.R 325): *"The clearance of an area of 20 hectares or more of*	BESS and grid connection corridor infrastructure will also be installed and constructed. Wiring to the Central Inverters Sections of the PV array would be wired to central inverters. The inverter converts DC electricity to alternating electricity (AC) at grid frequency.											water flowing down the outside of the casing. Full construction details of monitoring boreholes must be recorded when they are drilled (e.g., screen and casing lengths, diameters, total depth, etc). - Sampling of monitoring boreholes should be done according to recognised standards. - Where pollution occurs, this must be reported and cleaned-up in an appropriate manner as soon as possible.		
		General Environment (risks associated with BESS)	• Mechanical breakdown / Exposure to high temperatures • Fires, electrocutions and spillage of toxic substances into the surrounding environment. • Spillage of hazardous substances into the surrounding environment. • Soil contamination – leachate from spillages which could lead to an impact of the productivity of soil forms in affected areas. • Water Pollution – spillages into surrounding watercourses as well as groundwater. • Health impacts – on the surrounding communities, particularly those relying on watercourses (i.e., rivers, streams, etc.) as a primary source of water.		-	S	M	Pr	PR	ML	Yes	- Operators are trained and competent to operate the BESS. Training should include the discussion of the following: - Potential impact of electrolyte spills on groundwater; - Suitable disposal of waste and effluent; - Key measures in the EMPr relevant to worker's activities; - How incidents and suggestions for improvement can be reported. - Training records should be kept on file and be made available during audits. - Battery supplier user manuals safety specifications and Material Safety Data Sheets (MSDS) are filed on site at all times.	L	-

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS			SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES / INFORMATION
		Receptors		Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
indigenous vegetation."				• Generation of hazardous waste									- Compile method statements for approval by the Technical/SHEQ Manager for the operation and management and replacement of the battery units / electrolyte for the duration of the project life cycle. Method statements should be kept on site at all times. - Provide signage on site specifying the types of batteries in use and the risk of exposure to hazardous material and electric shock. Signage should also specify how electrical and chemical fires should be dealt with by first responders, and the potential risks to first responders (e.g., the inhalation of toxic fumes, etc.). - Firefighting equipment should readily be available at the BESS area and within the site. - Maintain strict access control to the BESS area. - Ensure all maintenance contractors / staff are familiar with the supplier's specifications. - Undertake a risk assessment prior to the commencement of general checks and maintenance tasks at the BESS. This should consider any aspects which could result in fire or spillage, and appropriate actions should be taken to prevent these.		

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS			SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES / INFORMATION
		Receptors		Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
													- Standard Operating Procedures (SOPs) should be made available by the Supplier to ensure that the batteries are handled in accordance with required best practices. - Spill kits must be made available to address any incidents associated with the flow of chemicals from the batteries into the surrounding environment. - The assembly of the batteries on-site should be avoided as far as possible. Activities on-site for the BESS should only be limited to the placement of the container wherein the batteries are placed. - Undertake periodic inspections on the BESS to ensure issues are identified timeously and addressed with the supplier where relevant. - The applicant in consultation with the supplier must compile and implement a Leak and Detection Monitoring Programme during the project life cycle of the BESS. - Batteries must be strictly maintained by the supplier or suitably qualified persons for the duration of the project life cycle. No unauthorised personnel should be allowed to maintain the BESS. - Damaged and used batteries must be removed from site by the		

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS			SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES / INFORMATION
		Receptors		Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
													supplier or any other suitably qualified professional for recycling or appropriate disposal. - The applicant should obtain a cradle to grave battery management plan from the supplier during the planning and design phase of the system. The plan must be kept on site and adhered to.		
		SOCIAL/ECONOMIC ENVIRONMENT	Positive social Impacts	• Creation of direct and indirect employment and skills development opportunities. • Economic multiplier effects • Improvements to shared infrastructure		+	L	S	D	CR	NL	Yes	- See Table 6.4	M	Social Impact Assessment (Appendix D7)
			Visual landscape	• Construction impacts of the PV facility. • Construction impacts of power line		-	L	S	D	PR	SL	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix D3)
			Traffic volumes	• Traffic Congestion • Increase in traffic volumes • Impact on road safety	-		N	S	D	CR	NL	Yes	• Stagger component delivery to site. • Reduce the construction period to 24 months as far as reasonably possible. • The use of mobile batch plants and quarries in close proximity to the site. • Staff and general trips should occur outside of morning and evening	M	-

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		Receptors	Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
												peak traffic periods as far as feasibly possible. • Regular maintenance of gravel roads by the Contractor during the construction phase and by Client/Facility Manager during operation phase • All construction vehicles must be roadworthy and drivers must have the relevant licenses for the type of vehicles they are operating. - All vehicle drivers need to strictly adhere to the rules of the road.		
		Negative social impacts	• Potential loss of productive farmland • In-migration of people (non-local workforce and jobseekers) • Impacts on safety and security. • Impacts on daily movement patterns. • Nuisance impacts (noise and dust). • Increased risk of veld fires. • Visual and sense of place impacts		-	L	S	Pr	PR	ML	Yes	- See Table 6.4	L	Social Impact Assessment (Appendix D7)
		Noise levels	• The generation of noise as a result of construction vehicles, the use of machinery such as drills and people working on the site.		-	L	S	Pr	CR	NL	Yes	- See Table 6.4	L	Social Impact Assessment (Appendix D7)
		Tourism industry	• N/A	-		L	S	D	CR	ML	Yes	- See Table 6.4	L	-

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			Receptors	Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
			Heritage resources	- As no sites, features or objects of cultural historic significance have been identified in the site, there would be no impact as a result of the proposed development.		-	S	P	D	IR	CL	Yes	- See Table 6.4	L	Heritage Impact Assessment (Appendix D5)
			Paleontological Heritage	• Loss of fossil heritage • Destroy or permanently seal-in fossils at or below the surface that are then no longer available for scientific study		-	S	P	D	IR	CL	Yes	- See Table 6.4	L	Paleontological Impact Assessment (Appendix D6)
OPERATIONAL PHASE															
Activity 11(i) (GNR 327): *"The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."* Activity 14 (GNR 327): *"The development and related operation of facilities or*	The key components of the proposed project are described below: PV Panel Array - To produce up to 240MW the facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple panels will be required to form the solar PV arrays which will comprise the PV facility. Battery Energy Storage System (BESS) – The battery energy storage system will make use of	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	• Direct habitat destruction • Habitat fragmentation • Increased soil erosion and sedimentation • Soil and water pollution • Air pollution • Spread and establishment of alien invasive species • Negative effect of human activities on fauna and road mortalities		-	L	L	Po	PR	SL	Yes	• See Table 6.5	L	Terrestrial Biodiversity Impact Assessment (Appendix D1)
			Avifauna	• Long-term or permanent degradation and modification of the receiving environment resulting to in the loss of important avian habitats. • Loss of resident avifauna through increased disturbance. • Collisions with PV panels and electrocution risks leading to injury		-	S	L	D	PR	SL	Yes	- See Table 6.5	L	Avifaunal Impact Assessment (Appendix D2)

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS			SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES / INFORMATION
		Receptors		Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres." Activity 28 (ii) (GN.R 327): *"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."*	solid state or flow battery technology. Both lithium-ion and Redox-flow technology are being considered for the project, depending on which is most feasible at the time of implementation. The extent of the system will be 4ha. The containers may be single stacked only to reduce the footprint. The containers will include cells, battery charge controllers, inverters, transformers, HVAC, fire, safety and control systems. Inverters - Sections of the PV array will be wired to inverters. The inverter is a pulse-width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency. Supporting Infrastructure – The			• or loss of avian life which decreases avifauna species diversity. • Collisions with overhead power lines and electrocution risks leading to injury or loss of avian life which decreases avian diversity										
			Air quality	• The proposed development will not result in any air pollution during the operational phase.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Soil and Agriculture	• Loss of land capability during the construction phase – PV Facility • Loss of land capability during the construction phase – Grid Connection	-		S	S	Pr	CR	NL	Yes	• See Table 6.5	L	Soil and Agricultural Impact Assessment (Appendix D4)
			Groundwater	• Leakage of hazardous materials. The development will comprise of a distribution substation and switching station and collector substation and will include transformer bays which will contain transformer oils. Leakage of these oils can contaminate water supplies.	-		L	L	Po	PR	ML	Yes	• All areas in which substances potentially hazardous to groundwater are stored, loaded, worked with or disposed of should be securely bunded (impermeable floor and sides) to prevent accidental discharge to groundwater.	L	-
			Wetland/ Riparian areas	• Increase contamination entering wetland systems. • Increase stormwater runoff, erosion and sedimentation	-		S	L	D	CR	NL	Yes	- See Table 6.5	L	Wetland Impact Assessment (Appendix D8)
		SOCIAL /ECON	Visual landscape	• Potential visual impacts on sensitive visual receptors located within a 1km radius from the solar facility.		-	L	L	D	IR	SL	Yes	• See Table 6.5	L	Visual Impact Assessment

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS			SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES / INFORMATION
		Receptors		Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
Activity 1 (GN.R 325): *"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more."*	following auxiliary buildings with basic services including water and electricity will be required on the site: • Operations & Maintenance Building / Office; • Switch gear and relay room; • Staff lockers and changing room; • Security control; • Temporary Laydown Areas; and construction site camp/site office; Roads – Access is most likely to be obtained via the R70 Provincial Road and existing farm roads. An internal site road network will also be required to provide access to the solar field and associated			• Potential visual impacts on sensitive visual receptors located within a 1km radius • Potential visual impacts on sensitive visual receptors located within a 1km radius. • Potential visual impacts on sensitive visual receptors between a 1km and 3km radius from the solar facility. • Potential visual impacts on sensitive visual receptors between a 1km and 3km radius • Potential visual impacts on sensitive visual receptors between a 3km and 5km radius from the solar facility. • Potential visual impacts on sensitive visual receptors between a 3km and 5km radius • Potential visual impacts on sensitive visual receptors between a 3km and 5km radius • Potential visual impacts on sensitive visual receptors located between a 5km and 10km radius from the solar facility. • Potential visual impacts on sensitive visual receptors located between a 5km and 10km radius.										(Appendix D3)

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS			SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES / INFORMATION
			Receptors	Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
	infrastructure. Access roads will be up to 8m wide (6m wide road surface, with 1m drainage either side). Fencing - For health, safety and security reasons, the facilities will require perimeter fencing and internal security fencing. The fencing will be up to 2.4 m in height.			• Potential visual impacts on sensitive visual receptors located between a 5km and 10km radius. • Lighting Impacts of the solar facility. • Solar glint and glare impacts of the solar facility. • Visual and sense of place impacts of the solar facility. • Visual and sense of place impacts											
			Traffic volumes	• The proposed development will not result in any major traffic impacts during the operational phase.	-		S	L	Po	PR	NL	Yes	• All operations and maintenance vehicles must be roadworthy and drivers must have the relevant licenses for the type of vehicles they are operating. • All vehicle drivers need to strictly adhere to the rules of the road.	L	-
			Heritage resources	• The sites, features or objects of cultural historic significance that have been identified in the site, will not be significantly affected at this delelopment stage •	-		S	P	U	CR	NL	Yes	• See Table 6.4	L	Heritage Impact Assessment (Appendix D5)
			Paleontological Heritage	• Loss of fossil heritage • Destroy or permanently seal-in fossils at or below the surface that are then no longer available for scientific study		-	S	P	U	CR	NL	Yes	• See Table 6.4	L	Paleontological Impact Assessment (Appendix D6)
			Health & Safety	• The proposed development will not result in any health and safety impacts during the operational phase.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	N/A	N/A

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS		SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES / INFORMATION
		Receptors	Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
		Positive social impacts	• Direct and indirect employment and skills development opportunities • Development of non-polluting, renewable energy infrastructure • Contribution to LED and social upliftment • Potential impacts on tourism • Increased household earnings		+	L	L	Pr	PR	NL	Yes	• See Table 6.5	H-L	Social Impact Assessment (Appendix D7)
		Negative social impacts	• Potential impacts on tourism • Impacts associated with the loss of agricultural land. • Visual and sense of place impacts		-	L	L	Pr	R	SL	Yes	• See Table 6.5	L	Social Impact Assessment (Appendix D7)
		Noise levels	• The proposed development will not result in any noise pollution during the operational phase.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Electricity supply	• Generation of additional electricity. • The power line will transport generated electricity into the grid.	+		I	L	D	I	N/A	Yes	-	N/A	-
		Electrical infrastructure	• Additional electrical infrastructure. The proposed solar facility will add to the existing electrical infrastructure and aid to lessen the reliance of electricity generation from coal-fired power stations.	+		I	L	D	I	N/A	Yes	-	N/A	-
DECOMMISSIONING PHASE														

