SCOPING REPORT

Final – 5 July 2023

THE PROPOSED ACRUX SOLAR PV PROJECT ONE NEAR BLOEMFONTEIN, FREE STATE PROVINCE

ENVIRONAMICS

PROJECT DETAIL

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GLOSSARY OF TERMS AND ACRONYMS

BA	Basic Assessment
BAR	Basic Assessment Report
CEA	Cumulative Effects Assessment
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
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.
GNR	Government Notice Regulation
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
LM	Local Municipality
Mitigate	Activities designed to compensate for unavoidable environmental damage.
MW	Megawatt

NEMA	National Environmental Management Act No. 107 of 1998
NERSA	National Energy Regulator of South Africa
NWA	National Water Act No. 36 of 1998
PAOI	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
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SPP	Solar Power Plant
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. 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.

In response to the above, Acrux Solar PV Project One (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 an identified site located on Remaining extent of Remaining Extent of Portion 6 of Farm Brabant 205, Registration Division Bloemfontein RD, Free State Province situated within the Mangaung Metropolitan Municipality area of jurisdiction (refer to Figure A for the locality map). The project entails the generation of up to 150 MW electrical power through photovoltaic (PV) technology. The total development footprint of the project will be up to 300 hectares (including supporting infrastructure) identified and assessed as part of the Environmental Impact Assessment (EIA) process. An additional corridor of 7km long OHPL and 200m wide was assessed for the proposed grid connection. The physical development footprint of the grid connection corridor will be further reduced and restricted to pylon footprints only. From a regional site selection perspective, this region is preferred for solar energy development due to its global horizontal irradiation value of around 2118 kWh/m^2/year.

EXECUTIVE SUMMARY

Like many other municipalities in the country, the Mangaung Metropolitan Municipality faces a number of challenges in addressing the needs of sustainable growth and improved quality of life (IDP, 2022/2027). The Mangaung Metropolitan Municipality Integrated Development Plan (2022/2027) 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, Mangaung 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.

Acrux Solar PV Project One (Pty) Ltd intends to develop a 150 MW photovoltaic solar facility and associated infrastructure on Remaining Extent of Portion 6 of Farm Brabant No. 205, situated within the Mangaung Metropolitan Municipality, area of jurisdiction. The City of Bloemfontein is located approximately 17 km east of the proposed development (refer to Figure A and B for the locality and regional map). The total footprint of the project will approximately be up to 320 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 N8 and N1 (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 Acrux Solar PV Project One. The following listed activities have been identified with special reference to the proposed development and are listed in the EIA Regulations (as amended):

- 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."*
- Activity 12 (ii)(c) (GN.R. 327): "*The development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more; (c) within 32 meters of a watercourse measured from the edge of a watercourse."*
- Activity 14 (GN.R. 327): *"The development and related operation of facilities or 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 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."*
- Activity 27 (GN.R. 327): *"The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation…"*
- 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."*
- 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 indigenous vegetation..."*
- Activity 4 (b)(i)(bb)(ee)(gg) (GN.R 324): *"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 (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)(bb)(ee)(gg)(hh) (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 (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 (hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland."*
- Activity 12 (b)(ii)(vi) (GN.R 324): "*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 (iv) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland".

- Activity 14(ii)(a)(c)(b)(i)(bb)(ff)(hh) (GN.R 324): *"The development of (ii) infrastructure or structures with a physical footprint of 10 square metres or more, where such development occurs (c) within 32 metres of a watercourse, measured from the edge of a watercourse (b) Free State, (i) Outside urban areas (bb) National Protected Area Expansion Strategy Focus areas (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the Competent Authority or in bioregional plans (hh) 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."*
- Activity 18 (b)(i)(bb)(ee)(hh) (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(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 (hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland."*

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). Environamics has been appointed as the independent consultant to undertake the EIA on behalf of Acrux Solar PV Project One (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 Acrux Solar PV Project One 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 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 Acrux Solar PV Project One.

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.

Predicted impacts during the construction phase:

During the construction phase minor negative impacts are foreseen over the short term. The latter refers to a period of up to 20 months. The potentially most significant impacts relate to habitat destruction caused by clearance of vegetation and socio-economic impacts such as the creation of direct and indirect employment opportunities, economic multiplier effects from the use of local goods and services and temporary increase in traffic disruptions and movement patterns.

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 25 – 30 years. The negative impacts are generally associated with habitat destruction caused by clearance of vegetation, displacement of priority avian species from important habitats, collision and electrocutions of avifauna and visual impact of sensitive visual receptors occurring for motorists that drive passed the proposed solar PV facility. The provision of sustainable services delivery also needs to be confirmed. 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 and contribution to economic development and social upliftment.

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 a number of 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 ten (10) similar developments that have been proposed in close proximity to the proposed activity.

The potential for cumulative impacts therefore exists. The final 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.

A Draft Scoping Report was 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 was made available to I&APs and all relevant State Departments. They were requested to provide written comments on the report within 30 days of receiving it. All issues that were identified and comments received during the review period were documented and compiled into a Comments and Response Report 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 on the BID, these comments have been included in Appendix C5 and C6 and have also been included and responded to in the Comments and Responses Report in Appendix C7.

1.2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Environamics 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:

Contact person:	Roschel Maharaj
EAPASA Registration:	2019/824
Postal Address:	14 Kingfisher Street, Tuscany Ridge Estate, Potchefstroom, 2531
Telephone:	063 062 7725 (Cell)
Electronic Mail:	roschel@environamics.co.za
And/or	
Contact person:	Carli van Niekerk
EAPASA Registration:	2019/1742
Postal Address:	14 Kingfisher Street, Tuscany Ridge Estate, Potchefstroom, 2531
Telephone:	082 220 8651 (Cell)
Electronic Mail:	carli@soils-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	-	Cell: 081 319 1225	info@thebiodiversitycompany.com
Avifaunal Impact Assessment	The Biodiversity Company	Andrew Husted	-	Cell: 081 319 1225	info@thebiodiversitycompany.com
Wetland Baseline and Risk Assessment	The Biodiversity Company	Andrew Husted	-	Cell: 081 319 1225	info@thebiodiversitycompany.com
Soil and Agricultural Impact Assessment	The Biodiversity Company	Andrew Husted	-	Cell: 081 319 1225	info@thebiodiversitycompany.com
Heritage Impact Assessment	J van Schalkwyk Heritage Consultant	J van Schalkwyk	62 Coetzer Avenue Monument Park 0181	Cell: 076 790 6777	jvschalkwyk@mweb.co.za
Paleontological Study	Banzai Environmental (Pty) Ltd	Elize Butler	-	Cell: 084 447 8759	elizebutler002@gmail.com
Social Impact Assessment	Donaway Environmental Consultants	Johan Botha	30 Fouche Street Steynsrus 9515	Cell: 082 493 5166	johan@donaway.co.za
Visual Impact Assessment	Donaway Environmental Consultants	Johan Botha	30 Fouche Street Steynsrus 9515	Tel: 082 316 7749	johan@donaway.co.za

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 23 February 2023.
- Site notices were erected on site on 23 February 2023 informing the public of the commencement of the EIA process.
- A pre-application meeting request was submitted to DFFE on 13 April 2023.
- The DFFE indicated that a pre-application meeting is not required, in an email dated 19 April 2023.
- A newspaper advertisement was placed in the Bloemnuus on 20 April 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 31 May 2023.
- The draft Scoping Report was made available for a 30-day review and comment period from 01 June 2023 to 03 July 2023.

The Final Scoping Report was be submitted to the Department in July 2023 and that the Final Scoping Report is anticipated to be accepted by the Department in August 2023. The S&EIR process should be completed within approximately nine months of submission of the Draft Scoping Report, i.e., by 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	-	23 February 2023
Public participation (BID)	30 Days	26 April 2023 – 29 May 2023
Pre-application meeting	-	N/A
Conduct specialist studies	-	March/April 2023
Submit application form and DSR	-	31 May 2023
Public participation (DSR)	30 Days	01 June 2023 – 03 July 2023

Submit FSR	44 Days	5 July 2023
Department acknowledges receipt	10 Days	July/August 2023
Department approves/reject	43 Days	August 2023
Public participation (DEIR)	30 Days	September/October 2023
Submit FEIR & EMPr	106 Days	October 2023
Department acknowledges receipt	10 Days	November 2023
Decision	107 Days	March 2024
Department notifies of decision	5 Days	March 2024
Registered I&APs notified of decision	14 Days	March 2024
Appeal	20 Days	March/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 Acrux Solar PV Project One

Tasks to be performed	February				March				April				May				June				July				August				September				October				November			
	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																																								
- Circulate																																								
Final EIA Report & EMP																																								
- Submission																																								

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 Acrux Solar PV Project One 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, 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): Old fields and potential for crop cultivation. 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 scoping statement is included in Appendix E of the Scoping Report.
Aquatic Biodiversity Impact Assessment Sensitivity: Very High Feature(s): The project area lies in close proximity to a strategic water source area	Yes	An aquatic scoping statement 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 desktop 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.
Civil Aviation Assessment Sensitivity: Low Feature(s): No major or other types of civil aviation aerodromes have been identified	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. The project is also not located within an area considered to be of a high sensitivity.
Defence Theme Sensitivity: Medium Feature(s): The site could potentially lie in close proximity to a defence site	No	The EAP disagrees with the sensitivity. No negative impacts are expected to occur on defence installations/sites and potential impacts will be site specific and can be mitigated. 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 lies within 1.5km of a nature reserve and is characterised by mountain tops and high ridges	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 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: Medium Feature(s): The project area may comprise of 257 sensitivity species	Yes	An ecological scoping statement is included in Appendix E of the Scoping Report.
RFI Assessment Sensitivity: Very High Feature(s): The project area is located less than 18km from a Weather Radar Installation	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 vulnerable ecosystem and Highlands Reserve	Yes	An ecological scoping statement 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 considered to be 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.

Table 1.5: Specialist studies identified by the DFFE screening tool, substation category and specialist studies completed

Study identified in the DFFE Screening Tool and sensitivity	**Study included?**	**Appendix**
Agricultural Impact Assessment Sensitivity: High Feature(s): Old fields and potential for crop cultivation 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 scoping statement is included in Appendix E of the Scoping Report.
Aquatic Biodiversity Impact Assessment Sensitivity: Very High Feature(s): The project area lies in close proximity to a strategic water source area	Yes	An aquatic scoping statement 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 desktop assessment included in Appendix E of the Scoping Report, as per the requirements of the National Heritage Resources Act.
Civil Aviation Assessment Sensitivity: High Feature(s): dangerous and restricted airspace as demarcated	No	The site is located within a high sensitivity, indicating a dangerous and restricted airspace as demarcated according to the screening tool report. However, it is not anticipated that the proposed activities will cause interference with civil aviation aerodromes located at a fair distance away. 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: Very high Feature(s): The site lies in close proximity to a defence site	No	The sensitivity for the entire extent of the site is medium to very high. Defence base has been found to be located in close proximity to the project site. However, no negative impacts are expected to occur on defence installations/sites/bases and potential impacts will be site specific and can be mitigated. 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.
Palaeontological Impact Assessment Sensitivity: Very High Feature (s): The project area may comprise features that have a 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: Medium Feature(s): The project area may comprise of 257 sensitivity species	Yes	An ecological scoping statement is included in Appendix E of the Scoping Report.
Terrestrial Biodiversity Impact Assessment Sensitivity: Very High Feature(s): The project area comprises of a vulnerable ecosystem and Highlands Reserve	Yes	An ecological scoping statement is included in Appendix E of the Scoping Report.

Table 1.6: Specialist studies identified by the DFFE screening tool, powerline category and specialist studies completed

Study identified in the DFFE Screening Tool and sensitivity	Study included?	Appendix
Agricultural Impact Assessment Sensitivity: Very High Feature(s): Pivot irrigation and 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 scoping statement is included in Appendix E of the Scoping Report.
Aquatic Biodiversity Impact Assessment Sensitivity: Very High Feature(s): The project area lies in close proximity to a strategic water source area	Yes	An aquatic scoping statement 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 desktop assessment included in Appendix E of the Scoping Report, as per the requirements of the National Heritage Resources Act.
Civil Aviation Assessment Sensitivity: High Feature(s): The site is potentially located between 8 and 15 km of other civil aviation aerodromes	No	The majority of the powerline route is located within medium sensitivity, while only a small portion of the route intrudes into a high sensitivity. It is not anticipated that the proposed activities will cause interference with civil

		aviation aerodromes located at a fair distance away. 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: Very high Feature(s): The site lies in close proximity to a military and defence site	No	The sensitivity for majority of the powerline route is of medium sensitivity, while only a small portion of the route intrudes into a high sensitivity area. Defence base has been found to be located in close proximity to the project site. However, no negative impacts are expected to occur on defence installations/sites/bases and potential impacts will be site specific and can be mitigated. 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.
Palaeontological Impact Assessment Sensitivity: Very High Feature(s): The project area may comprise features that have a 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: Medium Feature(s): The project area may comprise of 257 sensitivity species	Yes	An ecological scoping statement is included in Appendix E of the Scoping Report.
Terrestrial Biodiversity Impact Assessment Sensitivity: Very High Feature(s): The project is located in a vulnerable ecosystem	Yes	An ecological scoping statement is included in Appendix E of the Scoping Report.

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 1.7.

Table 1.7: 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 –	
	(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;	5
	(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;	6
	(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;	
	(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- (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;	Appendix A to the report
(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 solar PV facility and associated infrastructure on Remaining Extent of Portion 6 of the Farm Brabant No. 205, Registration Division Bloemfontein, Free State Province situated within the Mangaung Metropolitan Municipality area of jurisdiction. The proposed development is located in the Free State Province in central interior of South-Africa (refer to Figure B for the regional map). The City of Bloemfontein is located approximately 17 km east of the proposed development (refer to Figure A for the locality map).

The project entails the generation of up to 150 MW electrical power through the installation and operation of photovoltaic (PV) panels. The total area assessed comprises of approximately 320 ha proposed for the PV facility (including supporting infrastructure) with an additional corridor of 7km long OHOL and 200m wide assessed for the proposed solar grid infrastructure. The full extent of the development 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. It is envisioned that the development footprint for the Acrux Solar PV Project One will be ~300 ha in

extent. This could be further reduced as more information becomes available in terms of environmental constraints identified. Furthermore, the development footprint of the proposed solar grid infrastructure will be restricted to pylon footprints only. The property on which the facility is to be constructed will be leased by Acrux Solar PV Project One (Pty) Ltd from the property owner for the life span of the project (minimum of 25 years).

Energy generated by the facility will be transmitted from the facility substation/Eskom switching station to the existing Harvard Transmission Substation via a new 132kV powerline. Two (02) grid alternatives are being considered; these are as follows:

- *Alternative 1:* A 132 kV single or double circuit overhead powerline (OHPL) is proposed and will transmit energy generated by the solar PV facility directly into the existing Harvard substation. The proposed OHPL will be approximately 7km long and will be located within a 200 m wide grid corridor.
- *Alternative 2*: The second alternative will also be 132 kV single or double circuit overhead powerline (OHPL) which will follow the same route to connect directly into the existing Harvard substation. This alternative will also be located within the 7km long and will be located within a 200 m wide grid corridor.

Confirmation in terms of the preferred alternative will be based on feedback provided by the Eskom Grid Access Unit. Refer to Table 2.1 for the general site information.

Table 2.1: General site information

Description of affected farm portion	<u>Solar PV Facility:</u> • Remaining Extent of Remaining Extent of Portion 6 of the Farm Brabant No. 205 <u>Solar Grid Infrastructure:</u> • Remaining Extent of Portion 6 of Farm Brabant No. 205 • Portion 2 of Farm Brabant No. 205 • Portion 1 of Farm Brabant No. 205 • Portion 1 of Farm Spes Bona No. 2355 • Portion 13 of Farm Spes Bona No. 2355 • Portion 14 of Farm Spes Bona No. 2355 • Portion 10 of Farm Spes Bona No. 2355

	• Remaining Extent of Portion 6 of Farm Spes Bona No. 2355 • Portion 7 of Farm Spes Bona No. 2355 • Portion 11 of Farm Spes Bona No. 2355 • Remainder of Farm Spes Bona No. 2355 • Remainder of Farm Kwaggafontein No. 23000 <u>Access Road:</u> • Remaining Extent of Portion 6 of the Farm Brabant No. 205
Province	Free State
District Municipality	Mangaung Metropolitan Municipality
Local Municipality	Mangaung Metropolitan Municipality
Ward numbers	Ward 48
Closest towns	Bloemfontein is located approximately 17 km east of the proposed development.
21 Digit Surveyor General codes	<u>Solar PV Facility:</u> • Remaining Extent of Portion 6 of the Farm Brabant No. 205 F00300000000020500006 <u>Solar Grid Infrastructure:</u> • Remaining Extent of Portion 6 of Farm Brabant No. 205 F00300000000020500006 • Portion 2 of Farm Brabant No. 205 F00300000000020500002 • Portion 1 of Farm Brabant No. 205 F00300000000020500001 • Portion 1 of Farm Spes Bona No. 2355 F00300000000235500001

	• Portion 13 of Farm Spes Bona No. 2355 F00300000000235500013 • Portion 14 of Farm Spes Bona No. 2355 F00300000000235500014 • Portion 10 of Farm Spes Bona No. 2355 F00300000000235500010 • Remaining Extent of Portion 6 of Farm Spes Bona No. 2355 F00300000000235500006 • Portion 7 of Farm Spes Bona No. 2355 F00300000000235500007 • Portion 11 of Farm Spes Bona No. 2355 F00300000000235500011 • Remainder of Farm Spes Bona No. 2355 F00300000000230000000 • Remainder of Farm Kwaggafontein No. 23000 F00300000002300000000 <u>Access Road:</u> • Remaining Extent of Remaining Extent of Portion 6 of the Farm Brabant No. 205 F00300000000020500006
Photographs of the site	Included in Plates as an appendix to the Report
Type of technology	Photovoltaic solar facility
Structure Height	• Panels up to 6 m • Buildings up to 12 m • Powerline up to 30 m
Battery storage	Within a 5 ha area of the development footprint or spread out within the facility next to the inverters. Conventionally these battery containers would stand in a dedicated area

	next to each other however, an alternative location is having the single BESS container located next to the inverters in between the panel arrays.
Surface area to be covered (Development footprint)	Up to 320 ha
Structure orientation	Monofacial or Bifacial PV panels will be utilised. The panels will either be fixed to a single-axis and/or double 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. PV panels with single axis tracking is preferred over fixed-axis 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 development of the PV facility will take into consideration during the final design phase the use of either tracker vs fixed-tilt mounting structures. Both options are considered feasible for the site.
Laydown area dimensions (area assessed as part of the EIA)	Temporary laydown areas will occupy up to 10 hectares.
Generation capacity	Up to 150 MW
Expected production	Up to 150 MW

The area surrounding the proposed development is characterised mostly by agricultural development except to the east where large scale urban development is present. The proposed solar PV facility is located adjacent to the proclaimed Highlands Nature Reserve, but after further investigation, the visual impact assessment confirms that the reserve is only being used for cultivation farming with very low to no tourism potential. Refer to plates 1 – 8 for photographs of the affected property and assessment area.