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS			SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES / INFORMATION
			Receptors	Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
-	Dismantlement of infrastructure During the decommissioning phase the Solar PV Energy facility and its associated infrastructure will be dismantled. Rehabilitation of biophysical environment The biophysical environment will be rehabilitated.	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	• Direct habitat destruction • Habitat fragmentation • Increased soil erosion and sedimentation • Soil and water pollution • Air pollution • Spread and establishment of alien invasive species • Negative effect of human activities on fauna and road mortalities		-	L	L	/ Po	PR	SL	Yes	- See Table 6.6	L	Terrestrial Biodiversity Impact Assessment (Appendix D1)
			Avifaunal	• Long-term or permanent degradation and modification of the receiving environment resulting to in the loss of important avian habitats. • Displacement of resident avifauna through increased disturbance.		-	S	L	Pr	PR	SL	Yes	- See Table 6.6	L	Avifaunal Impact Assessment (Appendix D2)
			Air quality	• Air pollution due to the increase of traffic of construction vehicles	-		S	S	D	CR	NL	Yes	- Regular maintenance of equipment to ensure reduced exhaust emissions.	L	-
			Existing services infrastructure	• Generation of waste that needs to be accommodated at a licensed landfill site • Generation of sewage that needs to be accommodated by the municipal sewerage system and the local sewage plant • Increase in construction vehicles	-		L	S	D	I	NL	Yes	-	L	Confirmation from the Local Municipality is required to confirm services availability
			Groundwater	• Pollution due to construction vehicles	-		S	S	Pr	CR	ML	Yes	• All vehicles should be inspected for oil and fuel leaks on a regular basis. • Vehicle maintenance yards on site should make provision for drip	L	-

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS		SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES / INFORMATION
		Receptors	Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
												trays that will be used to capture any spills. Drip trays should be emptied into a holding tank and returned to the supplier.		
		Visual landscape	• Visual impact of activities on sensitive visual receptors in close proximity to the proposed Notsi PV 5. • The decommissioning phase of the project will result in the same visual impacts experienced during the construction phase of the project. However, in the case of Notsi PV 5 it is anticipated that the proposed facility will be refurbished and upgraded to prolong its life. No decommissioning of the facility is proposed.		-	L	S	D	PR	SL	Yes	• See Table 6.4	L	Visual Impact Assessment (Appendix D3)
		Traffic volumes	• Road network will be affected • Increase in traffic influencing traffic congestion and road safety	-		L	S	D	CR	NL	Yes	• All decommissioning vehicles must be roadworthy and drivers must have the relevant licenses for the type of vehicles they are operating. • All vehicle drivers need to strictly adhere to the rules of the road.	L	-
		Health & Safety	• Air/dust pollution. • Road safety. • Increased crime levels. The presence of construction workers on the site may increase security risks associated with an increase in crime levels as a result of influx of people in the rural area.	-		L	S	Pr	PR	ML	Yes	• Demarcated routes to be established for construction vehicles to ensure the safety of communities, especially in terms of road safety and communities to be informed of these demarcated routes.	L	-

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS		SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES / INFORMATION
		Receptors	Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
												• Where dust is generated by trucks passing on gravel roads, dust mitigation must be enforced. • Any infrastructure that would not be decommissioned must be appropriately locked and/or fenced off to ensure that it does not pose any danger to the community. • Components that are dismantled must be recycled / reduced as far as possible.		
		Noise levels	• The generation of noise as a result of construction vehicles, the use of machinery and people working on the site	-		L	S	D	CR	NL	Yes	• The decommissioning phase must aim to adhere to the relevant noise regulations and limit noise within standard working hours in order to reduce disturbance of dwellings in close proximity to the development.	L	-
		Tourism industry	• N/A	-		L	S	D	CR	ML	Yes	• See Table 6.4	L	-

Nature of the impact:	(N/A) No impact	(+) Positive Impact (-)	Negative Impact	
Geographical extent:	(S) Site;	(L) Local/District;	(P) Province/Region;	(I) International and National
Probability:	(U) Unlikely;	(Po) Possible;	(Pr) Probable;	(D) Definite
Duration:	(S) Short Term;	(M) Medium Term;	(L) Long Term;	(P) Permanent
Intensity / Magnitude:	(L) Low;	(M) Medium;	(H) High;	(VH) Very High
Reversibility:	(CR) Completely Reversible;	(PR) Partly Reversible;	(BR) Barely Reversible;	(IR) Irreversible
Irreplaceable loss of resources:	(IR) Irreversible	(NL) No Loss;	(ML) Marginal Loss;	(SL) Significant Loss;	(CL) Complete Loss

Level of residual risk:	(L) Low;	(M) Medium;	(H) High;	(VH) Very High	-

6.2 KEY ISSUES IDENTIFIED

From the above it is evident that mitigation measures should be available for potential impacts associated with the proposed activity and development phases. The scoping methodology identified the following key issues which should be addressed in more detail in the EIA report.

6.2.1 Impacts During the Construction Phase

During the construction phase the following activities will have various potential impacts on the biophysical and socio-economic environment:

- LN1 - Activity 11 (i) (GN.R. 517): *"The development of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."*
- LN1 - Activity 24 (ii) (GN.R 517): *"The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters."*
- LN1 - Activity 28 (ii) (GN.R. 517): *"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."*
- LN1 - Activity 56 (ii) (GN.R 517): "*The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres…"*
- LN2 - Activity 1 (GN.R. 517): *"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more..."*
- LN2 - Activity 15 (GN.R. 517): *"The clearance of an area of 20 hectares or more of indigenous vegetation..."*
- LN3 - Activity 4 (b)(i)(ee) (GN.R 517): *"The development of a road wider than 4 metres with a reserve less than 13,5 metres within (b) Free State, (i) Outside urban areas (bb) National Protected Area Expansion Strategy Focus areas, (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the Competent Authority or in bioregional plans, and (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas."*
- LN3 - Activity 10 (b)(i)(ee) (GN.R 517): *"The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres (b) Free State, (i) Outside urban areas (bb) National Protected Area Expansion Strategy Focus areas, (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the Competent Authority or in bioregional plans, (gg) Areas within 10 kilometres from national*

parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas."

- LN3 - Activity 12 (b)(ii)(iv) (GN.R 517): "*The clearance of an area of 300 square metres or more of indigenous vegetation (b) Free State (ii) Within critical biodiversity areas identified in bioregional plans."*

- LN3 - Activity 18 (b)(i)(ee) (GN.R 517): *"The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (b) Free State (i) Outside urban areas(bb) National Protected Area Expansion Strategy Focus areas (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the Competent Authority or in bioregional plans."*

During the construction phase temporary negative impacts are foreseen over the short term. Table 6.3 summarises the potentially most significant impacts and the mitigation measures that are proposed during the construction phase.

Table 6.3: Impacts and the mitigation measures during the construction phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Terrestrial Biodiversity Impact Assessment (Appendix E2)	Destruction, loss and fragmentation of habitats (including wetlands), ecosystems and the vegetation community.	Negative High	Negative Medium	• All development areas must be clearly demarcated. No Very High SEI areas should be disturbed at all. • Areas of indigenous vegetation outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. The construction area must be fenced off and no ingress into other areas allowed. • All activities must make use of existing roads and tracks as far as practically and feasibly possible. No new roads or servitudes should be constructed where existing infrastructure can be used. • Apply for a permit to relocate (where possible) protected plant species to similar habitat recommended by a specialist. Where Protected plants are located within the fenced area but outside the development area, these must be marked and not disturbed (as far as practicable). • All laydown areas, chemical toilets etc. should be restricted to disturbed areas where possible. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded. Use of re-usable/recyclable materials are recommended. • Areas that have been disturbed during construction, but will not undergo development, must be revegetated with indigenous vegetation dominant in the area. • A spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding

				areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment susceptible of leakages. • A stormwater management plan must be developed and applied to the site.
	Introduction of IAP species and invasive fauna.	Negative Medium	Negative Low	• The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas thereby causing further encroachment of invasive species. • An alien invasive plant management plan must be developed and applied to the site.
	Displacement of the indigenous faunal community (including SCC) due to habitat loss, direct mortalities, and disturbance (road collisions, noise, dust, light, vibration, and poaching).	Negative High	Negative Low	• A qualified environmental control officer must be on site when construction begins to identify fauna species that will be directly disturbed and to relocate protected fauna/flora that are found during the construction activities. The area must be walked though prior to construction to ensure no faunal species remain in the habitat and get killed. Should animals not move out of the area on their own relevant specialists must be contacted to advise on how the species can be relocated. • Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to nocturnal mammals • No trapping, killing, or poisoning of any wildlife is to be allowed • Fencing mitigations include the following: o Top 2 strands must be smooth wire o Routinely re-tension loose wires o Minimum 30cm between wires o Place markers on fences

				• Fauna should be kept out of the PV area by employing low and high electrified strands top prevent small and large mammal ingress. • Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all areas of construction. This includes wetting of exposed soft soil surfaces. No non-environmentally friendly suppressants may be used as this could result in the pollution of water sources. • All personnel to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of species, their identification, conservation status and importance, biology, habitat requirements and management requirements within the Environmental Authorisation and the EMPr.
Wetland Impact Assessment (Appendix E3) (Ratings are as per the GNR 509 Risk Assessment Matrix)	Direct disturbance / degradation to wetland soils or vegetation due to the construction of the solar facility.	Negative Low	Negative Low	• Clearly demarcate the construction footprint and restrict all construction activities to within the proposed infrastructure area. • When clearing vegetation, allow for some vegetation cover as opposed to bare areas. • Minimize the disturbance footprint and the unnecessary clearing of vegetation outside of this area. • Use the wetland shapefiles to signpost the edge of the wetlands closest to site. Place the sign 15 m from the edge (this is the buffer zone). Label these areas as environmentally sensitive areas, keep out. • Educate staff and relevant contractors on the location and importance of the identified wetlands through toolbox talks and by including them in site inductions as well as the overall master plan. • All activities (including driving) must adhere to the 15 m buffer area. • Promptly remove / control all alien and invasive plant species that may emerge during construction (i.e. weedy annuals and other alien forbs) must be removed.

				• Landscape and re-vegetate all denuded areas as soon as possible.
	Increased erosion and sedimentation.	Negative Low	Negative Low	• Limit construction activities near (< 50m) wetlands to winter (as much as possible) when rain is least likely to wash concrete and sand into the wetland. Activities in black turf soils can become messy during the height of the rainy season and construction activities should be minimised during these times to minimise unnecessary soil disturbances. • Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash. • No activities are permitted within the wetland and associated buffer areas. • Landscape and re-vegetate all unnecessarily denuded areas as soon as possible.
	Potential contamination of wetlands with machine oils and construction materials.	Negative Low	Negative Low	• Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility. • Appropriately stockpile topsoil cleared from the project area. • Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g., concrete) in such a way as to prevent them leaking and entering the wetlands. • No activities are permitted within the wetland and associated buffer areas.
Avifaunal Impact Assessment (Appendix E4)	Loss of resident avifauna through increased disturbance	Negative High	Negative Low	• Disturbance can be managed and mitigated at the design stage by avoiding important nesting, roosting and foraging areas of sensitive species during site selection and layout design. • All identified No Go Areas must be excluded from the development footprint, and areas of high sensitivity should be avoided. • The development footprint should exclude a 1 km No-Go buffer (Very High Sensitivity) surrounding any active or inactive/previous Secretarybird breeding site, as per Birdlife SA's Guideline.

				• Secretarybird typically change breeding sites every 1-5 years, and an area of up to 3 km surrounding the proposed development footprint should be surveyed (i.e., searched) every year during the breeding season post-authorisation in order to avoid conflicts at the start of construction. • It is noted that there are currently no known Secretarybird breeding sites within 3 km of the proposed project development footprint. Should a nest be located within 3 km of the authorised facility infrastructure post-authorisation development activities within 1 to 3 km of any active Secretarybird breeding site must be minimised to mitigate disturbance (Birdlife SA 2022) and the applied minimisation measures and any construction activities to take place must be signed-off in advance by a SACNASP registered avifaunal specialist in discussion with the Developer. • Minimisation measures could entail amending the construction schedule to commence construction as late as possible within the inside of the buffer area, and only commence with activities that create the least amount of disturbance to a breeding pair and immature bird until it has left the nest. It should be noted that the detail of what can be expected to be acceptable will depend largely on the breeding status at the time, but due to the nature of juvenile dispersal is likely to exclude the clearing of indigenous vegetation within a 1 – 2 km Secretarybird nest buffer area, which the juvenile bird relies on to forage for food before dispersal. • Breeding sites must be monitored regularly to determine breeding activity throughout the year, as Secretarybird can breed any time of the year, influenced by rainfall, until it is confirmed to be abandoned. • A walkthrough of the authorised final development layout and the 3 km surrounding area must be conducted by an avifaunal specialist or observer trained by an avifaunal specialist within 30 days prior to the commencement of construction to confirm SCC breeding activities.

				• Should any SCC be found breeding within 3 km of the operational facility, or facility to be decommissioned, a 1 km area surrounding the nest must be cordoned off as a no-go area as far as practically possible, and an avifaunal specialist must immediately be consulted for further instruction. • All disturbance can be further minimised by demarcating the disturbance footprint, and minimising this to the development footprint as much as practically possible.
	Habitat loss and displacement	Negative High	Negative Medium	• Mitigation of habitat loss from construction of the facility is primarily achieved during the design phase by avoiding sensitive and essential habitat, and nest buffers, and minimising the development footprint as far as practically possible. • A walkthrough of the authorised final development layout and the 3 km surrounding area must be conducted by an avifaunal specialist or observer trained by an avifaunal specialist within 30 days prior to the commencement of construction and decommissioning to confirm SCC breeding activities. • Mitigation following authorisation is only marginally possible by minimising the construction footprint of all associated infrastructure, including buildings, electrical infrastructure and the width and length of roads.
Soils and Agricultural Impact Assessment (Appendix E1)	Loss of land capability	Negative Low	Negative Low	• A system of stormwater management, which will prevent erosion, will be an inherent part of the engineering on site. • Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there. • Any excavations done during the construction phase, in areas that will be re-vegetated at the end of the construction phase, must separate the upper 30 cm of topsoil from the rest of the excavation spoils and store it in a separate stockpile.

				• When the excavation is back-filled, the topsoil must be back-filled last, so that it is at the surface. • Topsoil should only be stripped in areas that are excavated. Across the majority of the site, including construction laydown areas, it will be much more effective for rehabilitation, to retain the topsoil in place. • If levelling requires significant cutting, topsoil should be temporarily stockpiled and then re-spread after cutting, so that there is a covering of topsoil over the entire cut surface. It will be advantageous to have topsoil and vegetation cover below the panels during the operational phase to control dust and erosion.
Heritage Impact Assessment (Appendix E7)	Loss or damage to sites, features or objects of cultural heritage significance	Negative Medium	Negative Low	• A no development buffer area of 100m must be implemented around site Site002, the grave located in the northern section of the site. • A Heritage Agreement and Conservation Management Plan be developed for the ongoing management of these resources. • Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage • Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.
Palaeontological Impact Assessment (Appendix E7)	Destroy or permanently seal-in fossils at or below the surface that are then no longer available for scientific study	Negative Medium	Negative Low	• If Palaeontological Heritage is uncovered during surface clearing and excavations the **Chance find Protocol** attached should be implemented immediately. Fossil discoveries ought to be protected and the ECO/site manager must report to South African Heritage Resources Agency (SAHRA) (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation (recording and collection) can be carried out.

				• Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.
Visual Impact Assessment (Appendix E5)	Visual impact of construction activities of the solar facility	Negative Medium	Negative Medium	Planning • Retain and maintain natural vegetation immediately adjacent to the development footprint. Construction • Ensure that vegetation is not unnecessarily removed during the construction phase. • Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e., in already disturbed areas) where possible. • Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. • Ensure that rubble, litter, etc. are appropriately stored (if it can't be removed daily) and then disposed of regularly at a licenced waste site. • Reduce and control dust during construction by utilising dust suppression measures. • Limit construction activities to normal daytime hours, where possible, in order to reduce the impacts of construction lighting. • Rehabilitate all disturbed areas immediately after the completion of construction work and maintain good housekeeping.
Social Impact Assessment	Creation of direct and indirect employment and	Positive Low	Positive Medium	Enhancement: • A local employment policy should be adopted to maximise opportunities made available to the local labour force.

(Appendix E6)	skills development opportunities.			• Labour should be sourced from the local labour pool, and only if the necessary skills are unavailable should labour be sourced from (in order of preference) the greater Matjhabeng LM, Lejweleputswa DM, Free State Province, South Africa, or elsewhere. • Where feasible, training and skills development programmes should be initiated prior to the commencement of the construction phase. • As with the labour force, suppliers should also as far as possible be sourced locally. • As far as possible local contractors that are compliant with Broad-Based Black Economic Empowerment (B-BBEE) criteria should be used. • The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. • The recruitment process should ensure that all contracts should require compliance with relevant human rights legislation and ensure human rights are maintained.
	Economic Multiplier effect	Positive Low	Positive Medium	Enhancement: • It is recommended that a local procurement policy is adopted to maximise the benefit to the local economy. • A database of local companies, specifically Historically Disadvantaged Individuals (HDIs) which qualify as potential service providers (e.g., construction companies, security companies, catering companies, waste collection companies, transportation companies etc.) should be created and companies listed thereon should be invited to bid for project-related work where applicable. • Local procurement is encouraged along with engagement with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods and products from local suppliers where feasible.

	Improvements to shared infrastructure	Positive Low	Positive Low	Enhancement: • The project would contribute to an upgrade in the shared infrastructure of the LM as well as in the maintenance of this infrastructure. • The LM would be encouraged to participate in this maintenance and upgrade where it would be feasible for them to be involved. • A database of local companies, specifically Historically Disadvantaged Individuals (HDIs) which qualify as potential service providers (e.g., construction companies, security companies, catering companies, waste collection companies, transportation companies etc.) should be created (or sourced from the local Municipality, where available) and companies listed thereon should be invited to bid for project-related work where applicable and this would include the maintenance of this shared infrastructure.
	Potential loss of productive farmland	Negative Medium	Negative Low	• The proposed site needs to be fenced off prior to the construction phase and all construction related activities should be confined in this fenced off area. • Livestock grazing on the proposed site need to be relocated. • All affected areas outside of the development footprint, which are disturbed during the construction phase, need to be rehabilitated prior to the operational phase and should be continuously monitored. • Implement, manage and monitor a grievance mechanism for the recording and management of social issues and complaints.
	In-migration of people (non-local workforce and jobseekers).	Negative Medium	Negative Medium	• Develop and implement a local procurement policy which prioritises “locals first” to prevent the movement of people into the area in search of work. • Engage with local community representatives prior to construction to facilitate the adoption of the locals first procurement policy. • Provide transportation for workers (from closest towns and surrounds) to ensure workers can easily access their place of employment and do not need to move closer to the project site.

				• As far as possible, working hours should be kept between daylight hours during the construction phase, and / or as any deviation that is approved by the relevant authorities. • Compile and implement a grievance mechanism. • Appoint a Community Liaison Officer (CLO) to assist with the procurement of local labour. • Prevent the recruitment of workers at the project site. • Implement, manage and monitor a grievance mechanism for the recording and management of social issues and complaints. • Establish clear rules and regulations for access to the proposed site. • Appoint a security company and implement appropriate security procedures to ensure that workers do not remain onsite after working hours. • Inform local community organisations and policing forums of construction times and the duration of the construction phase. • Establish procedures for the control and removal of loiterers from the construction site.
	Safety and security impacts	Negative Medium	Negative Low	• As far as possible, working hours should be kept within daylight hours during the construction phase, and / or as any deviation that is approved by the relevant authorities. • Provide transportation for workers to prevent loitering within or near the project site outside of working hours. • The perimeter of the construction site should be appropriately secured to prevent any unauthorised access to the site. The fencing of the site should be maintained throughout the construction period. • The appointed EPC Contractor must appoint a security company to ensure appropriate security procedures and measures are implemented.

				• Access in and out of the construction site should be strictly controlled by a security company appointed to the project. • A CLO should be appointed as a grievance mechanism. A method of communication should be implemented whereby procedures to lodge complaints are set out for the local community to express any complaints or grievances with the construction process. • The EPC Contractor should implement a stakeholder management plan to address neighbouring farmer concerns regarding safety and security. • The project proposed must prepare and implement a Fire Management Plan; this must be done in conjunction with surrounding landowners. • The EPC Contractor must prepare a Method Statement which deals with fire prevention and management.
	Impacts on daily living and movement patterns	Negative Medium	Negative Low	• All vehicles must be road worthy, and drivers must be qualified, obey traffic rules, follow speed limits and be made aware of the potential road safety issues. • All drivers must have the relevant licences for the types of vehicles they are operating. • Heavy vehicles should be inspected regularly to ensure their road worthiness. • Provision of adequate and strategically placed traffic warning signs, that have to be maintained for the duration of the construction phase, and control measures along the S322 secondary road to warn road users of the construction activities taking place for the duration of the construction phase. Warning signs must be always visible, especially at night. • Implement penalties for reckless driving to enforce compliance to traffic rules. • Avoid heavy vehicle activity during “peak” hours (when children are taken to school, or people are driving to work).

				• The developer and EPC Contractor must ensure that all fencing along access roads is maintained in the present condition or repaired if disturbed due to construction activities. • The developer and EPC Contractor must ensure that the roads utilised for construction activities are either maintained in the present condition or upgraded if disturbed due to construction activities. • The EPC Contractor must ensure that damage / wear and tear caused by construction related traffic to the access roads is repaired before the completion of the construction phase. • A method of communication must be implemented whereby procedures to lodge complaints are set out for the local community to express any complaints or grievances with the construction process.
	Nuisance impacts (noise and dust)	Negative Medium	Negative Low	• The movement of heavy vehicles associated with the construction phase should be timed to avoid weekends, public holidays, and holiday periods where feasible. • Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. • Ensure all vehicles are road worthy, drivers are qualified and are made aware of the potential noise and dust issues. • A CLO should be appointed, and a grievance mechanism implemented.
	Increased risk of potential veld fires	Negative Medium	Negative Low	• A firebreak should be implemented before the construction phase. The firebreak should be controlled and implemented around the perimeters of the project site. • Adequate fire-fighting equipment should be provided and readily available on site and all staff should be trained in firefighting and how to use the fire-fighting equipment.

				• No staff (except security) should be accommodated overnight on site and the contractor should ensure that no open fires are allowed on site. The use of cooking or heating implements should only be used in designated areas. • Contractors need to ensure that any construction related activities that might pose potential fire risks, are done in the designated areas where it is also managed properly. • Precautionary measures need to be taken during high wind conditions or during the winter months when the fields are dry. • The project will adhere to the National Forest and Veld Fires act and the fire management plan. It is recommended that the project proponent join the local fire association.
	Visual and sense of place impacts	Negative Medium	Negative Low	• Implement mitigation measures identified in the Visual Impact Assessment (VIA) prepared for the project. • As far as possible, limit noise generating activities to normal daylight working hours and avoid weekends and public holidays. • The movement of heavy vehicles associated with the construction phase should be timed to avoid weekends, public holidays, and holiday periods where feasible. • Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. • All vehicles must be road-worthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits. • Communication, complaints, and grievance channels must be implemented and contact details of the CLO must be provided to the local community in the study area.

6.2.2 Impacts During the Operational Phase

During the operational phase the site will serve as a solar facility. The potential impacts will take place over a period of 25 – 30 years. During the operational phase the following activities will have various potential impacts on the biophysical and socio-economic environment:

- LN1 - Activity 11 (i) (GN.R. 517): *"The development of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."*
- LN2 - Activity 1 (GN.R. 517): *"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more..."*
- LN3 - Activity 10 (b)(i)(ee) (GN.R 517): *"The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres (b) Free State, (i) Outside urban areas (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the Competent Authority or in bioregional plans".*

During the operational phase minor negative impacts are foreseen over the long term. The latter refers to at least a 25-year period. Table 6.4 summarizes the potentially most significant impacts and the mitigation measures that are proposed during the operational phase.

Table 6.4: Impacts and the mitigation measures during the operational phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Terrestrial Biodiversity Impact Assessment (Appendix E2)	Continued fragmentation and degradation of natural habitats and ecosystems (including wetlands).	Negative Medium	Negative Low	• The clearing of vegetation must be minimized where possible. All activities must be restricted to within the authorised areas. It is recommended that areas to be developed be specifically and responsibly demarcated so that during the construction phase only the demarcated areas be impacted upon. • Existing access routes, especially roads, must be made use of. • Any materials may not be stored for extended periods of time and must be removed from the PAOI once the construction phase has been concluded. No permanent construction phase structures should be permitted. Construction buildings should preferably be prefabricated or constructed of re-usable/recyclable materials. No storage of vehicles or equipment will be allowed outside of the designated laydown areas. • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation according to a habitat rehabilitation plan, to prevent erosion during flood and wind events and to promote the regeneration of functional habitat. This will also reduce the likelihood of encroachment by invasive alien plant species. All grazing mammals must be kept out of the areas that have recently been re-planted.