2.2 ACTIVITY DESCRIPTION

The proposed development will trigger the following activities:

Table 2.2: Listed activities

Relevant notice:	**Activity No (s)**	**Description of each listed activity as per project description**:
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 complexes with a capacity of more than 33 but less than 275 kilovolts".* • Activity 11(i) is triggered since the proposed solar PV facility includes an on-site HV/MV substation and switching station with a capacity of up to 132kV. Energy generated from the facility will be transmitted to an existing Eskom facility substation via a 132 kV Overhead Power Line.
GNR. 327 (as amended in 2017)	Activity 12(ii)(c)	• *"The development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more; (c) within 32 meters of a watercourse measured from the edge of a watercourse."* • Activity 12(ii)(c) is triggered as the project area of influence (PAOI) overlaps with a single depression wetland listed as Least Threatened (LT). The PAOI further overlaps with unclassified FEPA wetlands, while several FEPA wetland types are located within the PAOI.
GNR. 327 (as amended in 2017)	Activity 14	• *"The development and related operation of facilities or 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."* • The use of hazardous substances will form part of the construction phase. The substances anticipated to be used includes cement powder associated with the concrete/ brick works; petrol/ diesel for trucks,

		cranes, bulldozers etc.; limited amounts of transformer oils. The dangerous goods will be stored during construction in a covered area/bin and disposed at registered hazardous waste sites. The storage requirements are not expected to exceed 500 cubic metres.
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 proposed main access road to Acrux Solar PV Project One will be between 8 m and 12 m wide, but with the inclusion of side drains and gavel embankments, will exceed the threshold of this activity.
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 the total area to be developed for the PV facility and associated infrastructure is greater than 1ha and occurs outside an urban area in an area currently zoned for agriculture. The property will be re-zoned to "special" use.
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 may 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.
GNR. 325 (as	Activity 1	• *"The development of facilities or infrastructure for the generation of electricity from a renewable*

amended in 2017)		*resource where the electricity output is 20 megawatts or more".* • Activity 1 is triggered since the proposed solar PV facility will generate up to 150 megawatts of electricity through the use of a renewable resource.
GNR. 325 (as amended in 2017)	Activity 15	• *"The clearance of an area of 20 hectares or more of indigenous vegetation."* • Activity 15 is triggered as the cumulative area of indigenous vegetation to be cleared for the entire Project (excluding linear components) will exceed 20 hectares. The development footprint is approximately 300 ha.
GNR. 324 (as amended in 2017)	Activity 4 (b)(i)(bb)(ee)(gg)	• "*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 (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)(bb)(ee)(gg) is triggered as internal and perimeter access roads with a width of between 6 and 10 meters will be constructed. The PAOI is located within 5 km of the Free State Highveld Grasslands NPAES focus area. In terms of NPAES PA Negotiated Focus Areas 2018, the PAOI is located within 5 km of Priority Focus Areas and Protected Area. The PAOI overlaps with a CBA 1 and is located within 5 km of the Highlands Reserve and Olievenkloof Private Nature Reserve.
GNR. 324 (as	Activity 10 (b)(i)(bb)(ee)(gg)(hh)	• "*The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage*

amended in 2017)		*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 (hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland."* • Activity 10(b)(i)(hh) 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. The PAOI is located within 5 km of the Free State Highveld Grasslands NPAES focus area. In terms of NPAES PA Negotiated Focus Areas 2018, the PAOI is located within 5 km of Priority Focus Areas and Protected Area. The PAOI overlaps with a CBA 1 and is located within 5 km of the Highlands Reserve and Olievenkloof Private Nature Reserve. The PAOI overlaps with a single depression wetland listed as Least Threatened (LT). The PAOI further overlaps with unclassified FEPA wetlands, while several FEPA wetland types are located within the PAOI.
GNR. 324 (as amended in 2017)	Activity 12 (b)(ii)(iv)	• *"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 (iv) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland".* • Activity 12 (b)(ii)(iv) is triggered since the project is located within the Free State Province. The PAOI overlaps with a single depression wetland listed as

		Least Threatened (LT). The PAOI further overlaps with unclassified FEPA wetlands, while several FEPA wetland types are located within the PAOI. The site overlaps with a CBA 1.
GNR. 324 (as amended in 2017)	Activity 14(ii)(c)(b)(i)(bb)(ff)(hh)	• *"The development of (ii) infrastructure or structures with a physical footprint of 10 square metres or more, where such development occurs (c) within 32 metres of a watercourse, measured from the edge of a watercourse (b) Free State, (i) Outside urban areas (bb) National Protected Area Expansion Strategy Focus areas (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the Competent Authority or in bioregional plans (hh) 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."* • Activity 14(ii)(a)(c)(b)(i)(ff) is triggered since the PAOI is located within 5 km of the Free State Highveld Grasslands NPAES focus area. In terms of NPAES PA Negotiated Focus Areas 2018, the PAOI is located within 5 km of Priority Focus Areas and Protected Area. The PAOI overlaps with a CBA 1 and is located within 5 km of the Highlands Reserve and Olievenkloof Private Nature Reserve. The PAOI overlaps with a single depression wetland listed as Least Threatened (LT). The PAOI further overlaps with unclassified FEPA wetlands, while several FEPA wetland types are located within the PAOI.
GNR. 324 (as amended in 2017)	Activity 18 (b)(i)(bb)(ee)(hh)	• *"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 (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 (hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland." • Activity 18 (b)(i)(bb)(ee)(hh) is triggered as the existing access to the affected property does not have a reserve and will need to be widened by more than 4 metres. The PAOI is located within 5 km of the Free State Highveld Grasslands NPAES focus area. In terms of NPAES PA Negotiated Focus Areas 2018, the PAOI is located within 5 km of Priority Focus Areas and Protected Area. The PAOI overlaps with a CBA 1 and is located within 5 km of the Highlands Reserve and Olievenkloof Private Nature Reserve. The PAOI overlaps with a single depression wetland listed as Least Threatened (LT). The PAOI further overlaps with unclassified FEPA wetlands, while several FEPA wetland types are located within the PAOI.

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 10 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 of up to 40 km, 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 150 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 be tilted at an optimum angle to capture the most sun or using one-axis tracker structures to follow the sun to increase the yield.

Figure 2.1: Typical example of solar PV array

- 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 480 V up to 33 kV up to 132 kV. The normal components and dimensions of a distribution rated electrical substation will be required. Output voltage from the inverter is 480 V and this is fed into step up transformers to 132 kV. An onsite substation will be required on the site to step the voltage up to 132 kV, after which the power will be evacuated into the national grid. It is expected that generation from the facility will connect to the national grid via the existing Harvard Substation. The Project will inject up to 150 MW into the National Grid. The installed capacity will be approximately 150 MW. In order to evacuate the energy generated by the facilities to the national grid, Acrux Solar PV Project One (Pty) Ltd is proposing two (02) solar grid alternatives:

    - *Alternative 1:* A 132 kV single or double circuit overhead powerline (OHPL) is proposed and will transmit energy generated by the solar PV facility directly into the existing Harvard substation. The proposed OHPL will be approximately 7 km long and will be located within a 200 m wide grid corridor.

- *Alternative 2:* The second alternative will also be 132 kV single or double circuit overhead powerline (OHPL) which will follow the same route to connect directly into the existing Harvard substation. This alternative will also be located within the 7km long and will be located within a 200 m wide grid corridor.

Confirmation in terms of the preferred alternative will be based on feedback provided by the Eskom Grid Access Unit.

- 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
  - The project requires the need for both temporary and permanent laydown areas.

- Battery Storage – The Battery Storage Facility will occupy an area of up to 5 hectares or be spread out within the facility next to the inverters.

- Roads – The majority of the access road will follow existing, gravel farm roads that may require widening up to 6 -10 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 of approximately 40 km, each with a width of up to 6 m, will be constructed to provide access to the various components of the PV development. Access is most likely to be obtained via existing roads just off the N8 National Road. 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 of up to 3 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 H. 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 H).

Table 2.3: Technical details for the proposed facility

Component	Description / dimensions
Height of PV panels	Up to 5 meters
Area of PV Array	Up to 300 ha
Area occupied by inverter / transformer stations / substations / BESS	BESS: Up to 5 ha Facility substation: Up to 1 ha Collector Substation: Up to 2 ha
Capacity of on-site substation	132kV
Capacity of the power line	132kV
Area occupied by both permanent and construction laydown areas	Temporary laydown areas will occupy up to 10 hectares.
Area occupied by buildings	Operations and Maintenance Building/Office; switch gear and relay room; staff lockers and changing room; security control; and offices: Up to 5 ha
Battery storage facility	The Battery Storage Facility will occupy an area of up to 5 hectares.
Length of internal roads	Up to 40 km
Width of internal roads	Up to 12 m
Height of fencing	Up to 3 m
Height of powerline	Up to 30 m
Capacity of powerline	132 kV
Eskom switching station	132 kV
Electricity Grid Infrastructure Corridor	Length: 7 km Width: 200 m
Grid connection corridor width	200 m
Grid connection corridor length	7 km
Power line servitude width	Up to 36 m
Type of pylon to be used	Monopole or Lattice Steel Concrete or Wooden structures

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	29° 4'56.02"S	26° 1'40.68"E
	B	29° 5'11.96"S	26° 2'29.46"E
	C	29° 5'3.88"S	26° 2'39.21"E
	D	29° 6'8.45"S	26° 3'0.57"E
	E	29° 5'51.81"S	26° 2'42.74"E
	F	29° 5'34.33"S	26° 2'37.15"E
	G	29° 5'29.97"S	26° 2'18.44"E
	H	29° 5'35.69"S	26° 2'17.13"E
	I	29° 5'57.02"S	26° 2'18.28"E
	J	29° 5'54.74"S	26° 2'9.42"E
	K	29° 6'2.74"S	26° 1'47.79"E
	L	29° 5'55.94"S	26° 1'23.46"E
	M	29° 5'52.31"S	26° 1'23.20"E
	N	29° 5'49.72"S	26° 1'21.20"E
	O	29° 5'45.31"S	26° 1'20.51"E
Supporting Infrastructure			
Laydown Area 1	1	29° 5'19.18"S	26° 2'25.41"E
	2	29° 5'19.67"S	26° 2'30.58"E
	3	29° 5'33.07"S	26° 2'35.05"E
	4	29° 5'29.33"S	26° 2'19.41"E
Laydown Area 2	5	29° 5'11.55"S	26° 2'30.99"E
	6	29° 5'9.52"S	26° 2'34.24"E
	7	29° 5'22.75"S	26° 2'39.29"E
	8	29° 5'25.34"S	26° 2'35.26"E
BESS	A	29° 5'47.13"S	26° 2'42.38"E

	B	29° 5'45.89"S	26° 2'51.96"E
	C	29° 5'50.37"S	26° 2'53.68"E
	D	29° 5'52.35"S	26° 2'43.79"E
Substation	E	29° 5'54.72"S	26° 2'46.07"E
	F	29° 5'52.88"S	26° 2'47.68"E
	G	29° 5'51.95"S	26° 2'54.41"E
	H	29° 6'5.40"S	26° 2'59.25"E
	I	29° 6'5.75"S	26° 2'58.22"E
Solar Grid Infrastructure			
Grid Alternative 1	A	29° 6'7.63"S	26° 3'0.16"E
	B	29° 6'8.16"S	26° 3'0.78"E
	C	29° 6'6.56"S	26° 3'15.94"E
	D	29° 6'17.81"S	26° 3'17.12"E
	E	29° 6'21.71"S	26° 3'24.26"E
	F	29° 6'22.96"S	26° 3'24.67"E
	G	29° 6'20.45"S	26° 3'55.06"E
	H	29° 6'26.93"S	26° 3'56.73"E
	I	29° 6'22.66"S	26° 4'45.63"E
	J	29° 6'41.96"S	26° 4'50.96"E
	K	29° 6'34.05"S	26° 6'22.44"E
	L	29° 6'20.07"S	26° 6'19.50"E
Grid Alternative 2	A	29° 6'7.63"S	26° 3'0.16"E
	1	29° 6'7.88"S	26° 3'8.78"E
	2	29° 6'6.95"S	26° 3'15.85"E