				• A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. ○ Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. ○ No servicing of equipment on site unless necessary. ○ All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. ○ Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them from leaking and entering the environment. ○ Construction activities and vehicles could cause spillages of lubricants, fuels and waste material negatively affecting the functioning of the ecosystem. ○ All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the project area.

				• It must be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants. • A fire management plan needs to be complied and implemented to restrict the impact fire would have on the surrounding areas.
	Continuing spread of IAP and weed species.	Negative medium	Negative Low	• An Invasive Alien Plant Management Plan must be compiled and implemented. This should regularly be updated to reflect the annual changed in IAP composition. • The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprints of the roads must be kept to prescribed widths. • Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site. A location specific waste management plan must be put in place to limit the presence of rodents and pests and waste must not be allowed to enter surrounding areas. • A pest control plan must be put in place and implemented; it is imperative that poisons not be used

				to control pests due to the likely occasional presence of SCC.
	Ongoing displacement and direct mortalities of the faunal community (including SCC) due to continued disturbance (road collisions, noise, light, dust, vibration, poaching, etc.)	Negative medium	Negative Low	• The areas to be disturbed must be specifically and responsibly demarcated to prevent the movement of staff or any individual into the surrounding environments, signs must be put up to enforce this. • Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to reptile species and nocturnal mammals. • No trapping, killing, or poisoning of any wildlife is to be allowed and • Signs must be put up to enforce this. Monitoring must take place in this regard. • Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from any sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible. • All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion is limited. • Schedule activities and operations during least sensitive periods, to avoid migration, nesting, and breeding seasons.

				• Fencing mitigations:
				  ○ Top 2 strands must be smooth wire
				  ○ Routinely re-tension loose wires
				  ○ Minimum 30cm between wires
				• Place markers on fences.
				• Use environmentally friendly cleaning and dust suppressant products.

Wetland Impact Assessment (Appendix E3) (Ratings are as per the GNR 509 Risk Assessment Matrix)	Potential for increased stormwater runoff leading to Increased erosion and sedimentation.	Negative Low	Negative Low	• Design and Implement an effective stormwater management plan. • Promote water infiltration into the ground beneath the solar panels. • Release only clean water into the environment. • Stormwater leaving the site should not be concentrated in a single exit drain but spread across multiple drains around the site each fitted with energy dissipaters (e.g., slabs of concrete with rocks cemented in). • Re-vegetate denuded areas as soon as possible. Regularly clear drains. • Minimise the extent of concreted / paved / gravel areas. • A covering of soil and grass (regularly cut and maintained) below the solar panels is ideal for infiltration. If not feasible then gravel is preferable over concrete or paving. • Avoid excessively compacting the ground beneath the solar panels.
	Potential for increased contaminants entering the wetland systems.	Negative Low	Negative Low	• Where possible minimise the use surfactants to clean solar panels and herbicides to control vegetation beneath the panels. If surfactants and herbicides must

				be used do so well prior to any significant predicted rainfall events.
Avifauna Impact Assessment (Appendix E4)	Loss of resident avifauna through increased disturbance	Negative High	Negative Low	• See construction mitigation measures provided in Table 6-4.
	Collisions with PV Panels and Associated Infrastructure	Negative Medium	Negative Low	• Mitigation measures to avoid collisions with PV panels are limited, but collisions can be reduced by site selection away from areas where birds congregate or known flyways, which the project has achieved, and by making the site otherwise unattractive to avifauna, i.e. by minimising any available perching and nesting structures, , reducing attractive or disorientating lighting, and by implementing an operational monitoring programme with carcass searching (Bennun et al. 2021). • The perimeter and internal fencing should consist of a single-fence design and be in line with the Birdlife SA guideline on Fences & Birds. • All internal power lines must be buried. • Operational phase monitoring of mortalities should be undertaken in line with current Best Practice Guidelines and if unacceptably high levels of mortalities are recorded, adaptive mitigation measures such as deterrent devices may need to be considered.
	Electrocution risks leading to injury or loss of avian life which decreases avifauna species diversity	Negative Medium	Negative Low	• Bird electrocutions can easily be prevented with bird-friendly pole design i.e., creating separation between conductors of differing electric potential, by placing insulation over conductors, or by redirecting birds to

				perch or nest away from conductors (APLIC 2006, Dwyer et al. 2017).
	Barrier effect	Negative Low	Negative Low	• The only realistic option to mitigate this impact is to select a site away from known migratory corridors and flyways between roosting and nesting areas. • There are no major known migratory flyways in the region, as migrating birds generally disperse into the interior of South Africa, and no distinct flyways between roosting and nesting areas were identified during pre-application monitoring. • The final layout must ensure habitat connectivity for Secretarybird breeding sites and foraging habitat with an infrastructure-free corridor consisting of a 90° area from a Secretarybird breeding site to the foraging habitat / site boundary, as per Birdlife SA guidance (Birdlife SA 2022).
Soils and Agricultural Impact Assessment (Appendix E1)	Loss of land capability	Negative Low	Negative Low	• See construction mitigation measures provided in Table 6-4.
Visual Impact Assessment (Appendix E5)	Potential visual impacts on sensitive visual receptors located within a 1km radius from the solar facility.	Negative High	Negative Medium	Planning • Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint. • Where insufficient natural vegetation exists next to the property, a 'screen' can be planted if the landowner

				requests additional mitigation. This can be done using endemic, fast growers that are water efficient. Operations • Maintain general appearance of the facility as a whole.
	Potential visual impacts on sensitive visual receptors located within a 1km and 3km radius	Negative Medium	Negative Medium	Planning • Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint. Operations • Maintain general appearance of the power line corridor. • Screening can be established near sensitive receptors, upon request, rather than to mitigate the impact at the source.
	Potential visual impacts on sensitive visual receptors located within a 3km and 5km radius.	Negative Medium	Negative Medium	
	Potential visual impacts on sensitive visual receptors between a 5km and 10km radius from the solar facility.	Negative Low	Negative Low	Planning • Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint. • Where insufficient natural vegetation exists next to the property, a 'screen' can be planted if the landowner requests additional mitigation. This can be done using endemic, fast growers that are water efficient. Operations • Maintain general appearance of the facility as a whole.
	Lighting Impacts of the solar facility.	Negative Medium	Negative Low	Planning & Operation As far as practically possible: • Shield the source of light by physical barriers (walls, vegetation etc.) • Limit mounting heights of lighting fixtures, or alternatively use footlights or bollard level lights. • Make use of minimum lumen or wattage in fixtures.

				• Make use of down-lighters, or shield fixtures. • Make use of low-pressure sodium lighting or other types of low impact lighting. • Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes. • The use of night vision or thermal security cameras are very effective and can replace security lighting entirely.
	Solar glint and glare impacts of the solar facility.	Negative Medium	Negative Low	No mitigation measures are required
	Visual and sense of place impacts of the solar facility.	Negative Medium	Negative Medium	• It is believed that renewable energy resources are essential to the environmental well- being of the country and planet (WESSA, 2012). Aesthetic issues are subjective, and some people find solar farms and their associated infrastructure pleasant and optimistic while others may find it visually invasive; it is mostly perceived as symbols of energy independence; and local prosperity. • The subjectivity towards the project in its entirety can be influenced by creating a "Green Energy" awareness campaign, educating the local community and potentially tourists on the benefits of renewable energy. This can be achieved by also hosting an 'open day' where the local community can have the opportunity to view the completed project which may enlist a sense of pride in the renewable energy project in their area. Note that

				this is not a requirement, but is encouraged, where possible. • Implement good housekeeping measures.
Social Impact Assessment (Appendix E6)	Direct and Indirect employment opportunities and skills development	Positive Low	Positive Medium	Enhancement: • It is recommended that local employment policy is adopted to maximise the opportunities made available to the local community. • The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. • Vocational training programs should be established to promote the development of skills.
	Development of non-polluting, renewable energy infrastructure	Positive Medium	Positive Medium	• No enhancement identified.
	Contribution to Local Economic Development (LED) and social upliftment	Positive Medium	Positive High	Enhancement: • A CNA must be conducted to ensure that the LED and social upliftment programmes proposed by the project are meaningful. • Ongoing communication and reporting are required to ensure that maximum benefit is obtained from the programmes identified, and to prevent the possibility for such programmes to be misused. • The programmes should be reviewed on an ongoing basis to ensure that they are best suited to the needs of the community at the time (bearing in mind that these are likely to change over time).

	Impact on tourism	Negative Low	Positive Low	Negative Low	Positive Low	• Due to the extent of the project no viable mitigation measures can be implemented to eliminate the visual impact of the PV panels, but the subjectivity towards the PV panels can be influenced by creating a "Green Energy" awareness campaign, educating the local community and tourists on the benefits of renewable energy. Tourists visiting the area should be made aware of South Africa's movement towards renewable energy. This might create a positive feeling of a country moving forward in terms of environmental sustainability.
	Visual and sense of place impacts	Negative Medium		Negative Low		• To effectively mitigate the visual impact and the impact on sense of place during the operational phase of the proposed project, it is suggested that the recommendations made in the Visual Impact Assessment (specialist study) should be followed in this regard
	Improvement of safety and security	Positive Medium		Positive Medium		• None identified.
	Increasement in household earnings	Positive Low		Positive Medium		• It is recommended that local employment policy is adopted to maximise the opportunities made available to the local community. • With the recruitment of the local community for job creation and increasement in household earnings will automatically be seen in the area surrounding the development.

Palaeontological Impact Assessment (Appendix E7)	Destroy or permanently seal-in fossils at or below the surface that are then no longer available for scientific study	Negative Medium	Negative Low (	• See construction mitigation measures provided in Table 6-4.

6.2.3 Impacts During the Decommissioning Phase

The physical environment will benefit from the closure of the solar facility since the site will be restored to its natural state. Table 6.5 provides a summary of the impacts during the decommissioning phase. The decommissioning phase will however potentially result in impact on soils, pressure on existing service infrastructure, surface water and the loss of permanent employment. Skilled staff will be eminently employable, and a number of temporary jobs will also be created in the process. Decommissioning of a PV facility will leave a positive impact on the habitat and biodiversity in the area as the area will be rehabilitated to its natural state.

Table 6.5: Impacts and the mitigation measures during the decommissioning phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Terrestrial Biodiversity Impact Assessment (Appendix E2)	Destruction, loss and fragmentation of habitats (including wetlands), ecosystems and the vegetation community.	Negative medium	Negative Low	• See construction mitigation measures provided in Table 6-4.
	Introduction of IAP species and invasive fauna.	Negative Medium	Negative Low	• See construction mitigation measures provided in Table 6-4.
	Displacement of the indigenous faunal community (including SCC) due to habitat loss, direct mortalities, and disturbance (road collisions, noise, dust, light, vibration, and poaching).	Negative Medium	Negative Low	• See construction mitigation measures provided in Table 6-4.
Wetland Impact Assessment (Appendix E3)	Potential loss or degradation of nearby wetlands through inappropriate closure.	Negative Low	Negative Low	• Develop and implement a rehabilitation and closure plan. • Appropriately rehabilitate the project area by ripping, landscaping and re-vegetating with locally indigenous species.

(Ratings are as per the GNR 509 Risk Assessment Matrix)				
Avifauna Impact Assessment (Appendix E4)	Displacement of resident avifauna through increased disturbance	Negative High	Negative Low	• See construction mitigation measures provided in Table 6-4.
	Loss of important avian habitats	Negative Low	Negative Low	• See construction mitigation measures provided in Table 6-4.
Traffic Impact Assessment (Appendix E8)	Traffic impacts	Negative Low	Negative Low	• All decommissioning vehicles must be roadworthy, and drivers must have the relevant licenses for the types of vehicles they are operating. • All vehicle drivers need to strictly adhere to the rules of the road.