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

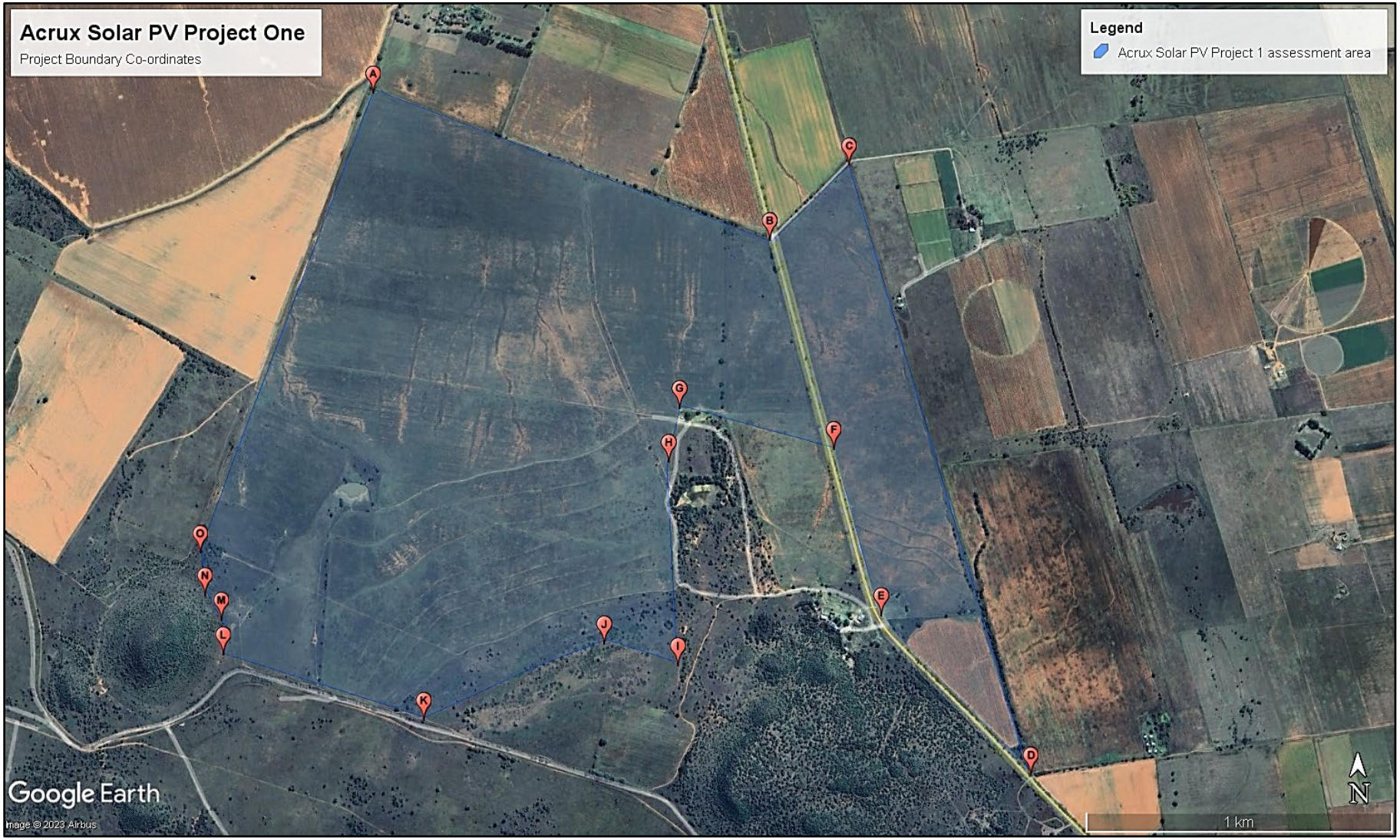


Figure 2.2: Co-ordinates points of the project boundary

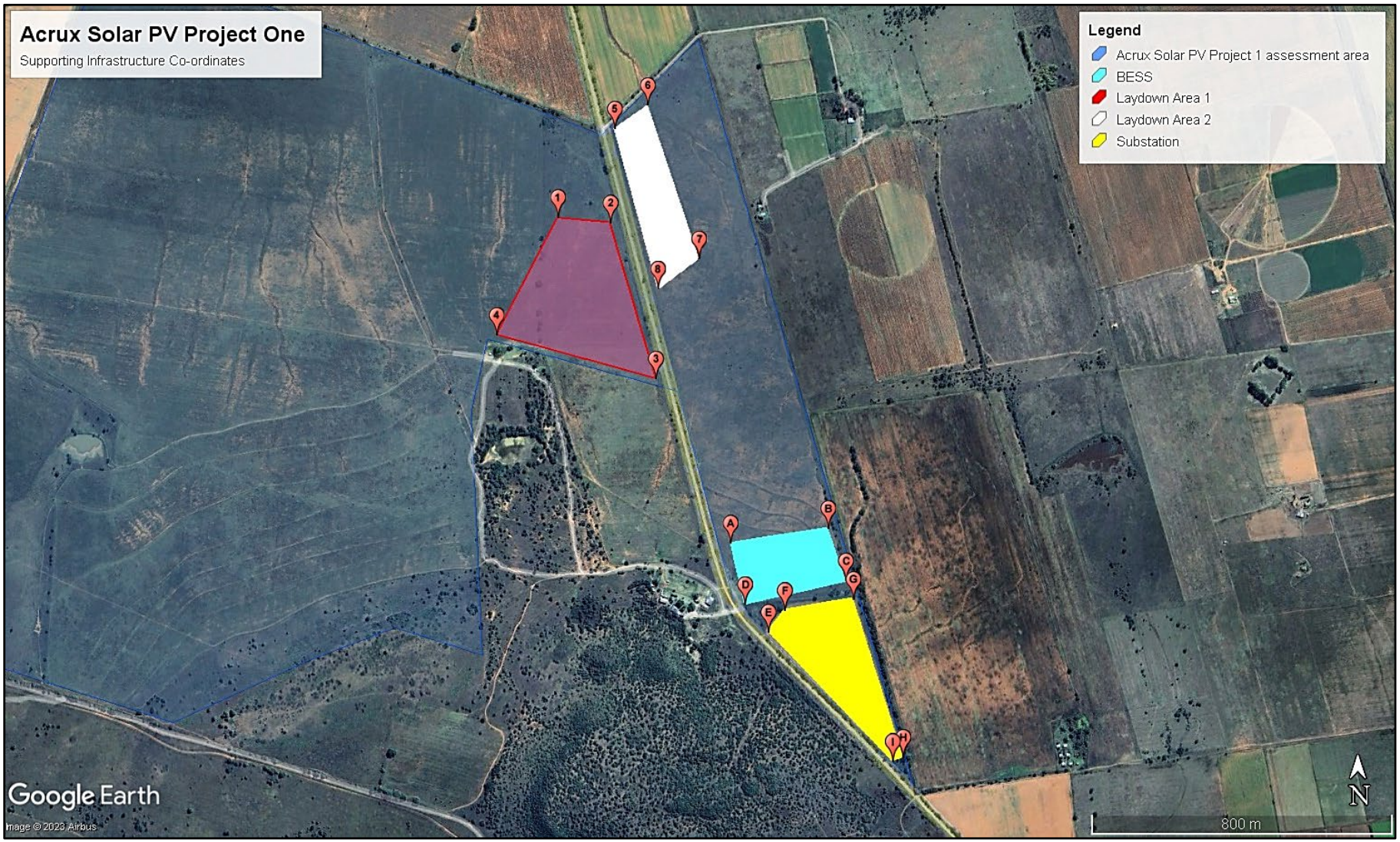


Figure 2.3: Co-ordinate points of supporting infrastructure

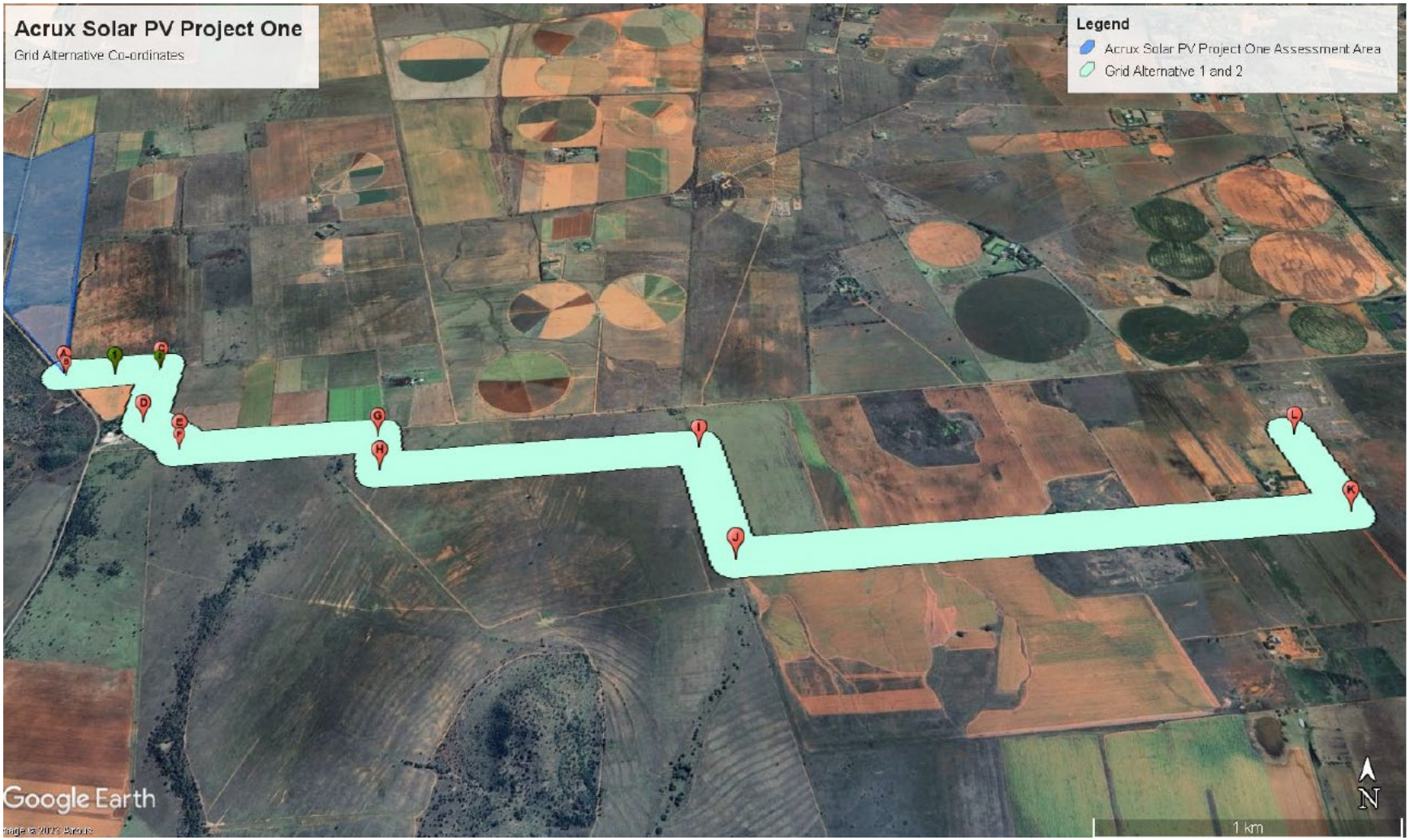


Figure 2.4: Co-ordinate points of the grid alternatives

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 construction is 30 500m^3. The estimated maximum amount of water required during the operational phase is 10 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 an existing or new 11 kV powerline.

During operation, the electricity will be supplied by the PV facility/ via the main grid connection or via the installed construction supply. Efficient electricity appliances will be used as far as possible on site. Where possible, borehole pumps will be powered by solar energy.

2.6 DECOMMISSIONING OF THE FACILITY

The operating period will be 25 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)
- Mangaung Metropolitan Municipality Integrated Development Plan (IDP) 2021-2022
- Mangaung Metropolitan Municipality Spatial Development Framework (SDF) 2020 (2020)

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 Acrux Solar PV Project One 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. 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 Acrux Solar PV Project One 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 Acrux Solar PV Project One 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. The PAOI overlaps with a single depression (DEPR) wetland listed as Least Threatened (LT). Furthermore, PAOI overlaps with unclassified FEPA wetlands, while several FEPA wetlands types are located within the PAOI. Also, should a water use license be required for the project, the National Water Act will be applicable in terms of obtaining the relevant license.
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	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

	and the Environment)		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 21202 has been opened on SAHRIS for the Acrux Solar PV Project One 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 E4, and the Palaeontological Impact Assessment is included as Appendix E5.
Conservation of Agricultural Resources	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

Act (Act No. 85 of 1983)			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 Acrux Solar PV Project One 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 Acrux Solar PV Project One and is included in Appendix E1.

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. Acrux Solar PV Project One 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 Acrux Solar PV Project One 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 Acrux Solar PV Project One. 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 Acrux Solar PV Project One 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. Acrux Solar PV Project One 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 Acrux Solar PV Project One 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 Acrux Solar PV Project One 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 Acrux Solar PV Project One 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 Acrux Solar PV Project One 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 Acrux Solar PV Project One 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 Acrux Solar PV Project One 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 Acrux Solar PV Project One 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 Acrux Solar PV Project One is in-line with the framework based on the contributions and opportunities presented by a development of this nature.
Mangaung Metropolitan Municipality Integrated Development Plan (IDP)	Mangaung Metropolitan Municipality	2021-2022	The long-term vision of the Mangaung MM is to be: *"...globally safe and attractive to live, work and invest in".* The above stated vision defines what Mangaung MM would like to attain over medium to long-term, and for that achievement to effectively materialize, their mission is: *"To improve social and economic livelihoods through public participation, effective and efficient integrated governance system programmes"* (IDP, 2021-2022). The Mangaung MM will achieve their vision by: o Providing democratic and accountable government for local communities. o Ensuring the provision of services to city's communities in a sustainable manner. o Promoting social and economic development to the residents of the Mangaung o Promoting safe and healthy environment. o Encouraging the involvement of communities and community organisations in the matter of local government. Of the eighteen (18) SIPs that are contained in the National Infrastructure Plan (NIP), there are eleven (11) which impacts on the Mangaung MM and thus need to be recognized and where appropriate; the metro'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:

			○ 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). ○ 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 ○ Electricity transmission and distribution for all (SIP 10): expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. The development of the Acrux Solar PV Project One is in line with the plan, considering the relevant Key Performance Area stated in the IDP.
Mangaung Metropolitan Municipality Spatial Development Framework (SDF)	Mangaung Metropolitan Municipality	2020	In order to guide the Mangaung MM's Vision and Mission statements, several objectives were identified. The following objectives will ensure that the municipality succeeds in their main purpose: ○ Objective 1: provide a strategic spatial development vision for the metropolitan area in line with the broad development objectives of the National and Provincial policies. ○ Objective 2: provide a clear and comprehensive Spatial Framework for the metropolitan area which will inform, improve and guide cross-sectoral policy alignment and project implementation. ○ Objective 3: indicate in as much detail as possible to stakeholders the desired future spatial form for the metropolitan area. ○ Objective 4: highlight planning, environmental, infrastructure and institutional issues that gave rise to the proposal. ○ Objective 5: provide all stakeholders an opportunity to participate during the process of formulating the SPF. ○ Objective 6: provide spatial reflection of the needs and priorities established in the Mangaung IDP and identify specific issues which are unique to the metropolitan area. ○ Objective 7: address rural development issues such as the integration with urban area, the provision of social facilities and the provision of infrastructure to rural communities.

	○ Objective 8: Identify areas for economic opportunities, particularly in the industrial, commercial, agricultural and tourism sectors. ○ Objective 9: Identify infrastructure needs and services constraints and bring forward tangible solutions. ○ Objective 10: Accommodate the growing housing needs taking into account the current backlogs and the projected need for development of various housing methodologies. ○ Objective 11: protect the natural environment, and more specifically hydrological and topographical resources, biodiversity areas, and high potential agricultural land. The development of the Acrux Solar PV Project One 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 with 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 Acrux Solar PV Project One facility. 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 Acrux Solar PV Project One 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	37149		1860	2100	2912	1474	1980	300	3830	499
2019	2155	-2373					244	300		Allocation to the extent of the short term capacity and energy gap.
2020	1433	-557				114	300			
2021	1433	-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					1600		2000	500
2028		-475				1000	1600			500
2029		-1694			1575	1000	1600			500
2030		-1050		2500		1000	1600			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 Mangaung Metropolitan Municipality is desirable since the overall municipal unemployment rate was found to be 29.2% (Mangaung IDP, 2022/2027).
- 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 makes a contribution 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 1000 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. According to the Mangaung MM IDP, 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 – No 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 recognises 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 on Remaining Extent of Portion 6 of Farm Brabant No. 205, and the farm was found favorable due to its close proximity to grid connections, solar radiation, ecology and relatively flat terrain. 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 to ensure that the facility layout is appropriate considering the sensitive features present. The site selection also took the site geology, land capability, water availability and land use into consideration before deciding on the specific site within the affected property.

The following sections explore different types of alternatives in relation to the proposed activity in more detail.

5.1.1 No-go Alternative

This alternative considers the option of 'do nothing' and maintaining the status quo of the affected environment. The description provided in section 5.3 of this report could be considered the baseline conditions (*status quo*) to persist should the no-go alternative be preferred. 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 the current land uses present. The area associated with the development footprint has limited agricultural potential (some crop fields present) and with grazing. The potential opportunity costs in terms of alternative land use income through rental for the energy facility and the supporting social and economic development in the area would be lost if the *status quo* persists.

5.1.2 Location Alternatives

PV Facility

This alternative asks the question, if there is not, from an environmental perspective, a more suitable location for the proposed activity. No other properties have at this stage been secured by Acrux Solar PV Project One (Pty) Ltd in the Bloemfontein area to potentially establish the Acrux Solar PV Project One. From a local perspective the Remaining Extent of Portion 6 of Farm Brabant No. 205 is preferred due to its suitable climatic conditions, topography (i.e., in terms of slope), environmental conditions (i.e., low agricultural potential and archaeology), proximity to a grid connection point (i.e., for the purpose of electricity evacuation), as well as site access (i.e., to facilitate the movement of machinery, equipment, infrastructure and people during the construction phase).

Based on the above site-specific attributes, the study area is considered highly preferred in terms of the development of a solar PV facility. As such, no property / location alternatives will be considered. Refer to Figure 5.1.

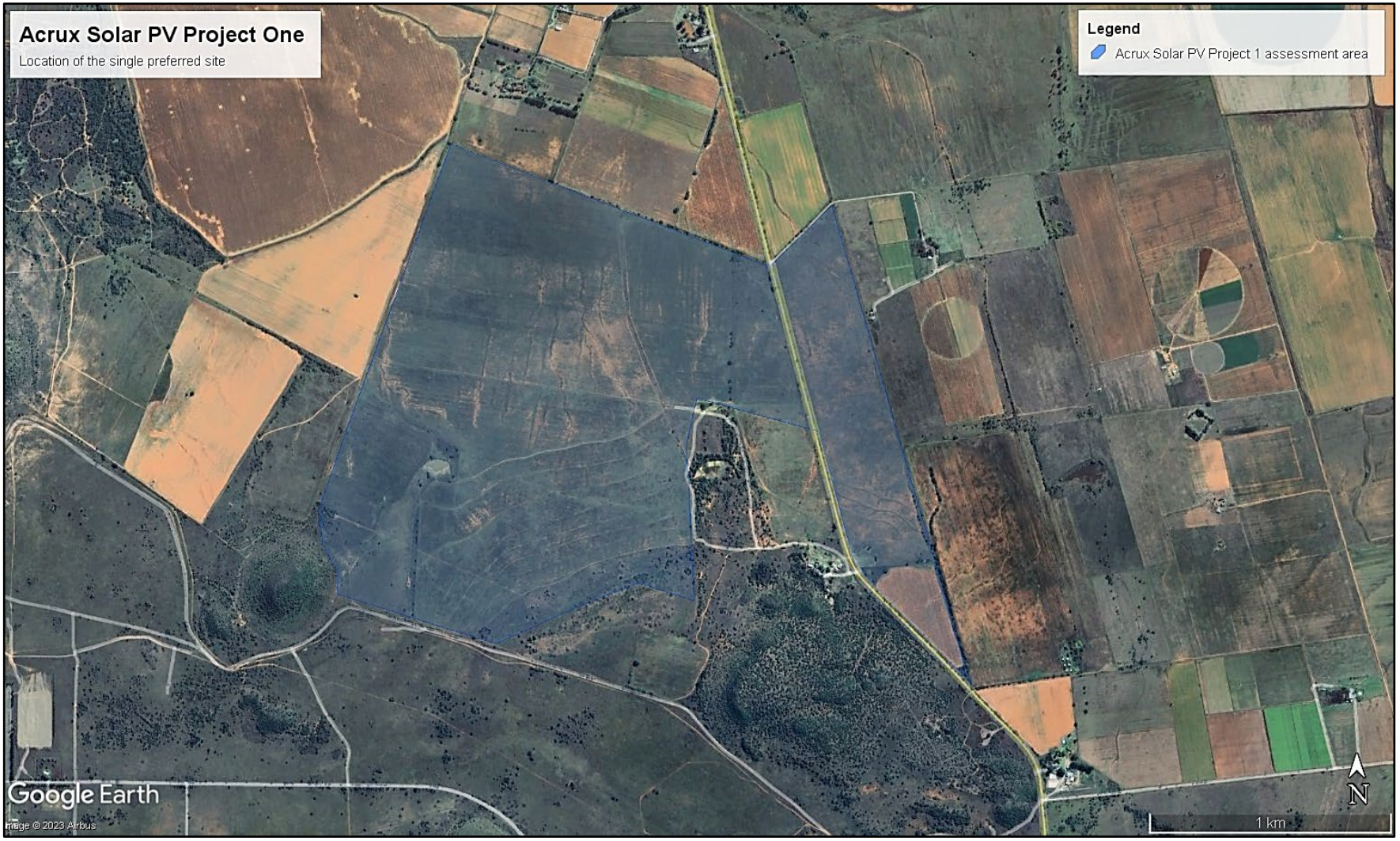


Figure 5.1: Location of the single preferred location alternative

BESS Location

A BESS is a type of energy storage power station that uses a group of batteries to store electrical energy. Conventionally these battery containers would stand in a dedicated area next to each other however, an alternative location is having the single BESS container located next to the inverters in between the panel arrays. Mirach Solar PV Project (Pty) Ltd will consider both location alternative to determine which location alternative is more feasible from an engineering perspective.

5.1.3 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 – Acrux Solar PV Project One (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.

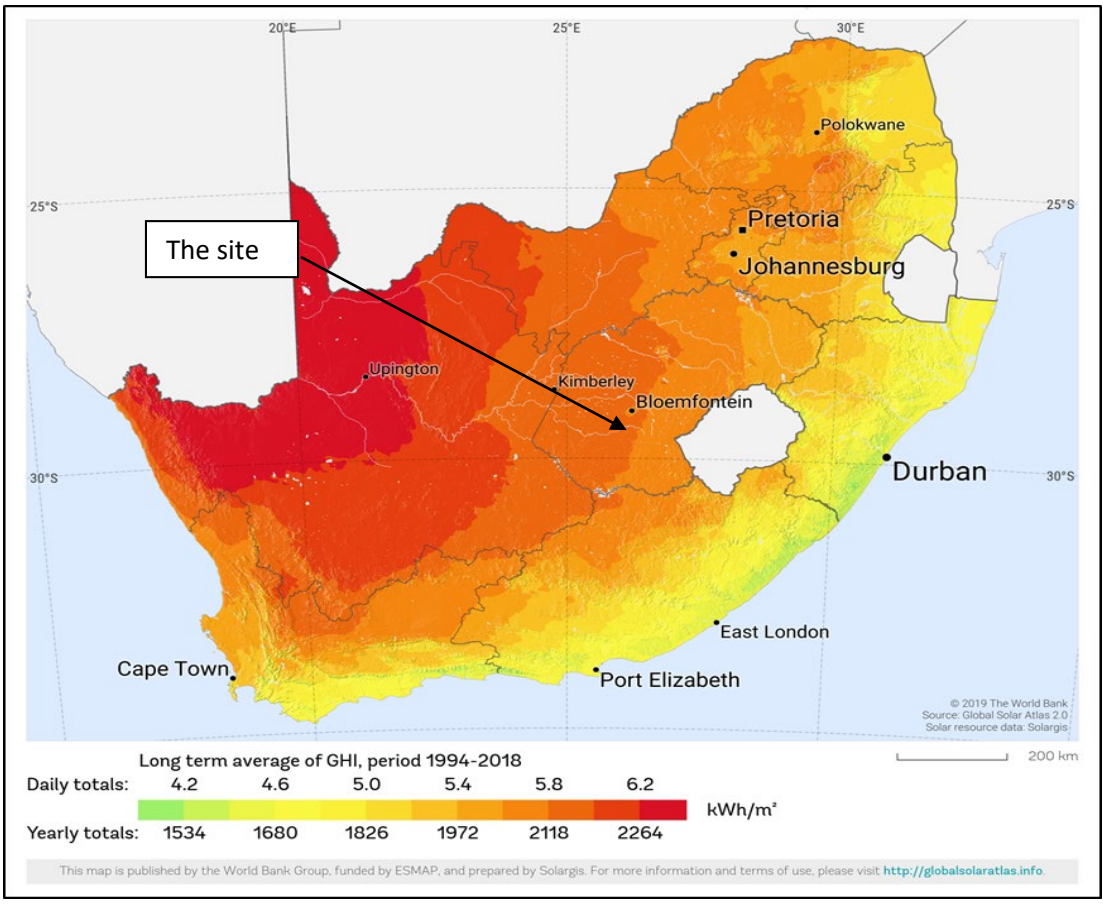


Figure 5.2: Global horizontal irradiation values for South Africa (Solar GIS, 2021) and the Acrux Solar PV Project One development footprint

5.1.4 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 Final Scoping Report. The final 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.