6.2.4 Impacts Associated with the Battery Energy Storage System (BESS)

Table 6.6: Impacts associated with the BESS

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
General Environment (risks associated with BESS)	Mechanical breakdown / Exposure to high temperatures Fires, electrocutions and spillage of toxic substances into the	Negative Medium	Negative Low	Operators are trained and competent to operate the BESS. Training should include the discussion of the following: ○ Potential impact of electrolyte spills on groundwater; ○ Suitable disposal of waste and effluent; ○ Key measures in the EMPr relevant to worker's activities; ○ How incidents and suggestions for improvement can be reported. ○ Training records should be kept on file and be made available during audits.

	surrounding environment. Spillage of hazardous substances into the surrounding environment. Soil contamination – leachate from spillages which could lead to an impact of the productivity of soil forms in affected areas. Water Pollution – spillages into surrounding watercourses as well as groundwater. Health impacts – on the surrounding communities, particularly those relying on watercourses (i.e. rivers, streams, etc) as a primary source of water.			• Battery supplier user manuals safety specifications and Material Safety Data Sheets (MSDS) are filed on site at all times. • Compile method statements for approval by the Technical/SHEQ Manager for the operation and management and replacement of the battery units / electrolyte for the duration of the project life cycle. Method statements should be kept on site at all times. • Provide signage on site specifying the types of batteries in use and the risk of exposure to hazardous material and electric shock. Signage should also specify how electrical and chemical fires should be dealt with by first responders, and the potential risks to first responders (e.g. the inhalation of toxic fumes, etc.). • Firefighting equipment should readily be available at the BESS area and within the site. • Maintain strict access control to the BESS area. • Ensure all maintenance contractors / staff are familiar with the supplier's specifications. • Undertake daily risk assessment prior to the commencement of daily tasks at the BESS. This should consider any aspects which could result in fire or spillage, and appropriate actions should be taken to prevent these. • Standard Operating Procedures (SOPs) should be made available by the Supplier to ensure that the batteries are handled in accordance with required best practices. • Spill kits must be made available to address any incidents associated with the flow of chemicals from the batteries into the surrounding environment. • The assembly of the batteries on-site should be avoided as far as possible. Activities on-site for the BESS should only be limited to the placement of the container wherein the batteries are placed.

	Generation of hazardous waste			• Undertake periodic inspections on the BESS to ensure issues are identified timeously and addressed with the supplier where relevant. • The applicant in consultation with the supplier must compile and implement a Leak and Detection Monitoring Programme during the project life cycle of the BESS. • Batteries must be strictly maintained by the supplier or suitably qualified persons for the duration of the project life cycle. No unauthorised personnel should be allowed to maintain the BESS. • Damaged and used batteries must be removed from site by the supplier or any other suitably qualified professional for recycling or appropriate disposal. • The applicant should obtain a cradle to grave battery management plan from the supplier during the planning and design phase of the system. The plan must be kept on site and adhered to.

7 CUMULATIVE EFFECTS ASSESSMENT

This section aims to address the requirements of Section 2 of the NEMA to consider cumulative impacts as part of any environmental assessment process.

7.1 INTRODUCTION

The EIA Regulations (2017) determine that cumulative impacts, "*in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities*." Cumulative impacts can be incremental, interactive, sequential or synergistic. EIAs have traditionally failed to come to terms with such impacts, largely as a result of the following considerations:

- Cumulative effects may be local, regional or global in scale and dealing with such impacts requires coordinated institutional arrangements;
- Complexity - dependent on numerous fluctuating influencing factors which may be completely independent of the controllable actions of the proponent or communities; and
- Project level investigations are ill-equipped to deal with broader biophysical, social and economic considerations.

Despite these challenges, cumulative impacts have been afforded increased attention in this Scoping Report and for each impact a separate section has been added which discusses any cumulative issues, and where applicable, draws attention to other issues that may contextualise or add value to the interpretation of the impact (refer to Appendix E). This chapter analyses the proposed project's potential cumulative impacts in more detail by: (1) defining the geographic area considered for the cumulative effects analysis; (2) providing an overview of relevant past and present actions in the project vicinity that may affect cumulative impacts; (3) presenting the reasonably foreseeable actions in the geographic area of consideration; and (4) determining whether there are adverse cumulative effects associated with the resource areas analysed.

The term "Cumulative Effect" has for the purpose of this report been defined as: the summation of effects over time which can be attributed to the operation of the project itself, and the overall effects on the ecosystem of the project area that can be attributed to the project and other existing and planned future projects.

7.2 GEOGRAPHIC AREA OF EVALUATION

The geographic area of evaluation is the spatial boundary in which the cumulative effects analysis was undertaken. The spatial boundary evaluated in this cumulative effects analysis generally includes an area of a 30 km radius surrounding the proposed development (refer to Figure 7.1 below).

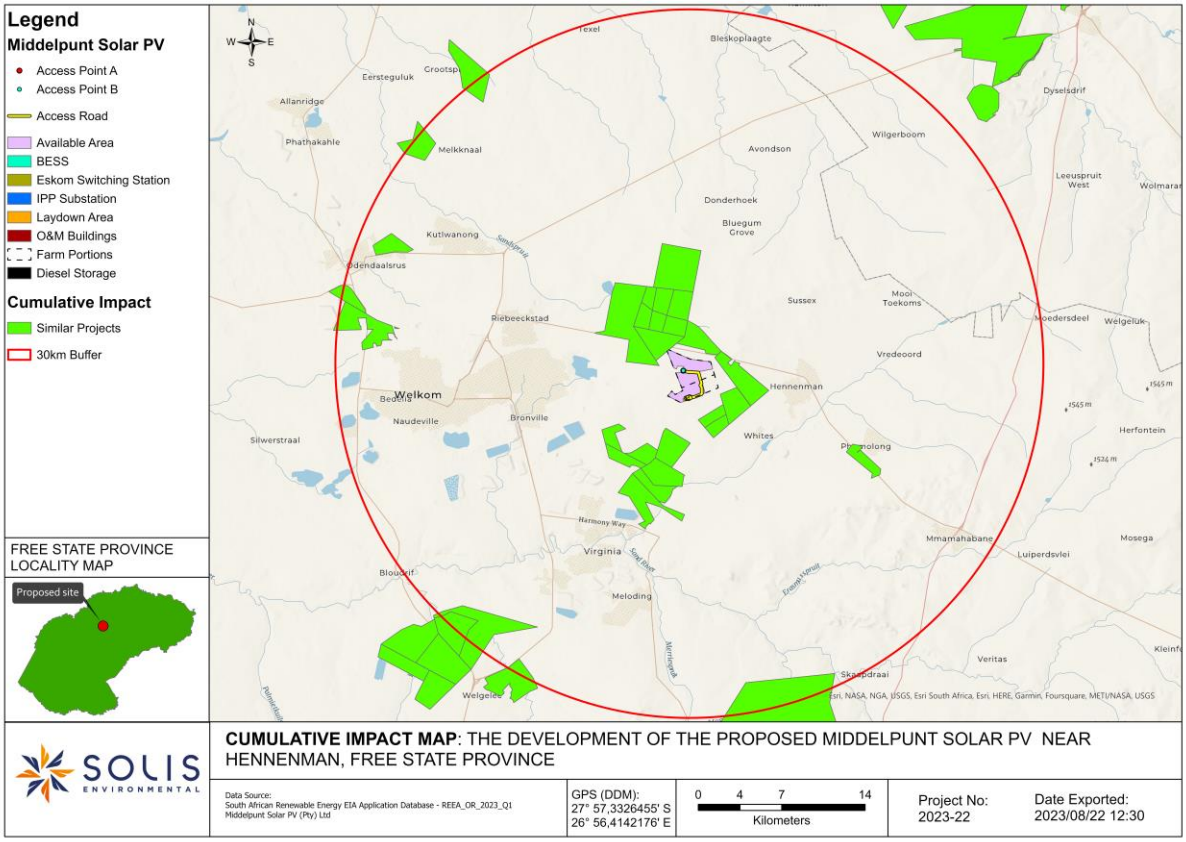

Figure 7. 1: Geographic area of evaluation with utility-scale renewable energy generation sites and power lines

The geographic spread of PV solar projects, administrative boundaries and any environmental features (the nature of the landscape) were considered when determining the geographic area of investigation. It was argued that a radius of 30 km would generally confine the potential for cumulative effects within this particular environmental landscape. The geographic area includes projects located within the Free State Provinces. A larger geographic area may be used to analyse cumulative impacts based on the specific temporal or spatial impacts of a resource. For example, the socio-economic cumulative analysis may include a larger area, as the construction workforce may draw from a much wider area. The geographic area of analysis is specified in the discussion of the cumulative impacts for that resource where it differs from the general area of evaluation described above.

7.3 TEMPORAL BOUNDARY OF EVALUATION

A temporal boundary is the timeframe during which the cumulative effects are reasonably expected to occur. The temporal parameters for this cumulative effects analysis are the anticipated lifespan of the proposed project, beginning in 2024 and extending out at least 20 years, which is the minimum expected project life of the proposed project. Where appropriate, particular focus is on near-term cumulative impacts of overlapping construction schedules for proposed projects in the area of evaluation.

7.4 OTHER PROJECTS IN THE AREA

7.4.1 Cumulative impact of Middelpunt Solar PV Facility and authorised and developing facilities on the surrounding environment.

According to the DFFE's database, 19 solar PV facility applications have been submitted to the Department within the geographic area of investigation (refer to Table 7.1). The primary cumulative impacts associated with the proposed Middelpunt Solar PV facility and already authorised facilities include cumulative loss of vegetation, agricultural land, impacts on flora and fauna and their associated habitats, primarily avifauna and visual impacts. The cumulative loss of agricultural land was calculated to be within acceptable limits and had a post mitigation significance of Low. The cumulative impact on vegetation loss was rated as a medium, post mitigation. A large portion of the land area has already been disturbed due to anthropogenic influences, such as agriculture and cropping practices. Existing avifaunal impacts within the greater project area are largely agricultural in nature. A large portion of the areas proposed for solar PV facilities within a 30 km radius, will be located on disturbed agricultural land. The cumulative impact on avifauna due to the proposed project as well as authorised projects in the surrounding area is medium to high, prior to the implementation of mitigation measures. These can be reduced to a medium significance with the implementation of mitigation measures. The cumulative visual impact on sensitive receptors is rated as a high significance, due to a change in the sense of place and few mitigation measures to manage the cumulative impact.

7.4.2 Cumulative impact of Middelpunt Solar PV and Associated Gridline on surrounding environment

The cumulative impacts of the Middelpunt Solar PV facility and its associated gridline will be very similar to those detailed in Section 7.5 below, where details on the cumulative impact of each specialist discipline and the potential associated cumulative impacts are discussed. The cumulative impacts of the Solar PV facility and gridline will be far less significant than the cumulative impact when taking all approved and/or existing projects in the area into consideration. Potential impacts on disciplines such as terrestrial biodiversity, avifauna, visual, palaeontology and wetlands can be managed to be within acceptable limits with the implementation of mitigation measures which will be detailed in the specialist assessments and EMPr.

7.4.3 Cumulative impact of Middelpunt Solar PV, it's Associated Gridline and authorised and developing facilities on the surrounding environment

Cumulative impacts associated with the Middelpunt Solar PV facility, associated gridline and authorised /existing facilities are anticipated to be similar to Section 7.4.1, although with the addition of cumulative impacts relating to the grid infrastructure, certain impacts may be slightly more significant. The largest impacts relating to powerlines are visual impacts, vegetation destruction, loss of habitat for flora and fauna and avifaunal impacts. The cumulative impacts from a visual perspective are of a high significance, due to a change in the sense of place and limited mitigation measures which will decrease the severity of the impact. The specialist assessment recommended that the project be implemented, as the positive impacts outweigh the potential negative impacts. Impact on flora, fauna and avifauna will also be similar to those detailed in Section 7.4.1, although the cumulative addition of grid infrastructure will slightly increase the significance on terrestrial fauna and avifauna. These impacts will remain as medium significance, even after the implementation of proposed mitigation measures.

Table 7.1: A summary of related projects that may have a cumulative impact, in a 30 km radius of the Middelpunt Solar PV site.

Site name	Distance from study area	Proposed generating capacity	DFFE reference	EIA process	Project status
Farm Blomskraal 216, Ventersburg RD, Matjhabeng Local Municipality, Free State Province	25km	100MW	14/12/16/3/3/2/2099	Scoping and EIA	Approved
Farm Blomskraal 216, Ventersburg RD, Matjhabeng Local Municipality, Free State Province	25km	20MW	14/12/16/3/3/2/2100	Scoping and EIA	Approved
The Virginia 3 (PV) renewable energy generation project and associated infrastructure near Virginia	25km	100MW	14/12/16/3/3/2/2101	Scoping and EIA	Approved
Portion 225 Of Farm Kalkoenkrans, Beatrix Mine Shaft 4, Oryx Mine In Virginia, Free State Province	23km	19 MW	12/12/20/2669	BAR	Approved
Hennenman 5 mw Solar Energy Facility, near Hennenman	13km	5MW	14/12/16/3/3/1/1322	BAR	Approved
Harmony Tshepong solar energy facility	22km	10MW	14/12/16/3/3/1/1444	BAR	Approved

on the farm Free State Geduls 448					
The 10mw Harmony Eland solar energy facility and its associated infrastructure	22km	10MW	14/12/16/3/3/1/1471	BAR	Approved
The 10mw Harmony Nyala solar energy facility and its associated infrastructure	24km	10MW	14/12/16/3/3/1/1472	BAR	Approved
Proposed Everest solar energy facility near Hennenman	1,5km	75MW	14/12/16/3/3/2/512	Scoping and EIA	Approved
Photovoltaic solar energy facility on the farm Grootspruit NO. 252 near Odendalsrus RD	26km	10MW	14/12/16/3/3/3/1/644	BAR	Approved
RE of the farm Onverwag No. 728 and Portion 2 of the Farm Vaalkranz No. 220, Welkom	7km	75MW	14/12/13/3/3/2/580	Scoping and EIA	In process
Farm Grooyspruit 252/0, Odendaalsrus RD	26km	75MW	14/12/16/3/3/2/376	Scoping and EIA	In process
Grootkop Solar Energy Facility near Allanridge	25km	75MW	14/12/16/3/3/2/515	Scoping and EIA	In process

The 75MW photovoltaic energy farm, 132KV power line and associated infrastructure on the RE of the farm Onverwag NO. 728 and PTN 2 of the farm Vaalkranz NO. 220, in Welkom	7km	75MW	14/12/16/3/3/2/580	Scoping and EIA	In process
The 75 MW Photovoltaic Solar Farm, 132kV power line and associated infrastructure on the RE of the Farm Uitkyk No. 509, the RE of the Farm Helderwater No. 494 and Portion 1 of the Farm Doornpan No. 426	1.5km	75MW	14/12/16/3/3/2/581	Scoping and EIA	In process
Additional development area for the authorised Engie Grootspruit PV Facility, in the Lejweleputswa District Municipality	26km	-	14/12/16/3/3/1/2499	BAR	Approved
Farm Weltevrede No. 638, Registration Division Theunissen, Free State Province situated within the Matjhabeng Local	26km	150MW	14/12/16/3/3/2/2087	Scoping and EIA	Approved

Municipality area of jurisdiction					
the Remaining Extent of Farm Vogelsrand No. 373, Registration Division Ventersburg	1km	20MW	14/12/16/3/3/2/2233	Scoping and EIA	In process
Remaining Extent of the Farm Kalkoenkrans No. 225, Registration Division Theunissen	25km	150MW	14/12/16/3/3/2/2230	Scoping and EIA	In process
Meru Solar PV on the remaining extent of the farm Prettig No. 583	10km	240MW	To be confirmed	Scoping and EIA	In process
Litha Solar PV located on the RE of the farm Schaapvlakte No.489, the RE of the farm Meijers Rust No. 168, and the RE of the farm Commandants Pan Zuid No. 142, Matjhabeng Local Municipality	3km	240MW	To be confirmed	Scoping and EIA	In process
Phemelo Solar PV, located on portion 1 of the farm Schaapvlakte No. 489, portion 1 of the farm Meijers Rust No. 168, ant the farm	0km	240MW	To be confirmed	Scoping and EIA	In process

Maatschappij No. 295					
Masana Solar PV on the remaining extent of the farm Granville No. 74, portion 1 of the farm Commandants Pan Zuid No. 142, and the remaining extent of the farm Maatschappij No. 295	0km	240MW	To be confirmed	Scoping and EIA	In process
Aluwani Solar PV, located on the remaining extentand portion 1 of the farm Vlakplaats No. 375, and the remaining extent of the farm BeyersNo.186	800m	240MW	To be confirmed	Scoping and EIA	In process
Nepal Solar PV, located on the remaining extent and portion 6 of the farm Welgegund No. 86, and the remaining extent of the farm Zomersveld No. 395,	5km	240MW	To be confirmed	Scoping and EIA	In process
Anker Solar PV, located on Remaining Extent of the Farm Erasme No. 614 and the Remaining Extent	6km	240MW	To be confirmed	Scoping and EIA	In process

of the Farm Ferreiras Rust No. 163					

It is unclear whether other projects not related to renewable energy is or has been or will be constructed in this area. In general, development activity in the area is focused on industrial development, mining and agriculture. Agriculture in the area is primarily associated with cattle grazing. The next section of this report will aim to evaluate the potential for solar projects for this area in the foreseeable future.

7.5 SPECIALIST INFORMATION ON CUMULATIVE EFFECTS

In line with the Terms of Reference (ToR) provided as part of the scoping report, specialists were asked to, where possible, take into consideration the cumulative effects associated with the proposed development and other projects which are either developed or in the process of being developed in the local area (refer to Figure 7.2 for process flow). The following sections present their findings.

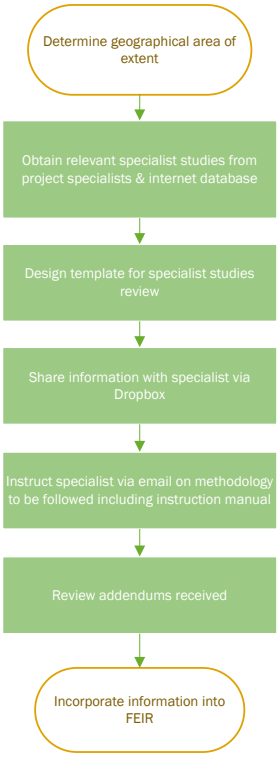

Figure 7. 2: Process flow diagram for determining cumulative effects

7.5.1 Soil, Land Capability and Agricultural Potential

According to the Agricultural Compliance Statement (Appendix E1) all of these projects have the same agricultural impacts in an almost identical agricultural environment, and therefore the same mitigation measures apply to all.

This cumulative impact assessment has considered all renewable energy projects within a 30 km radius. In quantifying the cumulative impact, the area of land taken out of agricultural use as a result of all the projects listed in Appendix 4 (total generation capacity of 2364 MW) will amount to a total of approximately 5910 hectares. This is calculated using the industry standards of 2.5 and 0.3 hectares per megawatt for solar and wind energy generation respectively, as per the Department of Environmental Affairs (DEA) Phase 1 Wind and Solar Strategic Environmental Assessment (SEA) (2015). As a proportion of the total area within a 30 km radius (approximately 282,700 ha), this amounts to 2.09% of the surface area. This is within an acceptable limit in terms of loss of limited potential agricultural land which is only suitable for grazing, and of which there is no particular scarcity in the country.

It should also be noted that renewable energy development can only be located in fairly close proximity to a substation that has available capacity. This creates cumulative impact in such places. However, this is acceptable because it also effectively protects most agricultural land in the country from renewable energy development because only a small proportion of the country's total land surface is located in close enough proximity to an available substation to be viable for renewable energy development.

Due to all of the considerations discussed above, the cumulative impact of loss of future agricultural production potential is assessed here as being of low significance and therefore as acceptable. In terms of cumulative agricultural impact, it is recommended that the development be approved.

7.5.2 Terrestrial Biodiversity Impact Assessment

The Terrestrial Biodiversity Impact Assessment (Appendix E2) explains that the Vaal-Vet Sandy Grassland, in which the project is located, is considered Endangered and that approximately 63% of this bioregion has been transformed primarily for cultivation of commercial crops, only 0.3% is statutorily conserved in the Bloemhof Dam, Schoonspruit, Sandveld, Faan Meintjies, Wolwespruit and Soetdoring Nature Reserves, the remaining percentage is used for grazing.

The development of the proposed Middelpunt Solar PV and other Solar PV Projects in the area will result in further loss of the Vaal-Vet Grassland and if the no-go areas and the mitigation measures, as suggested by the specialist, is not implemented it could result in a ‘High’ negative impact. Therefore, the overall cumulative impact of the overall project is rated as ‘High’. Careful and considerate spatial management and planning within the region must be a priority, in order to preserve important and functional habitat corridors, especially for the identified SCC species.

7.5.3 Wetland Riparian Impact Assessment

The Wetland Impact Assessment (Appendix E3) has indicated that if all mitigation measures can be met with the designing of the Middelpunt Solar PV Project area, it is expected that the proposed activities will pose low residual risks on the wetlands and thus no fatal flaws were identified for the project. Should the wetland areas not be avoided by the proposed development, a wetland compensation plan will be required. In conclusion, since the proposed development avoids sensitive wetland areas there will be no cumulative impact on wetlands in the wider project area.

7.5.4 Avifaunal Assessment

The Avifauna Verification Report (Appendix E4) indicated that one Secretarybird nest was found near Middelpunt Solar PV Project, a further two were also marked in the Middelpunt Solar PV Project Area.

The one was indicated by the farmer as the previous location of a Secretarybird nest while the other, anecdotal evidence was found that could suggest the presence of a nest. A 2 km buffer was placed around the known nest on site as per Birdlife guidelines.

Existing impacts within the Project area is largely of agricultural nature and overall, the significance of current impacts on avifauna is estimated as moderate. However, the cumulative impact of authorised projects in this area is estimated to be of medium to potentially high negative significance (without mitigation), in particular with regards to the impacts on Secretarybirds and the possibility of the Grass Owl.

7.5.5 Social Impact Assessment

The Social Impact Assessment (Appendix E6) indicates that potential cumulative impacts identified for the project include positive impacts on the economy, business development, and employment, as well as negative impacts such as a large-scale in-migration of people.

Middelpunt Solar PV Project and the establishment of other solar power projects within the area has the potential to result in significant positive cumulative impacts, specifically with regards to the creation of a number of socio-economic opportunities for the region, which in turn, can result in positive social benefits. The positive cumulative impacts include creation of employment, skills development and training opportunities, and downstream business opportunities. The cumulative benefits to the local, regional, and national economy through employment and procurement of services are more considerable than that of Middelpunt Solar PV Project alone.

While the development of a single solar power project may not result in a major influx of people into an area, the development of several projects may have a cumulative impact on the in-migration and movement of people. In addition, the fact that the project is proposed within an area characterised by good levels of solar irradiation suitable for the development of commercial solar energy facilities implies that the surrounding area is likely to be subject to considerable future applications for PV energy facilities. Levels of unemployment, and the low level of earning potential may attract individuals to the area in search of better employment opportunities and higher standards of living. It is exceedingly difficult to control an influx of people into an area, especially in a country where unemployment rates are high. It is therefore important that the developer implement and maintain strict adherence with a local employment policy in order to reduce the potential of such an impact occurring.

The positive cumulative impacts will be of a medium significance and the negative cumulative impacts will be of a low significance.

7.5.6 Visual Impact Assessment

The Visual Impact Assessment (Appendix E5) indicates that the proposed development is located in a close proximity to intensive existing power infrastructure and might have a cumulative impact on viewers. Twenty-six (26) other solar facilities are also proposed in the area and the potential for cumulative impacts to occur as a result of the projects is therefore highly likely. Permanent residents of the area might be desensitised over time with the construction of more solar facilities but will stay subjective for each viewer.

The anticipated cumulative visual impacts for the solar facility are expected to include the change in sense of place, as well as the precedent being set for solar development in the area where currently

there is only a precedent for agricultural and mining related activities. Further construction and operation of the development in the area is likely to have a negative high impact.

7.5.7 Heritage and Paleontological Impact Assessment

In terms of cumulative impacts to heritage resources, impacts to archaeological and palaeontological resources are sufficiently dealt with on a case by case basis. The primary concern from a cumulative impact perspective. would be to the cultural landscape. The cultural landscape is defined as the interaction between people and the places that they have occupied and impacted. In some places in South Africa, the cultural landscape can be more than 1 million years old where we find evidence of Early Stone Age archaeology (up to 2 million years old), Middle Stone Age archaeology (up to 200 000 years old), Later Stone Age archaeology (up to 20 000 years old), evidence of indigenous herder populations (up to 2000 years old) as well as evidence of colonial frontier settlement (up to 300 years old) and more recent agricultural layers.

The area proposed for development is presently dominated by agricultural activities and as such, the pattern of settlement within this landscape reflects this. A series of farm werfs runs down the centre of the development area. None of these farms were identified as having significant heritage value. However, the proposed development of the Middelpunt Solar PV Project and the adjacent PV facilities is likely to negatively impact on the broader context of these farm werfs.

According to the paleontological assessment the cumulative impacts of the Solar PV Projects near Hennenman is considered to be moderately and is within acceptable limits for the project.

7.6 IMPACT ASSESSMENT

Following the definitions of the term, the “residual effects on the environment”, i.e., effects after mitigation measures have been put in place, combined with the environmental effects of past, present and future projects and activities will be considered in this assessment. Also, a “combination of different individual environmental effects of the project acting on the same environmental component” can result in cumulative effects.

7.6.1 Potential Cumulative Effects

The receptors (hereafter referred to as Valued Ecosystem Components (VECs) presented in Section 6 (refer to the matrix analysis) have been examined alongside other past, present and future projects for potential adverse cumulative effects. A summary of the cumulative effects discussed are summarized in Table 7.2. There have been specific VECs identified with reference to the Solar Project (Table 6.2), which relates to the biophysical and socio-economic environments. Table 7.2 indicates the potential cumulative effects VECs and their associated gridlines along with the rationale for inclusion/exclusion.