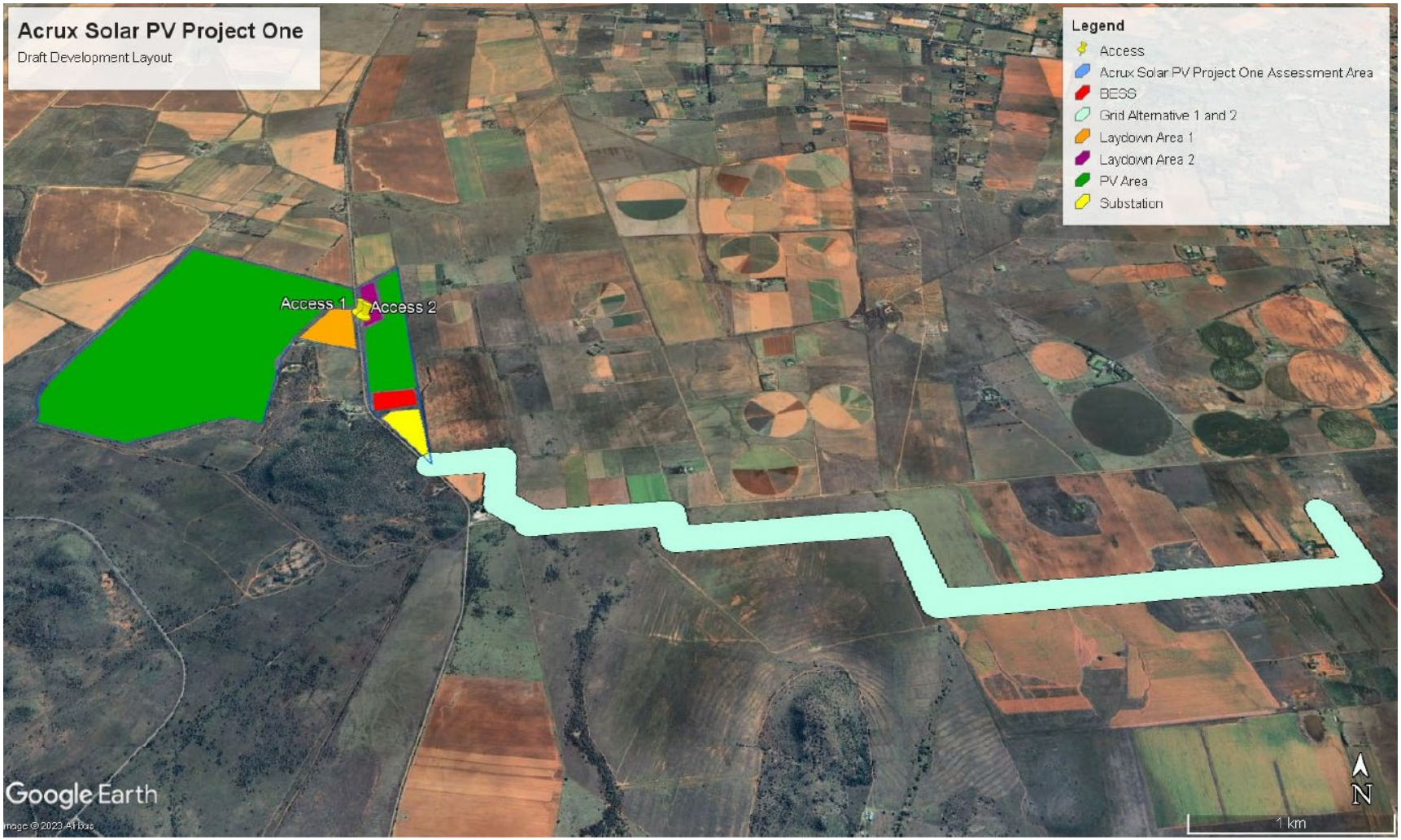


Figure 5.3: Draft layout plan for the Acrux Solar PV Project One

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) or an alternative programme, 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.

5.1.5 Technology Alternatives

Powerline:

Two (02) grid connection alternatives are being considered; these are as follows:

- *Alternative 1:* A 132 kV single or double circuit overhead powerline (OHPL) is proposed and will transmit energy generated by the solar PV facility directly into the existing Harvard substation. The proposed OHPL will be approximately 7 km long and will be located within a 200 m wide grid corridor.

- *Alternative 2:* The second alternative will also be 132 kV single or double circuit overhead powerline (OHPL) which will follow the same route to connect directly into the existing Harvard substation. This alternative will also be located within the 7km long and will be located within a 200 m wide grid corridor.

Confirmation in terms of the preferred alternative will be based on feedback provided by the Eskom Grid Access Unit.

A 132kV overhead distribution line is the only preferred alternative of the powerline technology for the applicant due to the following reasons:

- Overhead Distribution Lines - Overhead lines are less costly to construct than underground lines. Therefore, the preference for overhead lines is mainly based on cost. Overhead lines allow high voltage operations, and the surrounding air provides the necessary electrical insulation to earth. Further, the surrounding air cools the conductors that produce heat due to lost energy (Swingler et al., 2006).

  The overall weather conditions in the Free State Province are unlikely to cause damage and faults on the proposed overhead distribution power line. Nonetheless, if a fault occurs, it can be found quickly by visual means using a manual line patrol. Repair to overhead lines is relatively simple in most cases and the line can usually be put back into service within a few days. In terms of potential impacts associated with overhead distribution lines these include visual intrusion and threats to sensitive habitat (where applicable).

  Furthermore, overhead power lines also provide an opportunity for the avoidance of sensitive environmental features as the overhead lines can span on-ground environmental features to

ensure conservation, therefore providing more flexibility in terms of mitigation of the associated on-ground disturbance.

The choice of structure to be used for the powerline will be determined in consultation with Eskom once the Engineers have assessed the geotechnical and topographical conditions and decided on a suitable structure which meets the prescribed technical requirements. The choice of structures to be used will not have any adverse impacts on the environment. The line will be constructed according to the authorised standards for a power line approved by Eskom Holdings SoC Ltd.

Powerline Pylon Structure:

The choice of pylon structure to be used for the power line will be determined in consultation with Eskom and does not significantly affect the environmental impacts of the proposed development as provision has already been made for the visual, ecological and heritage impacts of erecting a power line. No defined structure has been confirmed at this stage and will depend on Eskom's technical requirements. The 132 kV line must be constructed according to the authorised standards for a power line approved by Eskom Holdings SoC Ltd. The structure to be utilised for the power line towers will also be informed by the local geotechnical and topographical conditions. The following alternatives are considered with regards to the proposed structures:

- Steel lattice towers –A lattice tower or truss tower is a freestanding vertical framework tower. This construction is widely used in transmission towers carrying high voltage electric power lines, in radio masts and towers (a self-radiating tower or as a support for aerials) and in observation towers. Its advantage is good shear strength at a much lower weight than a tower of solid construction would have as well as lower wind resistance.

- Steel monopoles - Monopole Tower is a kind of tower that consists of one stem or one pole anchored to the ground. Monopoles are polygonal sectioned and hot dip galvanized hollow steel structures used in various application in telecommunication, power transmission, railway, and other sectors. Monopoles are the latest advancement in transmission and distribution (T&D) sector, saving space and time for the grid manger and discoms. Monopole advantages are required small tower footprint and foundation, fast and easy to erect, available in different types depending upon applications.

- Wood poles - Wood pole structures are only used in extreme circumstances where a visual impact needs to be avoided. Wood pole structures may be cheaper to produce and to construct, but they have one tenth of the lifespan of the metal counterparts and are far more susceptible to weather conditions which makes them less efficient and practicable. The wood pole structure is also more susceptible to having the cross arms burnt off by electrical faults as well as being susceptible to deformation with height.

Battery Energy Storage Facility (BESS):

As technological advances within battery energy storage systems (BESS) are frequent, two BESS technology alternatives are considered:

- Solid state battery electrolytes; and
- Redox-flow technology.

Solid state battery electrolytes, such as lithium-ion (Li-ion), zinc hybrid cathode, sodium ion, flow (e.g., zinc iron or zinc bromine), sodium sulphur (NaS), zinc air and lead acid batteries, can be used for grid applications. Compared to other battery options, Li-ion batteries are highly efficient, have a high energy density and are lightweight. As a result of the declining costs, Li-ion technology now accounts for more than 90% of battery storage additions globally (IRENA, 2019).

Flow batteries use solid electrodes and liquid electrolytes. The most used flow battery is the Vanadium Redox Flow Battery (VRFB), which is a type of rechargeable flow battery that employs vanadium ions in different oxidative states to store chemical potential energy. Considering the nature of the project, only a solid-state technology type would be envisaged for implementation.

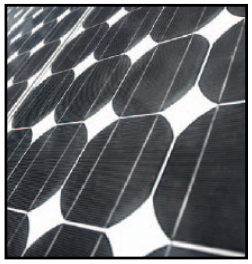
PV Panels:

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.

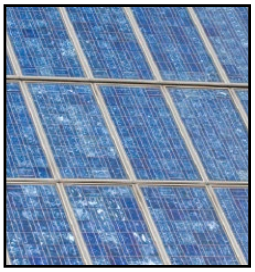
There are several types of semiconductor technologies currently available and in use for PV solar panels. Two, however, have become the most widely adopted, namely crystalline silicon and thin film. These technologies are discussed in more detail below:

- 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.



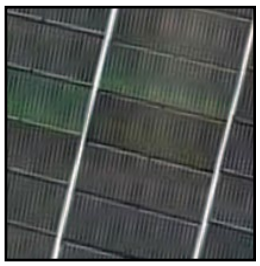
  - Poly-crystalline Silicon – poly-crystalline panels use solar cells that are cut from multifaceted silicon crystals. They are less uniform in appearance than mono-crystalline cells, resembling pieces of shattered glass. These are the most common solar panels on the market, being less expensive than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

- Thin film (low-cost technology with lower efficiency):

  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.

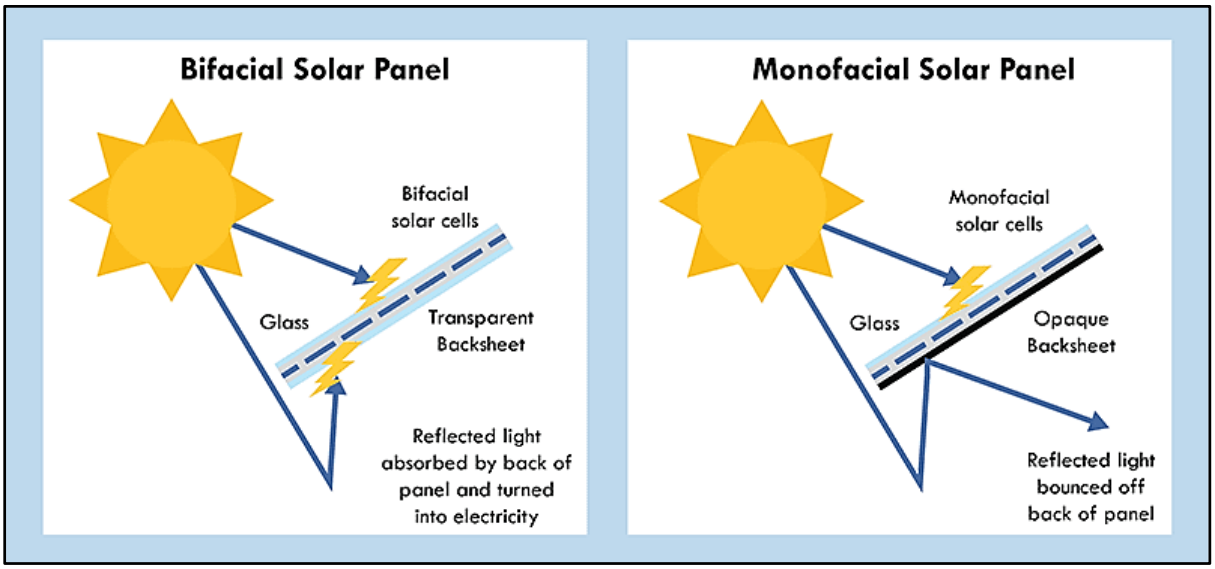


  - Copper, Indium, Gallium, Selenide (CIGS) - CIGS is a compound semiconductor that can be deposited onto many different materials. CIGS has only recently become available for small commercial applications, and is considered a developing PV technology (First Solar, 2011).

- 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.

5.2 PUBLIC PARTICIPATION PROCESS

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

5.2.1 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 23 February 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 26 March 2023. Photographic evidence of the site notices is included in Appendix C2.

- Newspaper advertisement
  An advertisement was placed in English in the Bloemnuus Local Newspaper on 20 April 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 Environamics Environmental Consultants. I&APs were given the opportunity to raise comments within 30 days of the advertisement (i.e., up until 22 May 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 26 April 2023.

- Direct notification of identified I&APs
  Identified I&APs, including key stakeholders representing various sectors, were directly informed of the EIA process on 26 April 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 29 May 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 26 April 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 03 July 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.

5.2.2 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 land owners.

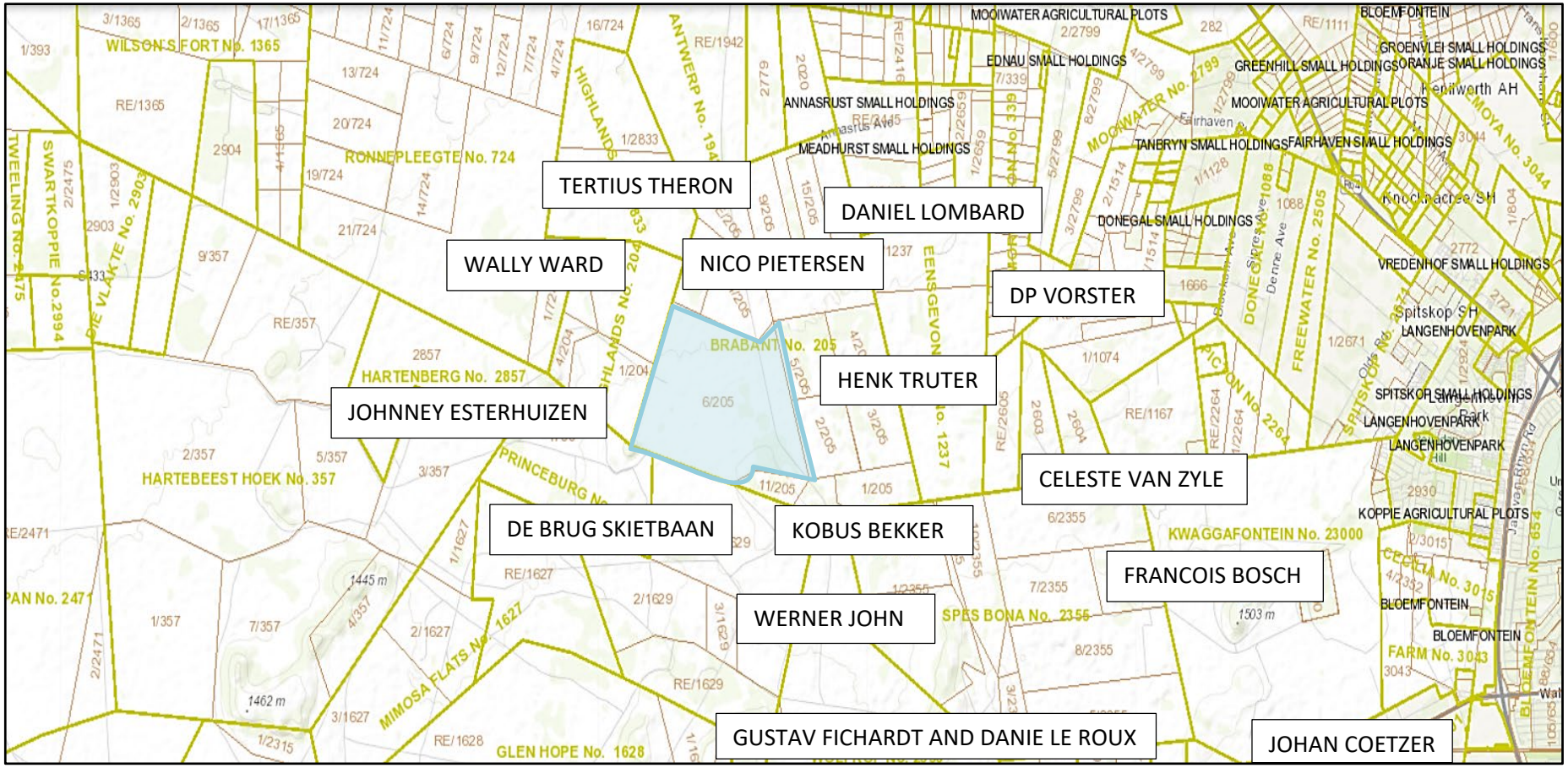


Figure 5.5: Affected properties (Blue) in relation to surrounding landowners

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

5.2.4 Issues Raised by I&APs and Consultation Bodies

To date the interim comment from SAHRA has been received and is summarised in the Comments and Response Report included in Appendix C6. Any comments received during the circulation of the draft Scoping Report is summarised thise final Scoping Report. The full wording and original correspondence were included in Appendix C5.

5.3 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).

5.3.1 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 the Table 1.1.

The area surrounding the proposed development is characterised mostly by agricultural development except to the east where large scale urban development is present. The proposed solar PV facility is located adjacent to the proclaimed Highlands Nature Reserve, but after further investigation, the visual impact assessment confirms that the reserve is only being used for cultivation farming with very low to no tourism potential. These features are described in more detail below.

5.3.1.1 Geology, Soils and Agricultural Potential

A desktop scoping report (attached as Appendix E1) was undertaken for the delineated Project Area Of Influence (PAOI) which discusses the geology, soils and agricultural potential within the PAOI. The delineated PAOI comprises of four (04) project sites located in close proximity to one another (assessed via independent and concurrent S&EIR processes).

Soil information was obtained using published South African Land Type Data. Land type data for the site was obtained from the Institute for Soil Climate and Water (ISCW) of the Agricultural Research Council (ARC) (Land Type Survey Staff, 1972 - 2006). The land type data is presented at a scale of 1:250 000 and comprises of the division of land into land types as presented in Figure 5.6 below. According to the land type database (Land Type Survey Staff, 1972 – 2006) the PAOI falls within the following land type: Ca8 and Ca22.