Table 7.2: Potential Cumulative Effects for the proposed project and associated gridline (prior to mitigation)

	Valued Ecosystem Components (VECs)	Rationale for Inclusion / Exclusion	Level of Cumulative Effect
Construction Phase			
Terrestrial Biodiversity Impact Assessment	Impacts to terrestrial biodiversity	In terms of the impacts identified to be associated with the development the Terrestrial Biodiversity Impact Assessment has indicated the following considering the cumulative assessment: • Habitat Destruction: High significance without mitigation, moderate significance with mitigation. • Habitat fragmentation: High significance without mitigation, moderate significance with mitigation. • Soil erosion and sedimentation: Medium significance without mitigation, negligible significance with mitigation. • Soil and water pollution: Medium significance without mitigation, negligible significance with mitigation. • Air pollution: Low significance without mitigation, negligible significance with mitigation. • Spread and establishment of alien invasive species: Moderately high significance without mitigation, low to negligible significance with mitigation. • Fauna mortalities: Low significance without mitigation, negligible significance with mitigation.	- High
Wetland Impact Assessment	Impacts on wetland features	The proposed project will have a medium to low impact on the wetland on site and a low to negligible impact within the 500m Regulated Zone. The cumulative impact is considered to be low.	- Low
Avifaunal Impact Assessment	Cumulative avifauna impacts	Cumulative impacts are expected to be associated with the development of the solar facility and the grid connection. The impacts are as follows: • Loss of priority avian species from important habitats; • Loss of resident avifauna through increased disturbance; • Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important avian habitats; • Collisions with PV panels and power line and electrocution risks leading to injury or loss of	- Medium

		avian life which decreases avifauna species diversity; and • Cumulative displacement of resident avifauna.	
Soils and Agricultural Impact Assessment	Loss of land capability	The cumulative impacts for the proposed development in terms of loss of land capability have been scored "Low," indicating that the potential incremental, interactive, sequential, and synergistic cumulative impacts are within acceptable levels. It is probable that the impact will result in spatial and temporal cumulative change. Furthermore, it is indicated that limited residual impacts will be associated with these activities, assuming that all recommended mitigation measures in the report are strictly adhered to by the development. However limited mitigation is required given the fact that the pre- mitigation significance rating has been scored as "Low – Negative" and the post- mitigation significance rating being scored as "Low – Negative".	- Low
Heritage Impact Assessment	Direct or physical impacts, implying alteration or destruction of heritage features within the project boundaries and indirect impacts, e.g., restriction of access or visual intrusion concerning the broader environment.	The cultural heritage profile of the larger region is very low. Most frequently found are stone artefacts, mostly dating to the Middle Stone Age. Sites containing such material are usually located along the margins of water features (pans, drainage lines), small hills and rocky outcrops. Such surface scatters or 'background scatter' is usually viewed to be of limited significance (Orton 2016). The colonial period manifests largely as individual farmsteads, in all its complexity, burial sites and infrastructure features such as roads, railways and power lines. Overall, however, the heritage sensitivity of the area proposed for development is moderate.. There is no objection to the proposed development, on condition that the recommendations outlined below are implemented	-Medium
Palaeontological Impact Assessment	Destroy or permanently seal-in fossils at or below the surface that are then no longer available for scientific study	Solar Facilities in a 30km radius of Project will have a Zero to High Palaeontological Sensitivity. However, it is important to note that the quality of preservation of these different sites will most probably vary and it is therefore difficult to allocate a cumulative sensitivity rating to the projects. If all the mitigation measures are carried out, a conservative estimate of the cumulative impacts on fossil Heritage will vary between low and medium.	- Medium
Social Impact Assessment	Impacts of employment opportunities, business opportunities and skills development	Middelpunt Solar PV and the establishment of other solar power projects within the area has the potential to result in significant positive cumulative impacts, specifically with regards to the creation of a number of socio-economic opportunities for the region, which in turn, can result in positive social	+ Medium

		benefits. The positive cumulative impacts include creation of employment, skills development and training opportunities, and downstream business opportunities. The cumulative benefits to the local, regional, and national economy through employment and procurement of services are more considerable than that of Middelpunt Solar PV alone.	
	Impact of large-scale in-migration of people	While the development of a single solar power project may not result in a major influx of people into an area, the development of several projects may have a cumulative impact on the in-migration and movement of people. In addition, the fact that the project is proposed within an area characterised by good levels of solar irradiation suitable for the development of commercial solar energy facilities implies that the surrounding area is likely to be subject to considerable future applications for PV energy facilities. Levels of unemployment, and the low level of earning potential may attract individuals to the area in search of better employment opportunities and higher standards of living. It is exceedingly difficult to control an influx of people into an area, especially in a country where unemployment rates are high. It is therefore important that the project proponent implement and maintain strict adherence with a local employment policy in order to reduce the potential of such an impact occurring.	- Medium
Visual Impact Assessment	Visual impacts related to the solar facility and power line	The anticipated cumulative visual impact for the solar facility and power line are expected to include the change in sense of place, as well as the precedent being set for solar development in the area where currently there is only a precedent for agricultural and mining related activities. Further construction and operation of the development in the area is likely to have a negative impact.	- High
Operational Phase			

Terrestrial Biodiversity Impact Assessment	Impacts to terrestrial biodiversity	In terms of the impacts identified to be associated with the development and associated powerline the Terrestrial Biodiversity Impact Assessment has indicated the following considering the cumulative assessment: • Habitat Destruction: Medium significance without mitigation, low significance with mitigation. • Habitat fragmentation: Low significance without mitigation, negligible significance with mitigation. • Soil erosion and sedimentation: Medium significance without mitigation, negligible significance with mitigation. • Soil and water pollution: Medium significance without mitigation, negligible significance with mitigation. • Air pollution: Low significance without mitigation, negligible significance with mitigation. • Spread and establishment of alien invasive species: Medium significance without mitigation, negligible significance with mitigation. • Fauna mortalities: Low significance without mitigation, negligible significance with mitigation.	- Low
Wetland Impact Assessment	Impacts on wetland features	The solar energy facilities and associated powerline proposed in the area are not proposed to be developed in major wetlands and therefore the cumulative impact on wetlands is not foreseen to be significant.	- Negligible
Avifaunal Impact Assessment	Cumulative avifauna impacts	Cumulative impacts are expected to be associated with the development of the solar facility and the grid connection. The impacts are as follows: • Loss of priority avian species from important habitats; • Loss of resident avifauna through increased disturbance; • Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important avian habitats; • Collisions with PV panels and power line and electrocution risks leading to injury or loss of avian life which decreases avifauna species diversity; and • Cumulative displacement of resident avifauna.	- Low
Soils and Agricultural	Loss of land capability	The cumulative impacts for the proposed development in terms of loss of land capability have been scored "Low," indicating that the potential	- Low

		incremental, interactive, sequential, and synergistic cumulative impacts are within acceptable levels. It is probable that the impact will result in spatial and temporal cumulative change. Furthermore, it is indicated that limited residual impacts will be associated with these activities, assuming that all recommended mitigation measures in the report are strictly adhered to by the development. However limited mitigation is required given the fact that the pre- mitigation significance rating has been scored as "Low – Negative" and the post- mitigation significance rating being scored as "Low – Negative".	
Visual Impact Assessment	Visual impacts related to the solar facility and power line	The anticipated cumulative visual impact for the solar facility and power line are expected to include the change in sense of place, as well as the precedent being set for solar development in the area where currently there is only a precedent for agricultural and mining related activities. Further construction and operation of the development in the area is likely to have a negative impact.	- High
Decommissioning Phase			
	Impacts to terrestrial biodiversity	In terms of the impacts identified to be associated with the development the Terrestrial Biodiversity Impact Assessment has indicated the following considering the cumulative assessment: • Habitat Destruction: Medium significance without mitigation, low significance with mitigation. • Habitat fragmentation: Low significance without mitigation, negligible significance with mitigation. • Soil erosion and sedimentation: Medium significance without mitigation, negligible significance with mitigation. • Soil and water pollution: Medium significance without mitigation, negligible significance with mitigation.	- Low
Terrestrial Biodiversity Impact Assessment		• Air pollution: Low significance without mitigation, negligible significance with mitigation. • Spread and establishment of alien invasive species: Medium significance without mitigation, negligible significance with mitigation. • Fauna mortalities: Low significance without mitigation, negligible significance with mitigation.	

Wetland Impact Assessment	Impacts on wetland features	The solar energy facilities proposed in the area are not proposed to be developed in major wetlands and therefore the cumulative impact on wetlands is not foreseen to be significant.	- Low to Negligible
Avifauna Impact Assessment	Cumulative avifauna impacts	Cumulative impacts are expected to be associated with the development of the solar facility and the grid connection. The impacts are as follows: • Loss of priority avian species from important habitats; • Loss of resident avifauna through increased disturbance; • Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important avian habitats; • Collisions with PV panels and power line and electrocution risks leading to injury or loss of avian life which decreases avifauna species diversity; and • Cumulative displacement of resident avifauna.	- Low
Visual Impact Assessment	Visual Intrusion	The decommissioning of the solar facility and 132kV power line may increase the cumulative visual impact together with farming activities and people using the existing gravel roads adjacent to site increasing the amount of dust generated. Dust control and housekeeping will be the main factors to consider.	- Low
Other	Generation of waste	An additional demand on municipal services could result in significant cumulative impacts with regards to the availability of landfill space.	- Medium

7.7 CONCLUSION

This chapter of the Scoping Report addressed the cumulative environmental effects of the construction, operation and decommissioning project phases to be further assessed as part of the EIA Phase. The information to date has shown that no significant adverse residual impacts are likely. However, cumulative impacts could arise as other similar projects are constructed in the area.

The potential most significant cumulative impacts relate to:

- <u>Cumulative effects during construction phase:</u>
  - Loss of habitat, and disruption of surrounding ecological corridors. As well as the influences of pollution (water, noise, air, etc.). (- high)
  - Impact on wetland features (- Medium)
  - Impacts of employment opportunities, business opportunities and skills development (+ Medium)

- Impact with large-scale in-migration of people (- Medium)
- Visual intrusion (- High)

➢ Cumulative effects during the operational phase:

- Loss of habitat, and disruption of surrounding ecological corridors. As well as the influences of pollution (water, noise, air, etc.). (- Medium)
- Visual intrusion (- High)
- Impact on wetland features (- Low)

➢ Cumulative effects during the decommissioning phase:

- Generation of waste (- Medium)

The cumulative impact for the proposed development ranges from low to high. Considering the extent of the project and information presented in section 7 of this report, it can be concluded that the cumulative impacts will not result in large scale changes and impacts on the environment.

Photovoltaic solar energy technology is a clean technology which contributes toward a better-quality environment. The proposed project will contribute to local economic growth by supporting industry development in line with provincial and regional goals and ensuring advanced skills are drawn to the Free State Province. Limited cumulative impacts with a high residual risk have been identified.

In terms of the desirability of the development of sources of renewable energy therefore, it may be preferable to incur a higher cumulative loss in such a region as this one (where the landscape has already experienced degradation), than to lose land with a higher environmental value elsewhere in the country.

8 PLAN OF STUDY FOR EIA

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include -

(i) a plan of study for undertaking the EIA process to be undertaken, including-

(i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;

(ii) a description of the aspects to be assessed as part of the EIA process;

(iii) aspects to be assessed by specialists;

(iv) a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;

(v) a description of the proposed method of assessing duration and significance;

(vi) an indication of the stages at which the competent authority will be consulted;

(vii) particulars of the public participation process that will be conducted during the EIA process; and

(viii) a description of the tasks that will be undertaken as part of the EIA process;

(ix) identify 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.

8.1 INTRODUCTION

This section gives a brief outline of the Plan of Study for EIA (PoSEIA) and the tasks that will be undertaken and the anticipated process to meet the objectives for the EIA phase. The approach to the EIA is to focus on those key issues identified for the preferred alternative. This will ensure that the EIA focuses on the most significant impacts and in the process save time and resources.

8.2 ANTICIPATED OUTCOMES OF THE IMPACT ASSESSMENT PHASE

The purpose of the EIA phase is to assess issues identified in the scoping phase and will include an environmental management program (EMPr). The EMPr will provide information on the proposed activity and the manner in which potential impacts will be minimized or mitigated. The EIA report will comply with Appendix 3 and will:

- Determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;

- Identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- Determine the—
  - (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
  - (ii) degree to which these impacts-
    - (aa) can be reversed;
    - (bb) may cause irreplaceable loss of resources, and
    - (cc) can be avoided, managed or mitigated;
- Identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- Identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- Identify suitable measures to avoid, manage or mitigate identified impacts; and
- Identify residual risks that need to be managed and monitored.