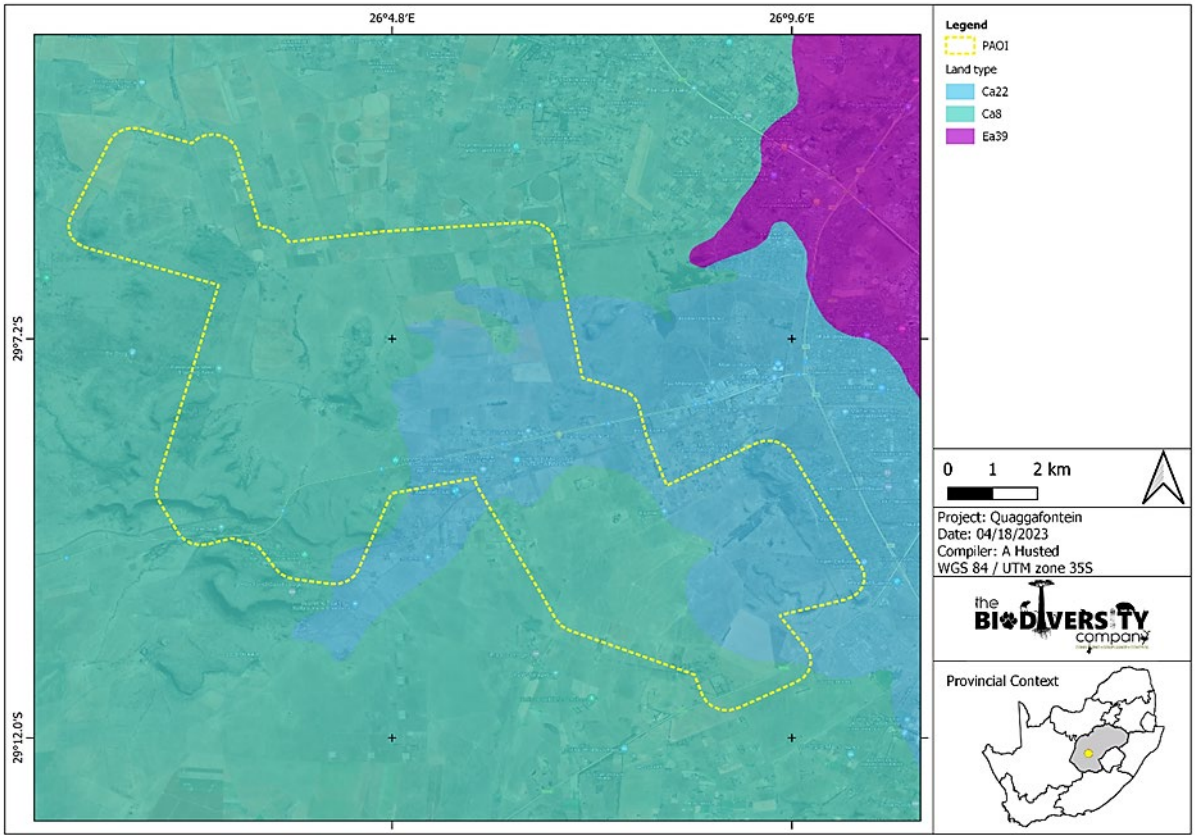


Figure 5.6: Land type data for the PAOI

Fifteen land capabilities have been digitised by (DAFF, 2017) across South Africa, of which eight potential land capability classes are located within the PAOI, including;

- Land Capability 1 to 5 (Very low, Very low/Low to Low Sensitivity); and
- Land Capability 6 to 8 (Low/Moderate to Moderate Sensitivity).

The sensitivities as per the Department of Agriculture, Forestry and Fisheries (DAFF, 2017) national raster file indicated that the land capabilities range from low to medium across the PAOI. Numerous areas identified as crop fields are located within the PAOI. Refer to Figure 5.7 below.

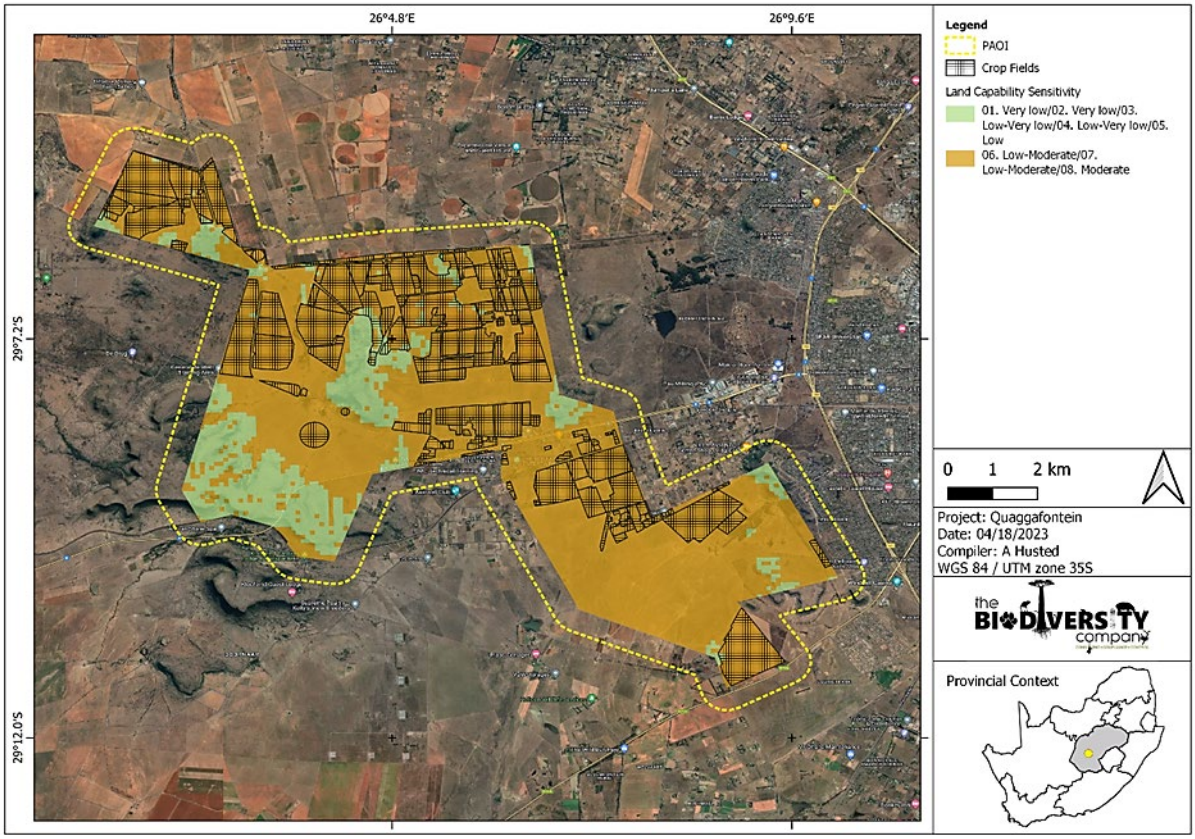


Figure 5.7: Land Capability Sensitivity (DAFF, 2017)

Soil Impact Assessment

Various soil forms are expected throughout the PAOI, of which some are commonly associated with higher land capabilities. Even though the soil depth, texture and permeability of these soils ensure higher land capability, the climatic capability of an area often reduces the land potential. Areas characterised by "High" land potential are expected for selected areas. The anticipated impacts to the soil are summarised in Table 5.1 below.

Table 5.1: Scoping evaluation table summarising the impacts identified to soils

Impact **Loss of land capability**			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Compaction/soil stripping/transformation of land use which leads to loss of land capability	Direct impacts: » Loss of soil / land capability Indirect impacts: » Loss of land capability	Local	None identified at this stage
Erosion	Direct impacts: » Loss of topsoil Indirect impacts: » Loss of land capability	Site/Local	None identified at this stage
Description of expected significance of impact			

The development of the area could result in the encroachment into areas characterised by high land potential properties, which can ultimately result in the loss of land capability. These disturbances could also result in the infestation and establishment of alien vegetation, which in turn can have a detrimental impact on soil resources. Earthworks will expose and mobilise earth materials which could result in compaction and/or erosion. A number of machines, vehicles and equipment will be required, aided by chemicals and concrete mixes for the project. Leaks, spillages or breakages from any of these could result in contamination of soil resources, which could affect the salinity or pH of the soil, which can render the fertility of the soil unable to provide nutrition to plants. During the operational phase, the impacts associated with the solar PV array will be easily managed by best "housekeeping" practices. The significance of these impacts will be determined after a field assessment has been conducted.

Gaps in knowledge & recommendations for further study

- **This is completed at a desktop level only.**
- **Identification and delineation of soil forms.**
- **Determine of soil sensitivity.**

Recommendations with regards to general field surveys

- **Field surveys to prioritise the development areas.**

The proposed development can result in the loss of land capability. The disturbances could further also result in the infestation and establishment of alien vegetation, which in turn can have a detrimental impact on soil resources. The development of the area could also result in compaction and/or erosion. Furthermore, these activities could also cause leaks and/or spillages resulting in contamination of soil resources, which could affect the salinity or pH of the soil, which can render the fertility of the soil unable to provide nutrition to plants. The significance of these impacts will be determined after a field assessment has been conducted.

5.3.1.2 Vegetation, Topography and Landscape Features

A desktop scoping report (attached as Appendix E1) was undertaken for the delineated Project Area Of Influence (PAOI) which discusses the vegetation, topography as well as the landscape features identified within the PAOI. The delineated PAOI comprises of four (04) project sites located in close proximity to one another (assessed via independent and concurrent S&EIR processes). The PAOI is situated within the Grassland Biome. The Grassland Biome in South Africa occurs mainly on the Highveld, the inland areas of the eastern seaboard, the mountainous areas of KwaZulu-Natal and the central parts of the Eastern Cape. The topography is mainly flat to rolling, but also includes mountainous regions and the Escarpment (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the Grassland Biome include summer to strong summer rainfall and winter drought; and frost is common, fog is found on the upper slopes of the Great Escarpment and seaward scarps (Mucina & Rutherford, 2006).

Grasslands characteristically contain herbaceous vegetation of a relatively short and simple structure that is dominated by graminoids, usually of the family Poaceae. Woody plants are rare (usually made up of low or medium-sized shrubs), absent, or confined to specific habitats such as smaller escarpments or koppies. Core grassland areas usually have deep, fertile soils although a wide spectrum of soil types do occur (Mucina & Rutherford, 2006). The Grassland Biome is comprised of four (04) parent bioregions and a total of 72 different vegetation types. The PAOI is situated within the Bloemfontein Dry Grassland and the Winburg Grassy Shrubland. The conservation status of the two vegetation types is Endangered and Least Threatened respectively. Refer to Figure 5.8 below.

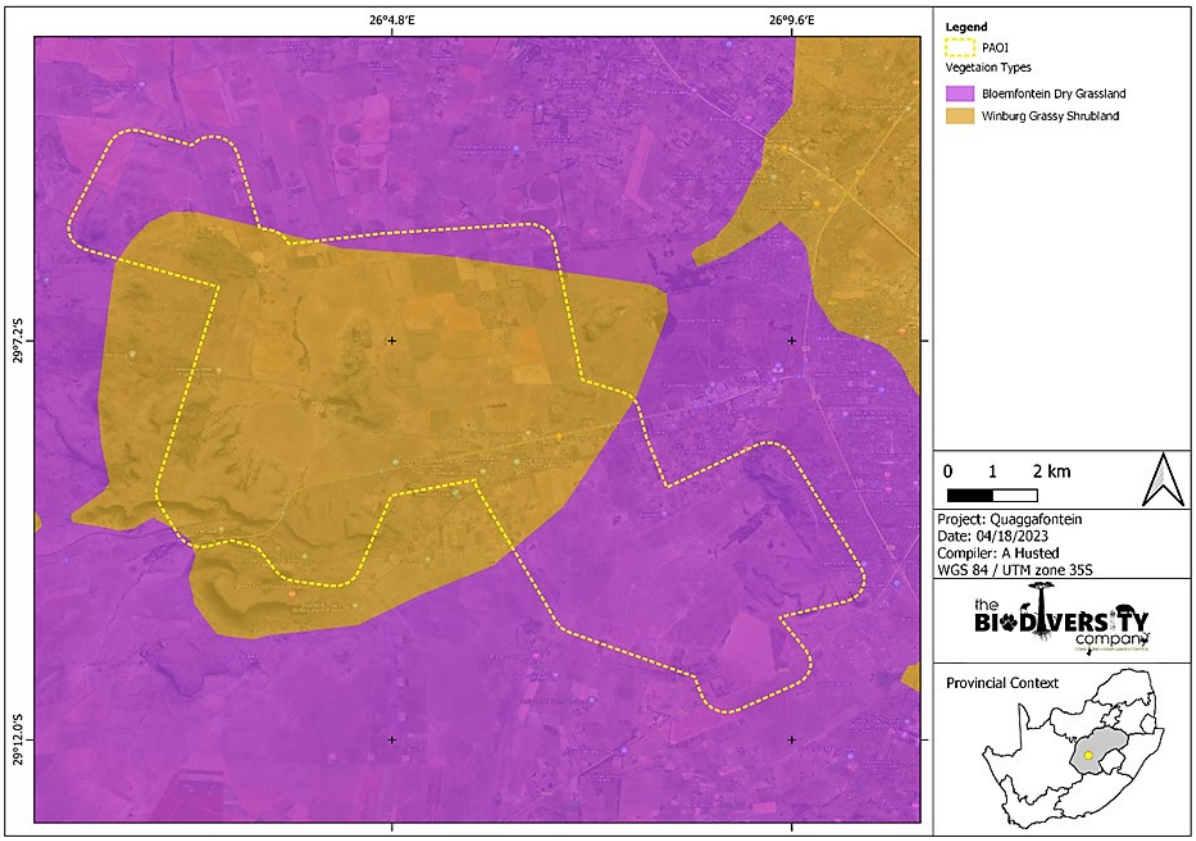


Figure 5.8: Map illustrating the vegetation types associated with the PAOI

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 PAOI overlaps LC and NT ecosystems as per Figure 5.9. below.

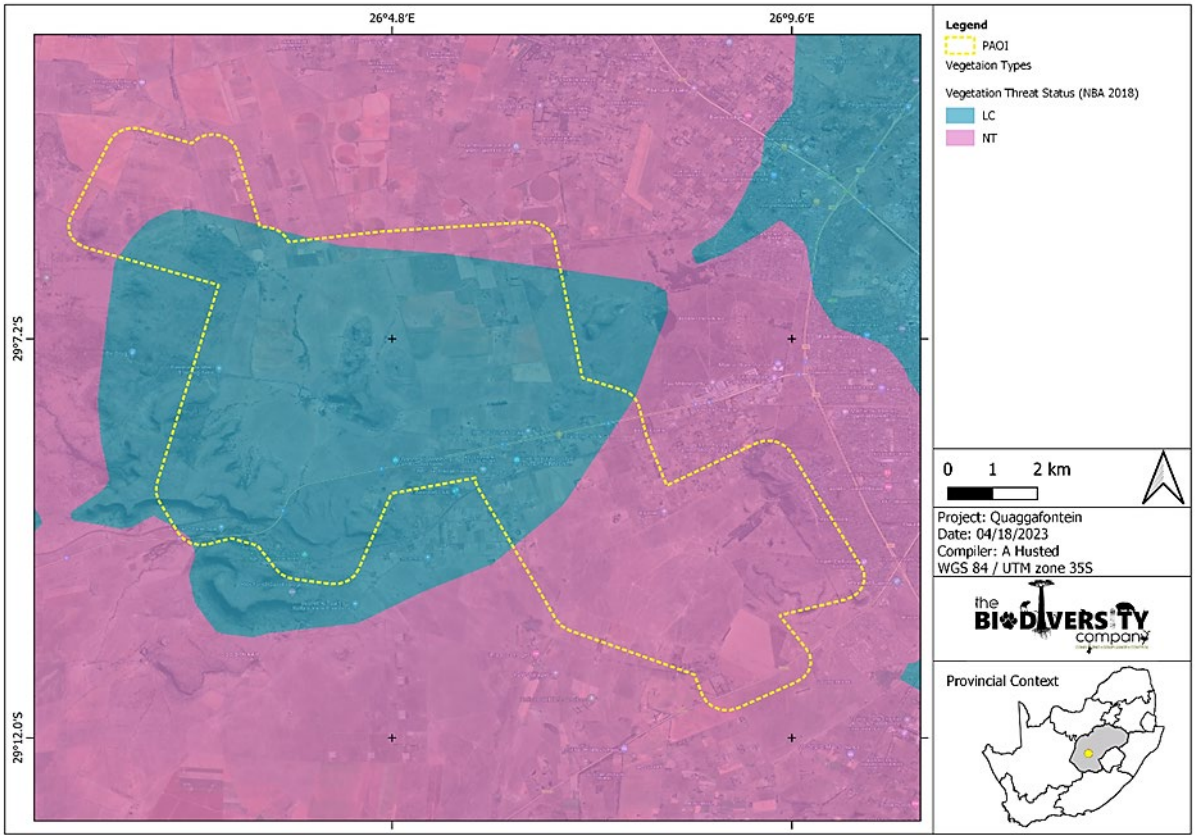


Figure 5.9: Map illustrating the ecosystem threat status associated with the PAOI

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 PP ecosystem as per Figure 5.10 below.

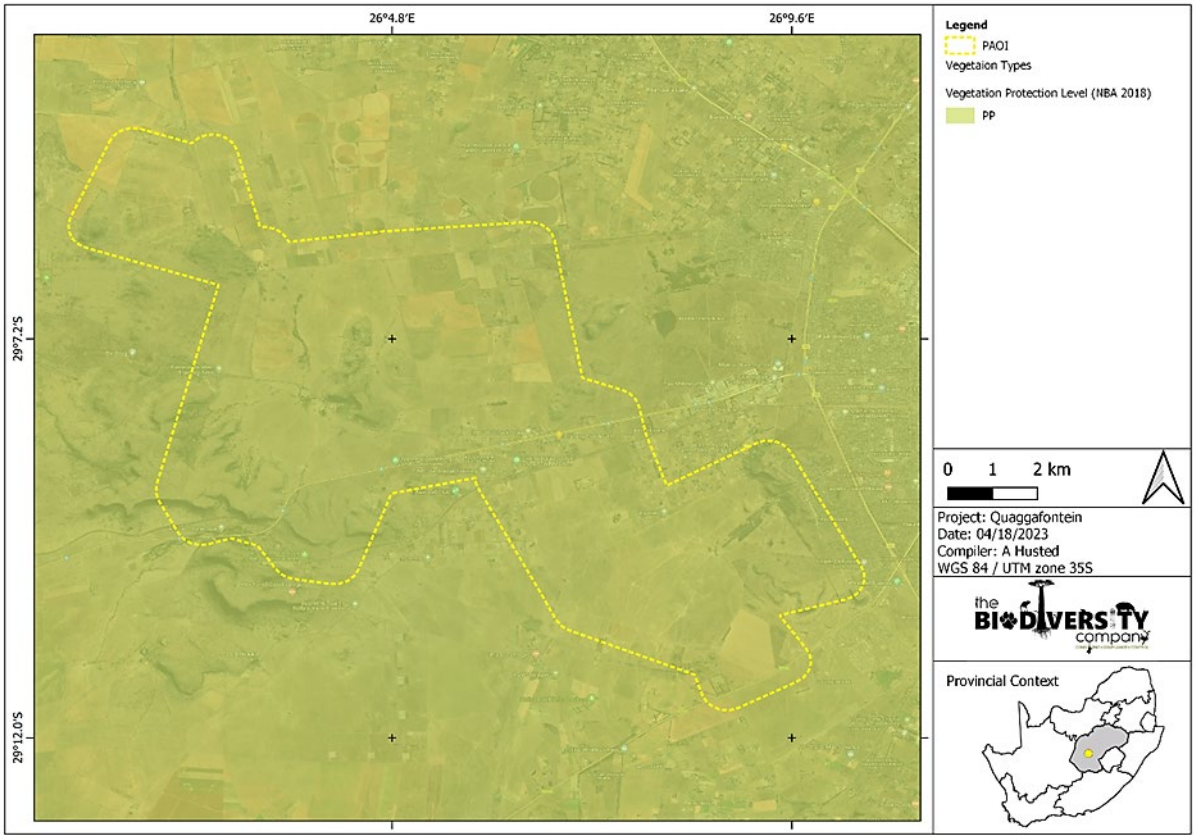


Figure 5.10: Map illustrating the ecosystem protection level associated with the PAOI

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 5.11 shows the PAOI superimposed on the conservation plan. The PAOI overlaps with areas predominantly classified as Other Natural Areas and Degraded Areas. Notable areas classified as CBA 1 are also located within the PAOI.

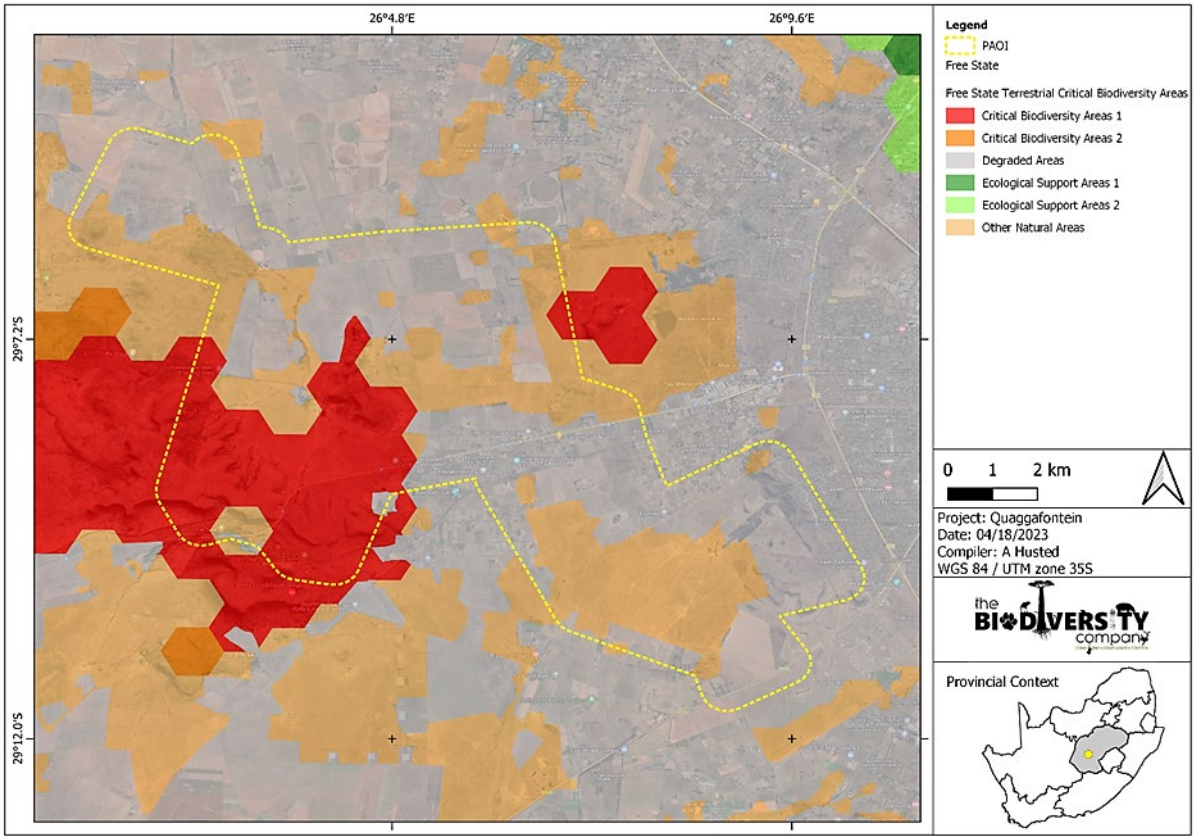


Figure 5.11: Map illustrating the locations of the PAOI area in relation to the CBA Map

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 (2022) and SACAD (2022), the PAOI overlaps with portions of the Highlands Reserve and Olievenkloof Private Nature Reserve as per Figure 5.12 below. The proposed project footprints do not encroach into these areas.

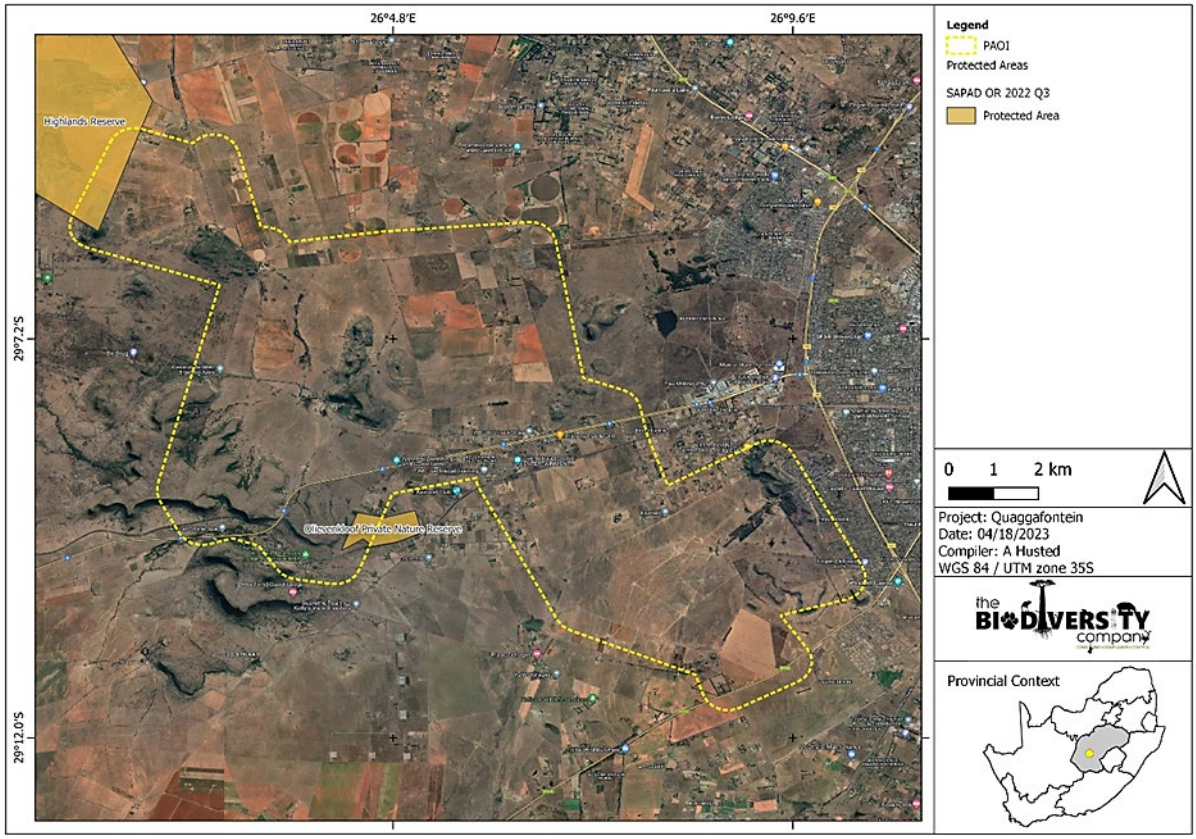


Figure 5.12: The project area in relation to the protected areas

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 2016 (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, 2016). The PAOI does overlap with NPAES areas, including Protected Areas and also Priority Focus Area as per Figure 5.13 below.

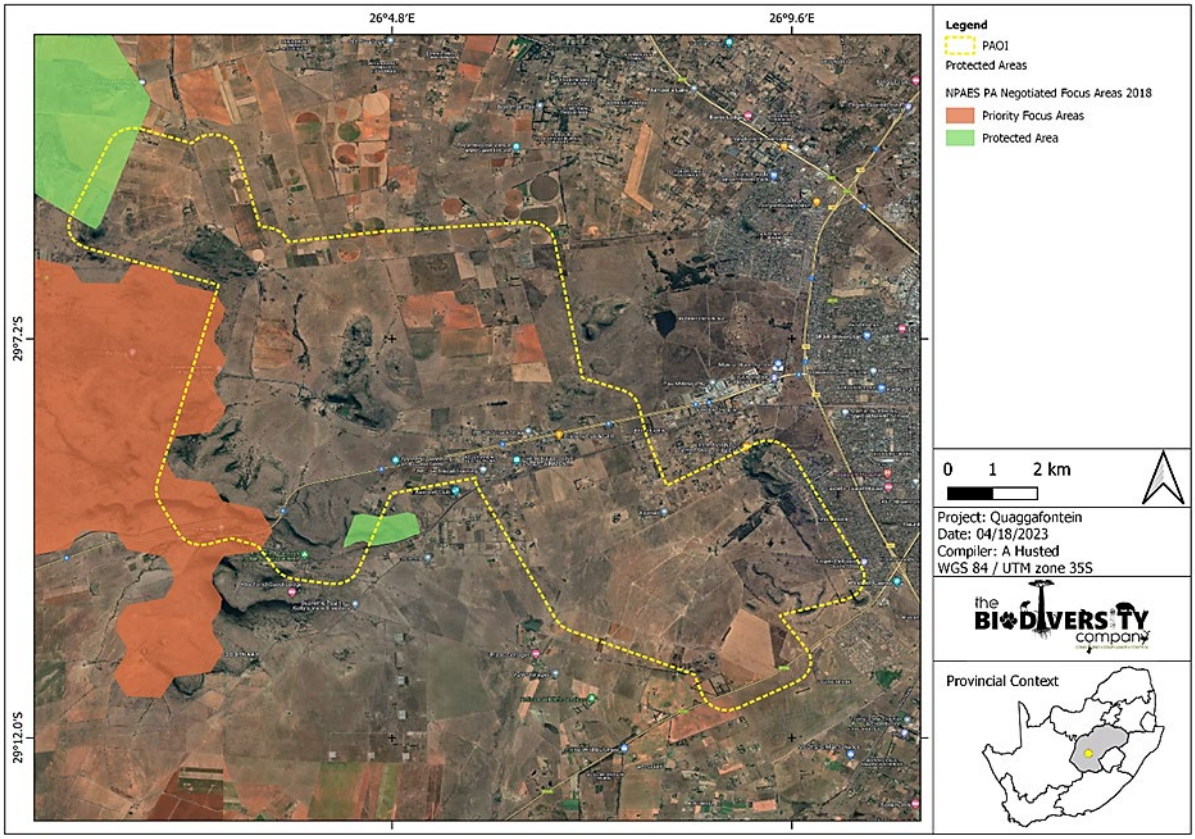


Figure 5.13: The project area in relation to the National Protected Area Expansion Strategy

Terrestrial 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 wildlife movement corridors such as rivers, streams and drainage lines, or other locally important features. The removal of natural vegetation may reduce the habitat available for fauna species and may reduce animal populations and species compositions within the area.

The majority of terrestrial habitat expected in the project area consists of two vegetation types (Least Threatened), species of conservation concern also expected for the PAOI. The PAOI does also overlap with water resources. Two protected areas and CBA1 areas are also located within the PAOI. Based on the desktop assessment information it can be said that the sensitivity rating of the project area will be medium to high, with protected areas and CBA1 areas likely assigned Very High sensitivity. However, the actual state of the project area must be confirmed by a field assessment. Anticipated impacts on terrestrial biodiversity are summarised in Table 5.2 below.

Table 5.2: Scoping evaluation table summarising the impacts identified to terrestrial biodiversity

Impact	**Biodiversity loss/disturbance**		
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Destruction, fragmentation and degradation of habitats and ecosystems	Direct impacts: » Disturbance / degradation / loss to vegetation and habitats » Ecological corridors are disrupted » Habitat fragmentation Indirect impacts: » Erosion risk increases » Fire risk increases » Increase in invasive alien species	Local	None identified at this stage
Spread and/or establishment of alien and/or invasive species	Direct impacts: » Loss of vegetation and habitat due to increase in alien species Indirect impacts: » Creation of infrastructure suitable for breeding activities of alien and/or invasive species » Spreading of potentially dangerous diseases due to invasive and pest species	Local	None identified at this stage
Direct mortality of fauna	Direct impacts: » Loss of SCC species » Loss of fauna diversity Indirect impacts: » Loss of diversity and species composition in the area. » Possible impact on the food chain	Local	None identified at this stage
Reduced dispersal/migration of fauna	Direct impacts: » Loss of genetic diversity » Isolation of species and groups leading to inbreeding Indirect impacts: » Reduced seed dispersal » Loss of ecosystem services	National/ Local	None identified at this stage

Environmental pollution due to water runoff, spills from vehicles and erosion	Direct impacts: » Pollution in waterbodies and the surrounding environment » Faunal mortality (direct and indirectly) Indirect impacts: » Ground water pollution » Loss of ecosystem services	Regional/ Local	None identified at this stage
Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust, heat radiation and light pollution.	Direct impacts: » Disruption/alteration of ecological life cycles due to noise » Reduced pollination and growth of vegetation due to dust » Faunal mortality due to light pollution (nocturnal species becoming more visible to predators) » Heat radiation could lead to the displacement of species Indirect impacts: » Loss of ecosystem services	Local	None identified at this stage
Staff and others interacting directly with fauna (potentially dangerous) or poaching of animals	Direct impacts: » Loss of SCCs or TOPS species Indirect impacts: » Loss of ecosystem service » Loss of genetic diversity	Local	None identified at this stage

Description of expected significance of impact

The development of the area could result in the loss or degradation of the habitat and vegetation which is expected to support a number of flora and fauna SCC species. The construction of the solar facility could also lead to the displacement/mortalities of the fauna and more specifically SCC fauna species. The operation of the facility could result in the disruption of ecological life cycles. This could be as a result of a number of things, but mainly due to dust, noise, light pollution and heat radiation. The disturbance of the soil/vegetation layer will allow for the establishment of flora alien invasive species. In turn, the new infrastructure could provide refuge for invasive/feral fauna species. Erosion is another possible impact that could result from the disturbance of the topsoil and vegetation cover. A number of machines, vehicles and equipment will be required, aided by chemicals and concrete mixes for the project. Leaks, spillages or breakages from any of these could result in contamination of the receiving water resources. Contaminated water resources are likely to have an effect on the associated biota. The significance of these impacts will be determined after a field assessment has been conducted.

Gaps in knowledge & recommendations for further study

- **This is completed at a desktop level only.**

- **Identification and descriptions of habitats.**
- **Identification of the Site Ecological Importance.**
- **Location and identification of SCCs as well as in the case of fauna their location of the nests/dens.**
- **Determine a suitable buffer width for the identified features.**

Recommendations with regards to general field surveys

- **Field surveys to prioritise the development areas, but also consider the 500 m regulated zone.**
- **Fieldwork to be undertaken during the wet season period.**
- **Avifauna assessment field work to be conducted over two seasons to ensure migratory species are considered.**

Based on the desktop assessment it can be said that the PAOI is sensitive with a moderate to high likelihood of species of conservation concern occurring. This assumption is based on the presence of CBA1 and water resources in and around the project area.

The expectant anthropogenic activities are likely to drive habitat destruction, causing displacement of fauna and flora, and possibly event direct mortality. Land clearing destroys local wildlife habitat and can lead to the loss of local breeding grounds, nesting sites and wildlife movement corridors such as rivers, streams and drainage lines, or other locally important features. The removal of natural vegetation may reduce the habitat available for fauna species and may reduce animal populations and species compositions within the area. The significance of these impacts will be determined after a field assessment has been conducted.

5.3.1.3 Wetlands and Riparian Features

A desktop scoping report (attached as Appendix E1) was undertaken for the delineated Project Area of Influence (PAOI) which discusses the hydrological setting identified within the PAOI. The delineated PAOI comprises of four (04) project sites located in close proximity to one another (assessed via independent and concurrent S&EIR processes).

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). The PAOI overlaps with a single depression (DEPR) wetland listed as LT. Refer to Figure 5.14 below.

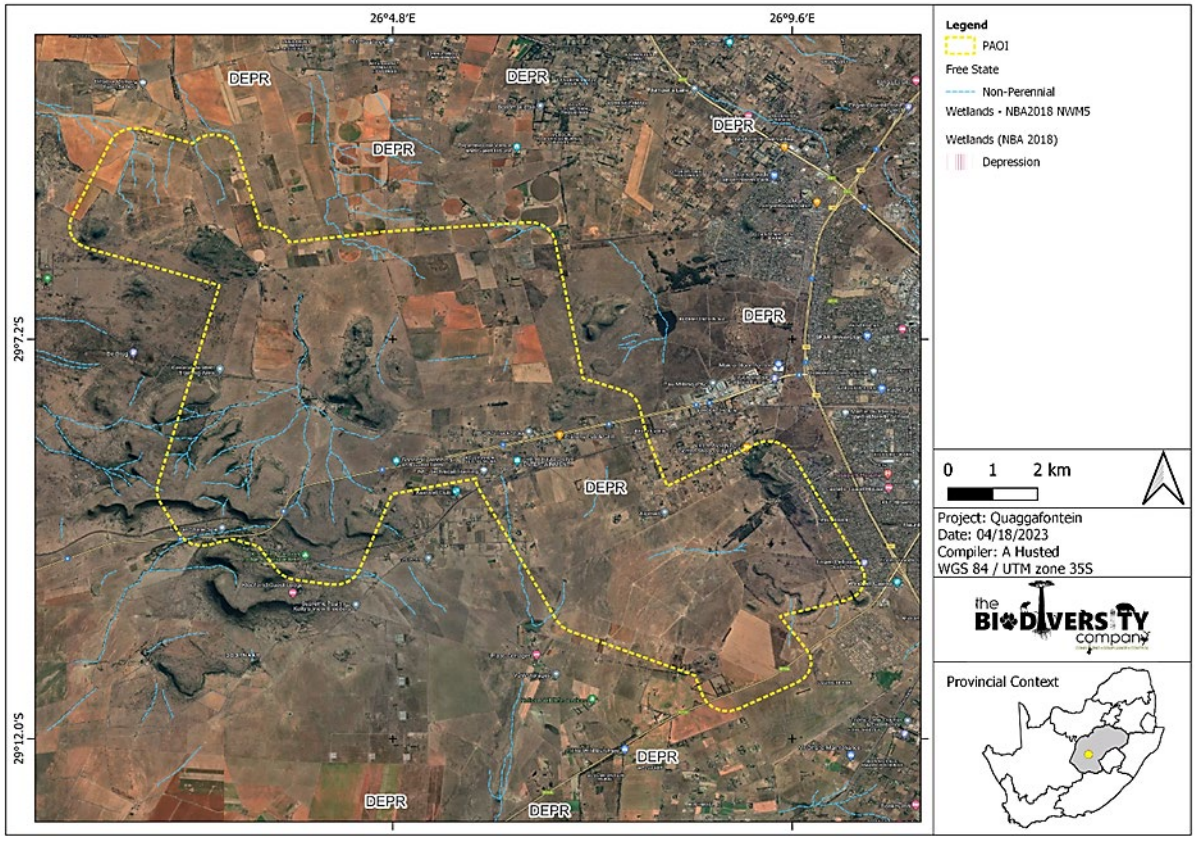


Figure 5.14: Map illustrating the ecosystem threat status of rivers and wetland ecosystems in the project area

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver et al., 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals (Nel et al., 2011).