8.3 TASKS TO BE UNDERTAKEN

The following sections describe the tasks that will be undertaken as part of the EIA Phase of the process.

8.3.1 Project Description

Further technical and supporting information will be gathered to provide a more detailed project description. This will include a detailed and finalised site layout plan that will be compiled once the areas of sensitivity identified in this Scoping Report have been confirmed by the specialists.

8.3.2 Consideration of Alternatives

The following project alternatives will be investigated in the EIR:

- Design/Layout alternatives: In terms of the actual layout of the proposed PV plant which will only be assessed for the preferred site alternative. A draft facility layout is included in Figure I.

8.3.3 Compilation of Environmental Impact Report (EIR)

A Draft EIR will be compiled to meet the content requirements as per Appendix 3 of GNR. 326 of the EIA Regulations (as amended) and will also include a draft Environmental Management Programme containing the aspects contemplated in Appendix 4 of GNR326. The Generic EMPr for overhead electricity transmission and distribution infrastructure and the Generic EMPr for the development of

the associated substation infrastructure for transmission and distribution of electricity as per Government Notice 435, which were published in Government Gazette 42323 on 22 March 2019, will also be included in the Draft EIR.

8.3.4 Public Participation

All registered I&APs and relevant State Departments will be given the opportunity to review the Draft Environmental Impact Report in accordance with Regulation R326. A minimum of 30 days commenting period will be allowed and all stakeholders and I&APs will be given an opportunity to forward their written comments within that period. All issues identified during this 30-day review and comment period will be documented and compiled into a Comments and Response Report to be included as part of the Final EIR to be submitted to the DFFE for decision-making on the Application for Environmental Authorisation.

8.4 ASPECTS ASSESSED

Table 8.1 below provides a summary of the aspects that have been assessed. The aspects are also linked to specialist information obtained.

Table 8.1: Aspects assessed

Aspects	Potential impacts	Specialist studies / technical information
Construction of the PV Solar facility	• Impacts on the fauna and flora	Terrestrial Ecological Assessment and Avifauna Impact Assessment
	• Wetlands and riparian areas	Wetland Baseline and Risk Assessment
	• Impacts on agricultural potential (soils)	Soil and Agricultural Assessment
	• Impacts on existing services infrastructure	Confirmation from the Local Municipality
	• Temporary employment, impacts on health and safety	Social Impact Assessment
	• Impacts on heritage resources	Heritage Impact Assessment and Paleontological Impact Assessment
	• Traffic impacts	Traffic Impact Assessment
Operation of the PV Solar facility	• Impacts on the fauna and flora	Terrestrial Ecological Assessment and Avifauna Impact Assessment
	• Wetlands and riparian areas	Wetland Baseline and Risk Assessment

	• Impacts on agricultural potential (soils)	Soil and Agricultural Assessment
	• Increased consumption of water	Confirmed volumes to be provided by the Applicant
	• Visual Impact	Visual Impact Assessment
	• Provision of employment and generation of income for the local community	Social Impact Assessment
Decommissioning of the PV Solar facility	• Wetlands and riparian areas	Wetland Baseline and Risk Assessment
	• Socio-economic impacts (loss of employment)	Social Impact Assessment
Cumulative Impacts	• Cumulative biophysical impacts resulting from similar developments in close proximity to the proposed activity.	All independent specialist studies results to be considered and analyzed by the EAP

8.4.1 Specialist Studies

Based on the initial descriptions of potential environmental impacts or aspects (refer to Table 6.2), specialists have been subcontracted to assess the potential impacts that may be significant. The specialist studies assess impacts on both the social and the biophysical environment and also help in identifying ways that can help to mitigate the envisaged impacts. The following specialist studies have been included to address the potentially most significant impact as identified during the scoping phase – refer to Table 6.2:

- Heritage Impact Assessment: To determine whether the proposed activity will impact on any heritage or archeological artifacts.
- Terrestrial Biodiversity, Plant and Animal Species Impact Assessment: To determine what the impact of the proposed activity will be on the ecology (fauna and flora) in the area.
- Wetland Baseline and Risk Assessment: To determine the impact of the proposed activity on the wetlands present on the Project site and the 500m Regulated Zone.
- Avifauna Impact Assessment: To determine what the impacts of the proposed activity will have on the birds (avifauna) in the area, specifically referring to the Grass Owl and the Secretary Bird.
- Visual Impact Assessment: To determine to what extent the proposed activity will be visually intrusive to the surrounding communities or other receptors.

- Soil and Agricultural Potential Study: To determine how the proposed activity will impact on soil and agricultural resources.
- Social Impact Assessment: To determine how the proposed activity will impact on the socio-economic environment.
- Palaeontological Impact Assessment: To determine the impacts on palaeontological resources.
- Traffic Impact Assessment: To determine how the proposed activity will impact on the traffic in the surrounding environment.

8.4.2 Terms of Reference for Specialist Studies

Specialists in their field of expertise will consider baseline data and identify and assess impacts according to predefined rating scales (section 8.5). Specialists will also suggest optional or essential ways in which to mitigate negative impacts and enhance positive impacts. Further, specialists will, where possible, take into consideration the cumulative effects associated with this and other projects which are either developed or in the process of being developed in the local area. The specialist is reminded to follow the latest DFFE protocols.

The results of these specialist studies have been integrated into the draft Scoping Report. The general requirements proposed for the inputs are presented below and specialists are encouraged to comment and provide input on these. The Terms of Reference (ToR) for each specialist study are included as Appendix E6 to the report.

8.4.3 General Requirements

Specialists' reports must comply with Appendix 6 of GNR. 326 published under sections 24(5), and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and whereby the following are to be included:

- The details of-
    - the specialist who prepared the report; and
    - the expertise of that specialist to compile a specialist report including a curriculum vitae;
- A declaration that the specialist is independent in a form as may be specified by the competent authority;
- An indication of the scope of, and the purpose for which, the report was prepared;
    - An indication of the quality and age of base data used for the specialist report;
    - A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;
- The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;

- A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;
- Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;
- An identification of any areas to be avoided, including buffers;
- A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;
- A description of any assumptions made and any uncertainties or gaps in knowledge;
- A description of the findings and potential implications of such findings on the impact of the proposed activity, or activities;
- Any mitigation measures for inclusion in the EMPr;
- Any conditions for inclusion in the environmental authorisation;
- Any monitoring requirements for inclusion in the EMPr or environmental authorisation;
- A reasoned opinion-
    - whether the proposed activity, activities or portions thereof should be authorised;
        - regarding the acceptability of the proposed activity or activities; and
    - if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;
- A description of any consultation process that was undertaken during the course of preparing the specialist report;
- A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and
- Any other information requested by the competent authority.

In addition to the above, specialists are expected to:

- Review the Scoping Report, with specific reference to the Comments and Response Report to familiarize with all relevant issues or concerns relevant to their field of expertise;
- In addition to the impacts listed in the Scoping Report, identify any issue or aspect that needs to be assessed and provide expert opinion on any issue in their field of expertise that they deem necessary in order to avoid potential detrimental impacts;
- Assess the degree and extent of all identified impacts (including cumulative impacts) that the preferred project activity and its proposed alternatives, including that of the no-go alternative, may have;

- Identify and list all legislation and permit requirements that are relevant to the development proposal in context of the study;
- Reference all sources of information and literature consulted; and
- Include an executive summary to the report.

8.5 METHOD OF ENVIRONMENTAL ASSESSMENT

The environmental assessment aims to identify the various possible environmental impacts that could results from the proposed activity. Different impacts need to be evaluated in terms of its significance and in doing so highlight the most critical issues to be addressed.

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in Table 8.2.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

8.5.1 Impact Rating System

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the project phases:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact the following criteria is used:

Table 8.2: The rating system

NATURE
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.

GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not

		occur in such a way or such a time span that the impact can be considered indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/ component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		

1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects
SIGNIFICANCE		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity. The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.

51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

8.6 CONSULTATION WITH THE COMPETENT AUTHORITY

Consultation with the competent and commenting authorities will continue throughout the duration of impact assessment phase. The authorities will also comment on whether they deem it necessary to conduct additional specialist studies other than what is proposed already in this PoSEIA. On-going consultation will include:

- Submission of the Final EIR following a 30-day public review period (and consideration of comments received).
- Arrangements will be made to discuss the report with the Environmental Officer responsible for the project during the review period, where required.

9 CONCLUSION

This Draft Scoping Report is aimed at identifying the 'scope' of the EIA that will be conducted in respect of the activity for which authorization is being applied for. It can be concluded that:

- The scoping phase complied with the specifications set out in Regulations 21 and Appendix 2 of GNR326.
- All key consultees have been consulted as required by the Regulations 39 to 44.

Based on the contents of the report the following key environmental issues are anticipated which need to be addressed in the EIA report. Note that significance indicated is prior to mitigation.

- Impacts during construction phase:
    - Impacts on fauna and flora including 1) destruction, loss and fragmentation of habitats, ecosystems and the vegetation community (- High), 2) introduction of Invasive Alien Plant (IAP) species and invasive fauna (- Medium), 3) destruction of protected plant species (- High), and 4) displacement of the indigenous faunal community (- High).
    - Visual impact of construction activities on sensitive visual receptors and a basic agricultural landscape, with a nearby mining landscape (- Medium).
    - Loss of Land Capability (- Medium).
    - Direct or physical impacts, implying alteration or destruction of heritage features within the project boundaries – Grave/ Burial sites and Farmstead (- Medium).
    - Disturbance, damage, or destruction of legally protected fossil heritage within the development footprint during the construction phase (- Medium).
    - Social impacts including 1) creation of direct and indirect employment opportunities (+ Medium), 2) influx of jobseekers and change in population in the study area (- Medium), 3) temporary increase in safety and security concerns associated with the influx of people (- Medium), 4) temporary increase in traffic disruptions and movement patterns (- Medium), 5) nuisance impact (noise and dust) (- Medium), 6) increased risk of potential veld fires (- Medium), 7) Potential loss of productive farmland (- medium), 8) impacts on the sense of place (- Medium).
- Impacts during the operational phase:
    - Impacts on fauna and flora including 1) continued fragmentation and degradation of natural habitats and ecosystems (- Medium), 2) continuing spread of IAP and weed species (- Medium) and 3) ongoing displacement and direct mortalities of the faunal community (- Medium).
    - Visual impact of industrial operational infrastructure on sensitive visual receptors, landscape and scenic resources. Change in sense of place of the local area (- High).
    - Loss of Land Capability, soil erosion and compaction effects (- Medium).

- Direct or physical impacts, implying alteration or destruction of heritage features within the project boundaries – Grave/ Burial sites and Farmstead (- Medium).
- Social impacts including 1) loss of agricultural land and overall productivity (- Medium), 2) development of non-polluting, renewable energy infrastructure (+ Medium), 3) contribution to Local Economic Development (LED) and social upliftment (+ Medium), 4) increase in household earnings, and 5) visual impact and impacts on sense of place (- Medium).

- Impacts during the decommissioning phase:
  - Impacts on fauna and flora including 1) continued fragmentation and degradation of natural habitats and ecosystems (- Medium), 2) continuing spread of IAP and weed species (- Medium) and 3) ongoing displacement and direct mortalities of the faunal community (- Medium).
  - Visual impact of decommissioning activities on sensitive visual receptors in close proximity to the Solar PV facility (- High).
- Cumulative biophysical impacts resulting from similar development in close proximity to the proposed activity.

No fatal flaws or impacts of a high significance will remain after the implementation of the proposed mitigation measures. The issues identified will be addressed in more detail in the EIA report as part of the EIA Phase.

Considering the environmental sensitive features present within the development footprint, as identified in this Scoping Report, the Applicant has proposed a draft facility layout which currently considers technical constraints. The environmental sensitive features as identified within this scoping report will be further investigated in the detailed EIA phase and thereby will aim to avoid any direct impact on these features. As part of this optimisation process, associated infrastructure will be reconsidered if required and shifted outside of these sensitive environmental features and areas. The draft layout will be further assessed and optimised as part of the EIA Phase of the project to ensure that the development footprint within the affected property is appropriate from an environmental perspective, and thereby avoids the present sensitive environmental features and areas as identified by the independent specialists. Refer to Figure I for the draft layout proposed for development.

The EAP therefore recommends that:

The scoping report be approved after which the EIA process, as required by Regulations 23 to 24 may commence.

We trust that the Department of Forestry, Fisheries and the Environment find the report in order and we eagerly await your comments in this regard.

Ms. Siyongamele Dzingwa
Solis-Environnemental Consultants

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