Figure 5.15 below shows that the PAOI overlaps with unclassified FEPA wetlands, while several FEPA wetland types are located within the PAOI.

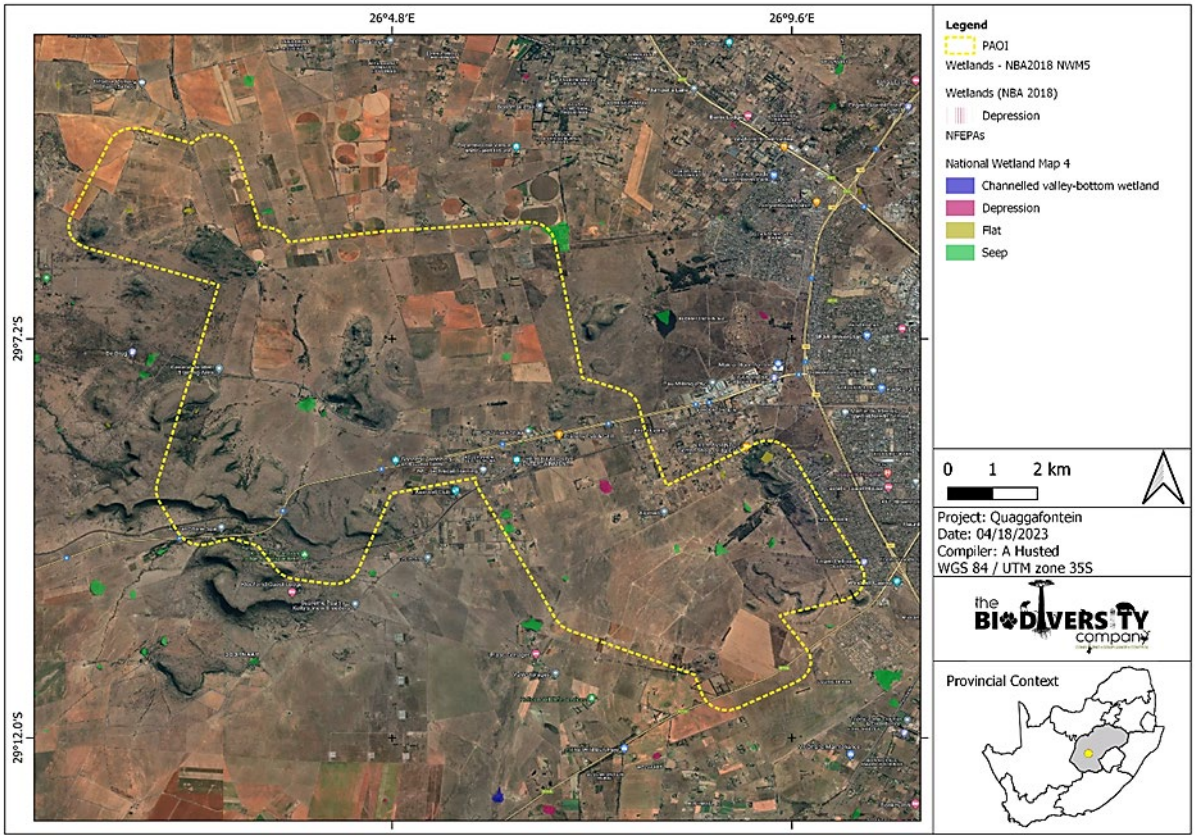


Figure 5.15: The project area in relation to the NFEPA & NWM5 datasets

Wetland Impact Assessment

A key consideration for the scoping level impact assessment is the presence of the water resources located in proximity to the PAOI. The available data suggests the presence of several wetlands within the PAOI, 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. Anticipated impacts on wetlands are summarised in Table 5.3 below.

Table 5.3: 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	<u>Direct impacts:</u> » Disturbance / degradation to wetland soils or vegetation <u>Indirect impacts:</u> » 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: » Sedimentation & contamination of downstream reaches	Local	None identified at this stage
Description of expected significance of impact **The development of the area could result in the encroachment into water resources and result in the loss or degradation of these systems. These disturbances could also result in the infestation and establishment of alien vegetation which would affect the functioning of the systems. Earthworks will expose and mobilise earth materials which could result in sedimentation of the receiving systems. A number of machines, vehicles and equipment will be required, aided by chemicals and concrete mixes for the project. Leaks, spillages or breakages from any of these could result in contamination of the receiving water resources. Contaminated water resources are likely to influence the associated biota. It is anticipated to increase stormwater runoff due to the hardened surfaces will result in an increase in run-off volume and velocities, resulting in altered flow regimes. The changes could result in physical changes to the receiving systems caused by erosion, run-off and also sedimentation, and the functional changes could result in changes to the vegetative structure of the systems. The reporting of surface run-off to the systems could also result in the contamination of the systems, transporting (in addition to sediment) diesel, hydrocarbons and soil from the operational areas. The significance of these impacts will be determined after a field assessment has been conducted.**			
Gaps in knowledge & recommendations for further study » **This is completed at a desktop level only.** » **Identification, delineation and characterisation of water resources.** » **Undertake a functional assessment of systems where applicable.** » **Determine a suitable buffer width for the resources.** **Recommendations with regards to general field surveys** » **Field surveys to prioritise the development areas, but also consider the 500 m regulated zone.** » **Beneficial to undertake fieldwork during the wet season period.**			

A key consideration for the impact assessment is the presence of the identified water resources in relation to the PAOI. Several wetlands within the PAOI, 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. The significance of these impacts will be determined after a field assessment has been conducted.

5.3.1.4 Climate

This region is characterised as a summer-rainfall region, with Mean Annual Precipitation (MAP) around 500 mm. Much of the rainfall is of convectional origin. Overall Mean Annual Temperature (MAT) is slightly higher than 15°C, with more than 40 days of frost in 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).

5.3.1.5 Biodiversity

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 biodiversity on the site in more detail.

Avifauna

A desktop scoping report (attached as Appendix E1) was undertaken for the delineated Project Area Of Influence (PAOI) which discusses the avifauna identified within the PAOI. The delineated PAOI comprises of four (04) project sites located in close proximity to one another (assessed via independent and concurrent S&EIR processes).

Important Bird and Biodiversity Areas (IBAs) constitute a global network of over 13 500 sites, of which 112 sites are found in South Africa. IBAs are sites of global significance for bird conservation, identified through multi-stakeholder processes using globally standardised, quantitative and scientifically agreed criteria. The PAOI is located more than 20 km south of the Soetdoring nature Reserve IBA.

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 5.4 below summarises avifauna impacts identified.

Table 5.4: 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	Direct impacts:	Regional	None identified

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		at this stage
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	None identified at this stage
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	None identified at this stage
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	None identified at this stage
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	None identified at this stage

	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	None identified at this stage
Description of expected significance of impact **The development of the area could result in the loss or degradation of the habitat and vegetation, some of which is still in a natural condition and is expected to support a number of avifauna species. The construction of the solar facility could also lead to the displacement/mortalities of the avifauna and more specifically SCC avifauna species. The operation could result in collisions and electrocutions.**			
Gaps in knowledge & recommendations for further study » **This is completed at a desktop level only.** » **Identification and descriptions of habitats.** » **Identification of the Site Ecological Importance.** » **Location and identification of SCCs as well as in the case of avifauna their location of the nests.** » **Determine a suitable buffer width for the identified features.** **Recommendations with regards to general field surveys** » **Field surveys to prioritise the development areas.** » **Fieldwork to be undertaken during the wet season period.** » **Avifauna assessment field work to be conducted over two seasons to ensure migratory species are considered.**			

5.3.1.6 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 E2), 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:

- **Area Receptors** which include:
  - A large number of smallholdings.

- Bloemfontein and associated suburbs, including Quaggafontein.
- General De Wet Shooting Range.
- De Brug Military Base.

- **Linear Receptors** which include:
  - N1 National Road.
  - N8 National Road.
  - R64 regional road.
  - R706 regional road.
  - Abrahamskraal road.
  - A gravel road adjacent to site. *For the sake of this report, this gravel road will be referred to as the "Adjacent gravel road".*
  - Other roads in and around Bloemfontein.
  - Private aerodromes.
- **Point Receptors** which include:
  - Homesteads on farms.
  - Lodging facilities.

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 5.5: ZTV Assumptions

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

Table 5.6 below reflects the visibility rating in terms of proximity on sensitive receptors of the proposed solar PV facility. The ZTV maps 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.

Table 5.6: ZTV rating in terms of proximity to the solar PV facility

Radius	Visual Receptors	Visibility rating in terms of proximity
0-1km	- Five homesteads on farms - Adjacent gravel road - Highlands Nature Reserve **Visibility Coverage: 77.85%**	Very High

1-3km	- 11 homesteads on farms - Adjacent gravel road - Highlands Nature Reserve - Small section of smallholdings - General De Wet Shooting Range **Visibility Coverage: 38.97%**	High
3-5km	- 10 homesteads on farms - Adjacent gravel road - Abrahamskraal road - Highlands Nature Reserve - Smallholdings **Visibility Coverage: 30.08%**	Medium
5-10km	- 47 homesteads on farms - Two lodging facilities - Smallholdings - Highlands Nature Reserve - Abrahamskraal road - R64 regional road - N8 National Road - One private airstrip - Olievenkloof Nature Reserve - De Brug Military Base **Visibility Coverage: 19.07%**	Low

Figures 5.16 and 5.17 below illustrates the theoretical visibility as listed in Table 5.6.

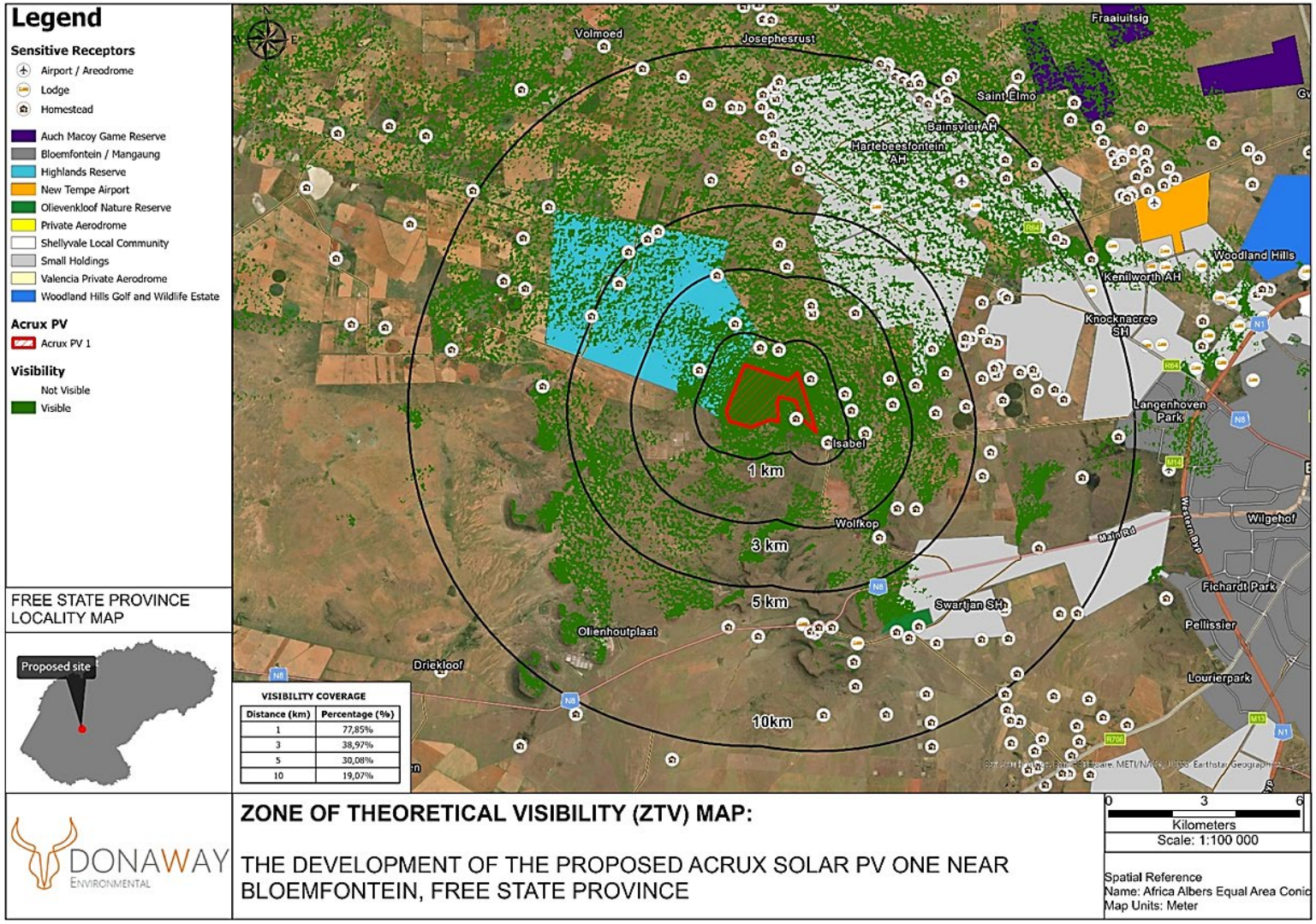


Figure 5.16: Zone of Theoretical Visibility (ZTV) of the solar PV facility, satellite view

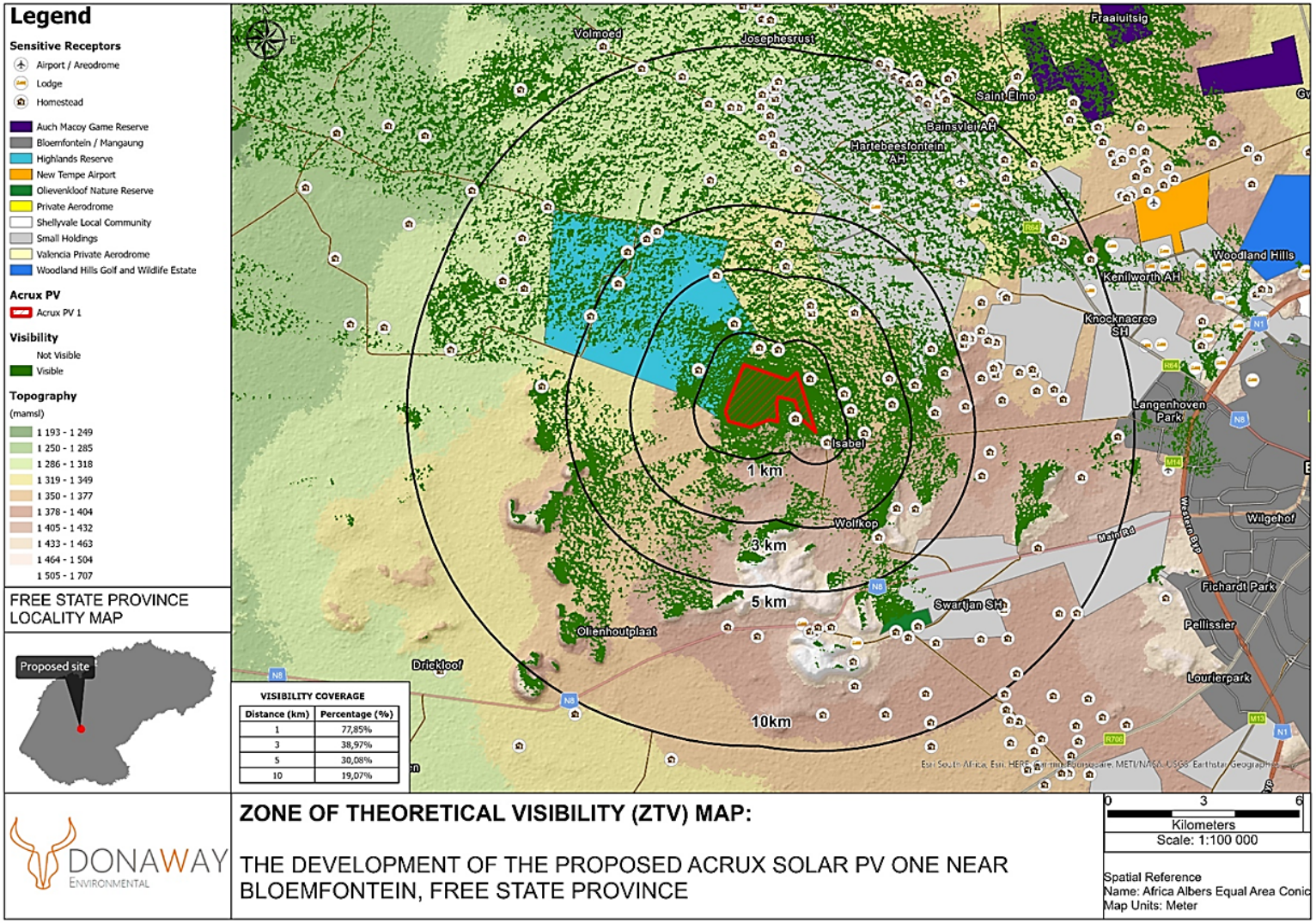


Figure 5.17: Zone of Theoretical Visibility (ZTV) of the solar PV facility, topography view

Table 5.7 below reflects the visibility rating in terms of proximity on sensitive receptors of the grid alternative 1.

Table 5.7: ZTV rating in terms of proximity to grid alternative 1

Radius	Visual Receptors	Visibility rating in terms of proximity
0-1km	- Six homesteads on farms - Adjacent gravel road **Visibility Coverage: 96.67%**	Very High
1-3km	- 23 homesteads on farms - Adjacent gravel road - Smallholdings **Visibility Coverage: 64.47%**	High
3-5km	- 15 homesteads on farms - Smallholdings - Adjacent gravel road - Highlands Nature Reserve - Small section of Langenhoven Park, a suburb of Bloemfontein. - N8 National Road - Olievenkloof Nature Reserve **Visibility Coverage: 35.51%**	Medium
5-10km	- 32 homesteads on farms - 16 lodging facilities - Smallholdings - One private airstrip - R64 regional road - Abrahamskraal road - N8 National Road - N1 National Road - Small area of Bloemfontein - Highlands Nature Reserve - Olievenkloof Nature Reserve **Visibility Coverage: 17.32%**	Low

Figures 5.18 and 5.19 below illustrates the theoretical visibility as listed in Table 5.7.

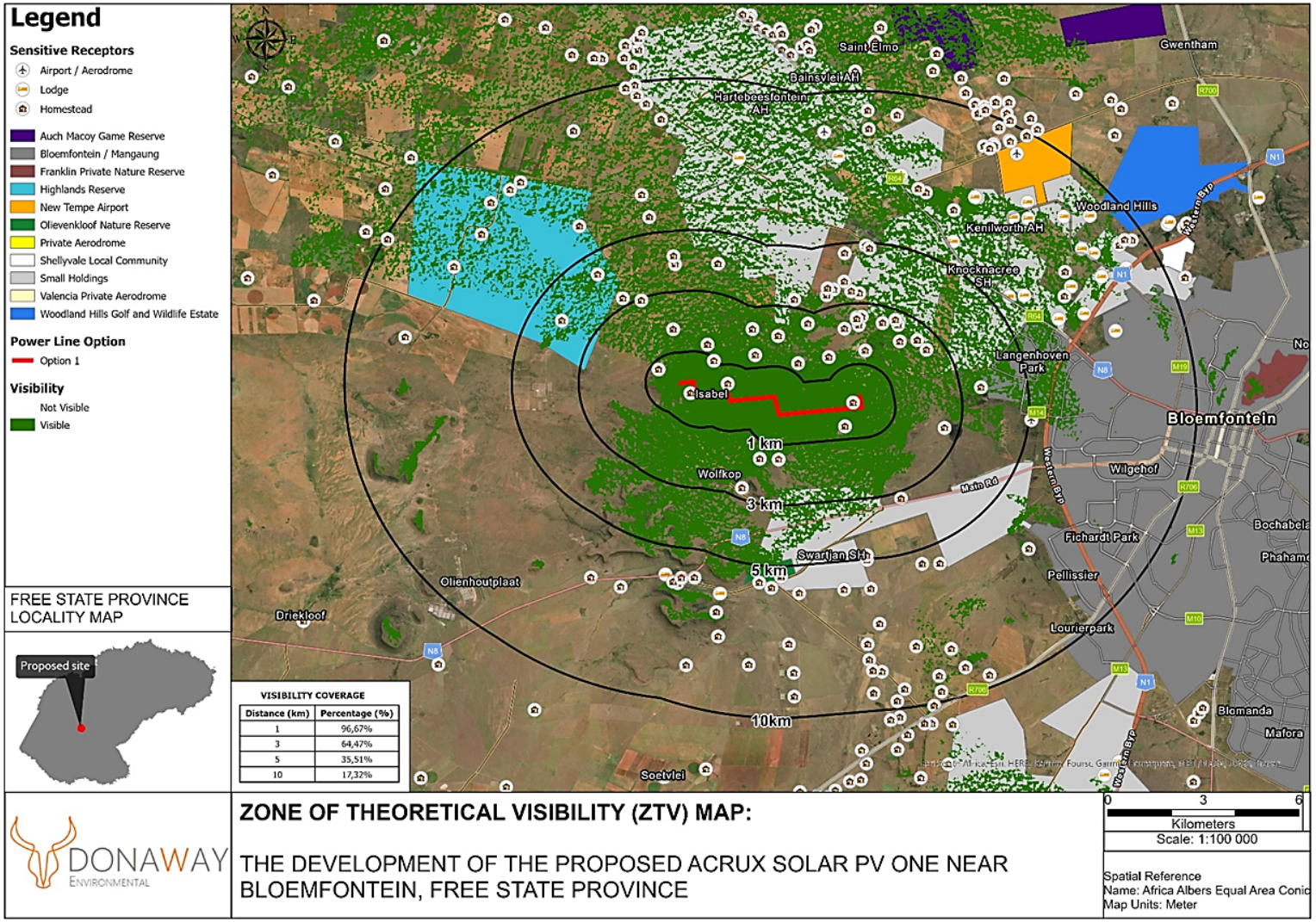


Figure 5.18: Zone of Theoretical Visibility (ZTV) of grid alternative 1, satellite view

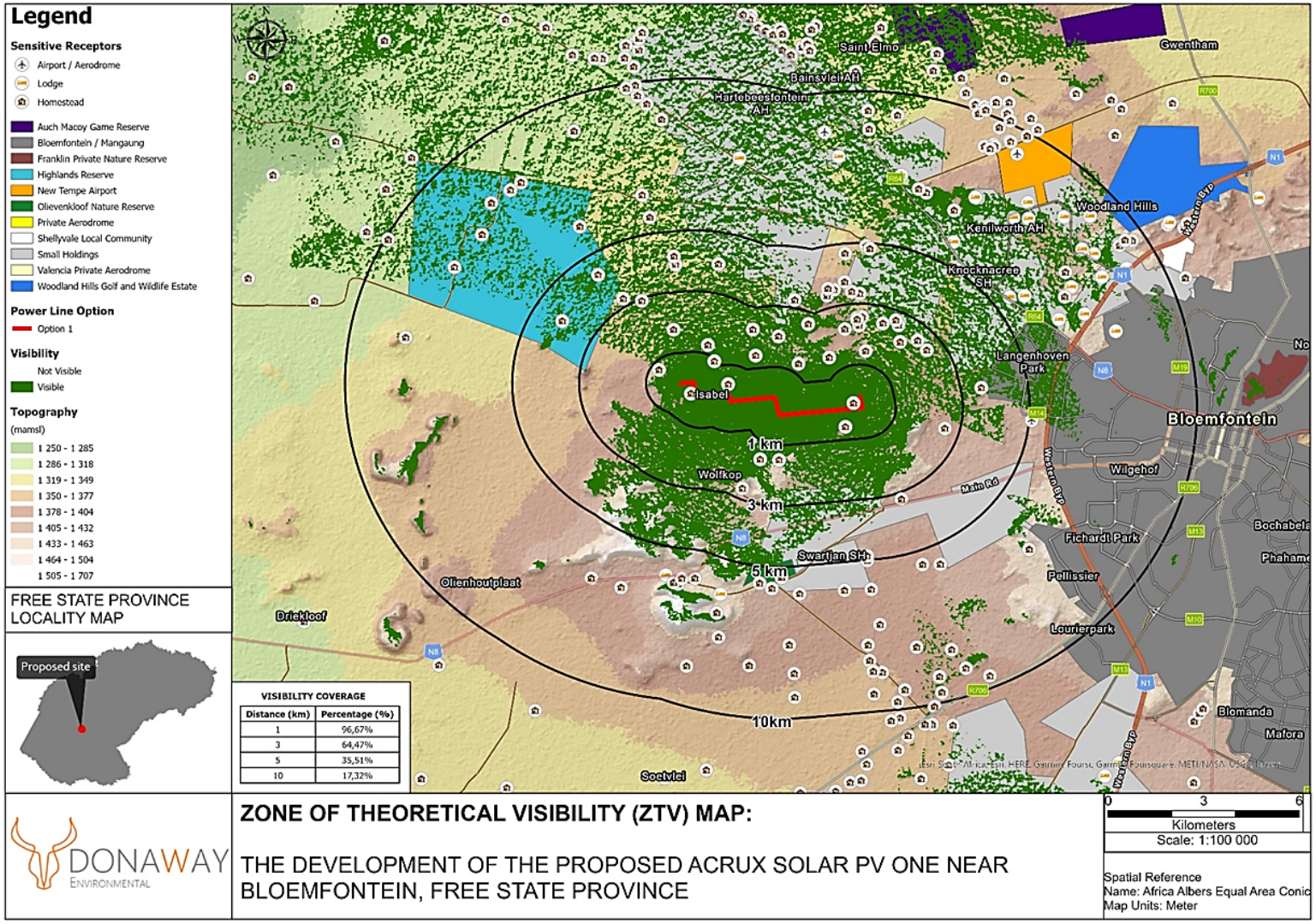


Figure 5.19: Zone of Theoretical Visibility (ZTV) of grid alternative 1, topography view

Table 5.8 below reflects the visibility rating in terms of proximity on sensitive receptors of the grid alternative 2.

Table 5.8: ZTV rating in terms of proximity to grid alternative 2

Radius	Visual Receptors	Visibility rating in terms of proximity
0-1km	- Three homesteads on farms - Adjacent gravel road **Visibility Coverage: 77.22%**	Very High
1-3km	- Seven homesteads on farms - Adjacent gravel road **Visibility Coverage: 53.96%**	High
3-5km	- Nine homesteads on farms - Adjacent gravel road - Highlands Nature Reserve - Smallholdings **Visibility Coverage: 23.06%**	Medium
5-10km	- 21 homesteads on farms - Two lodging facilities - Smallholdings - Adjacent gravel road - Abrahamskraal road - R64 regional road - N8 National Road - Highlands Nature Reserve - Olienkloof Nature Reserve - One private airstrip - Small section of Langenhoven Park, a suburb of Bloemfontein. **Visibility Coverage: 10.07%**	Low

Figures 5.20 and 5.21 below illustrates the theoretical visibility as listed in Table 5.8.

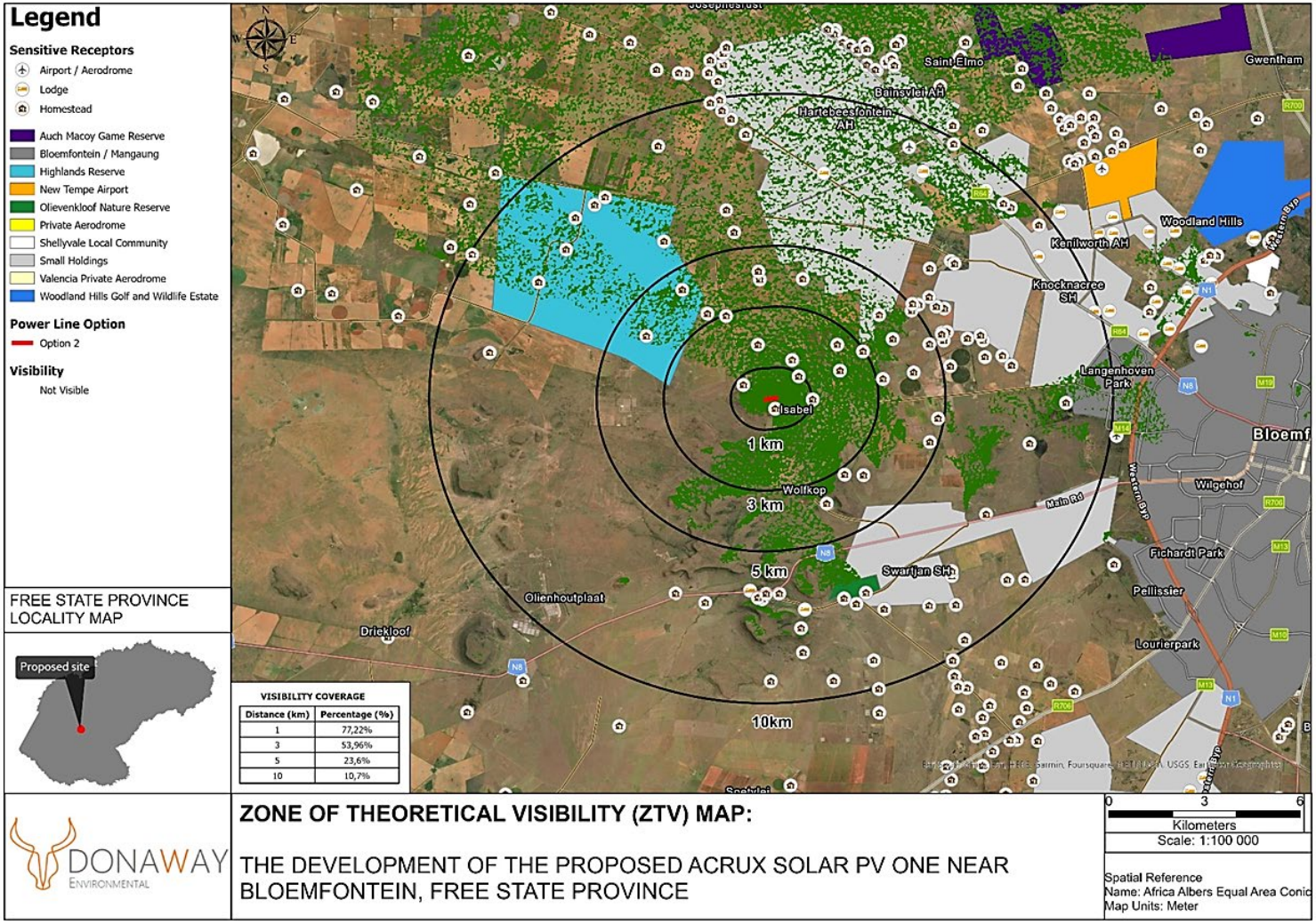


Figure 5.20: Zone of Theoretical Visibility (ZTV) of grid alternative 2, satellite view

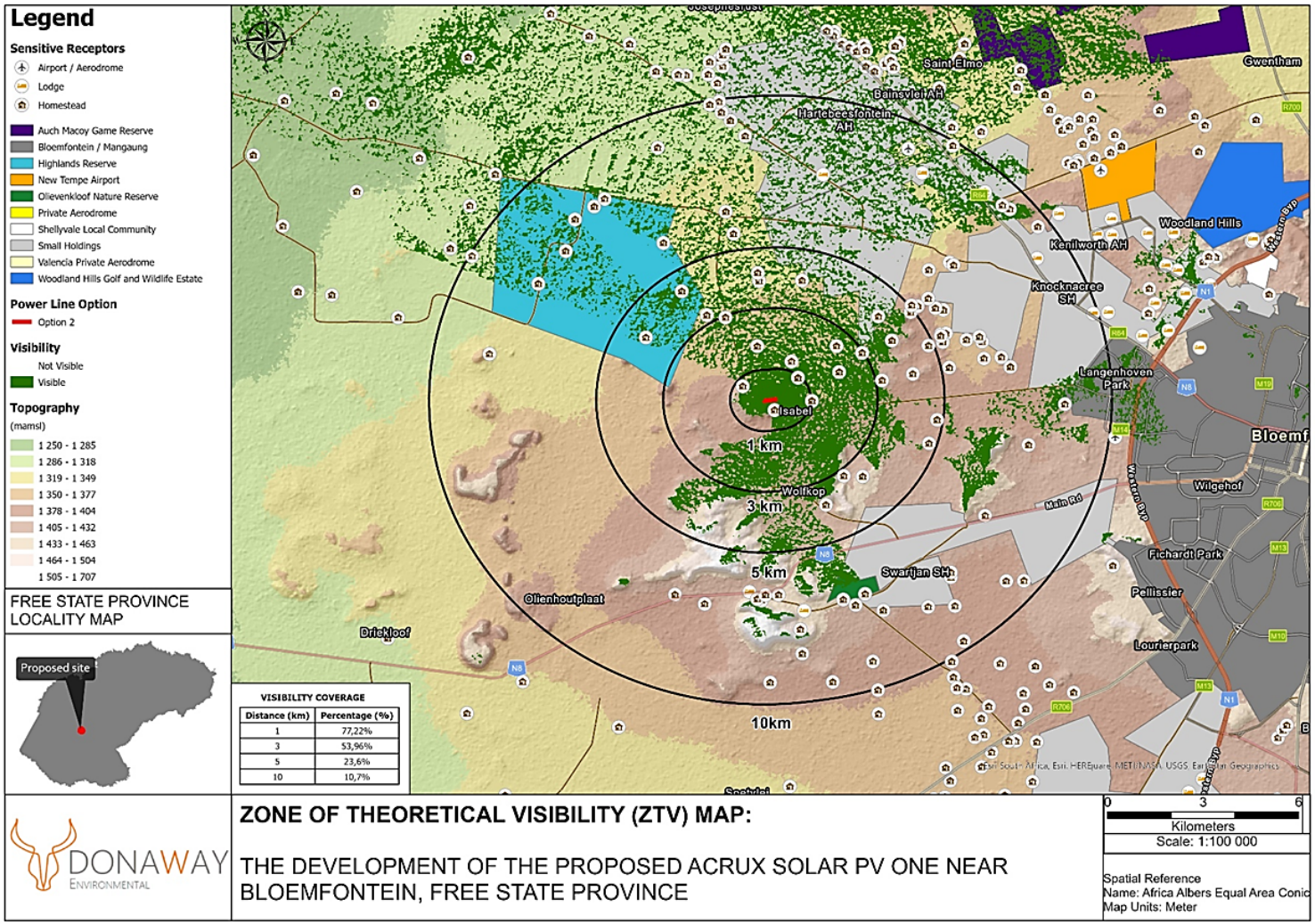


Figure 5.21: Zone of Theoretical Visibility (ZTV) of grid alternative 2, topography view

The significance of the visual impact will be a "Negative Low Impact" after mitigation for the solar PV facility combined with either grid alternatives. The only receptors likely to be impacted by the proposed development are the nearby property owners and nearby roads. However, a large part of the visual landscape is still reflecting a farming landscape with a better visual appearance.

5.3.2 Description of the Socio-Economic Environment

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

5.3.2.1 Socio-Economic Conditions

The Social Impact Assessment (attached as Appendix E3) 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.

The Free State Province is divided into the Mangaung Metropolitan Municipality and four district municipalities, which are further subdivided into 18 local municipalities.

Mangaung Metropolitan Municipality

The Mangaung Metropolitan Municipality (MM) is a Category A municipality located in the southern centralised part of the Free State Province, one of eight metros in South Africa. Its western and

southern border is shared by the Xhariep District Municipality (DM), while the Lejweleputswa DM borders the regions northern boundary. The north-eastern boundary is sharded with the Thabo Mofutsanyana DM of the Free State Province, with the remaining boundary in the east shared with the independent state of Lesotho. Three urban centres are situated in the region, Bloemfontein, Botshabelo and Thaba Nchu.

The Mangaung MM is the smallest administrative region compared to the four other district municipalities of the Free State Province, compromising only 7.6% of the geographical area of the province. Mangaung MM boundaries changed on the 3rd of August 2016, specifically the previously known Naledi Local Municipality formerly part of the Xhariep District was disestablished and merged into the Mangaung MM. The Metropolitan is home to second largest population distribution in the province with 787 803 people at 27.8% of the total population of the Free State Province.

The economy of the region is mostly driven by the governmental sector through programmes to improve livelihoods of its population, additionally the economy is supported by the finance sector by means of active estate and construction activities. Small businesses in the Mangaung MM have an important role in the economy of the region through employment, income generation and output growth. Although unemployment levels have risen in the region and the informal economy has made an important contribution to the region, as a result, the population are in need of alternative means of income.

The N1 national route runs through the Mangaung MM connecting Bloemfontein to Johannesburg and Cape Town, providing an important transportation route in South Africa. Additionally, the N8 national route connects the independent state of Lesotho and the Northern Cape Province via Bloemfontein. Bloemfontein is the sixth largest city in South Africa and known as the “City of Roses” originating from its Dutch meaning of fountain of flowers. Mangaung means the “Place of the Cheetahs” in Sesotho.

Mangaung Ward 48

Mangaung Ward 48 is one of 50 wards subdividing the Mangaung Metropolitan Municipality. The ward is situated from the western boundary of the metro bordering the Letsemeng Local Municipality (LM) to the west of Bloemfontein, only including a small section of the city. No major towns are situated within the region with most of the area covered by agricultural activities. The N8 national route traverse the ward and provides an important transportation route between Bloemfontein and Kimberley in the Northern Cape Province. Tourism activities are limited to a few guest farms and wedding venues. The “de Brug Memorial” a memorial commemorating soldiers and other military personal who made the ultimate sacrifice while on UN (United Nations) deployment is situated in the region.

5.3.3 Cultural and Heritage Environment

In order to determine the feasibility of the project, a cultural heritage desktop assessment was done for three (03) project sites that are in close proximity to one another (assessed via independent S&EIR processes), in order to determine if there would be any red flag issues that might prevent the project from proceeding to the next level of investigation. The project sites include Acrux Solar PV Project One (current report); Acrux Solar PV Project Two and Acrux PV Project Three.

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.

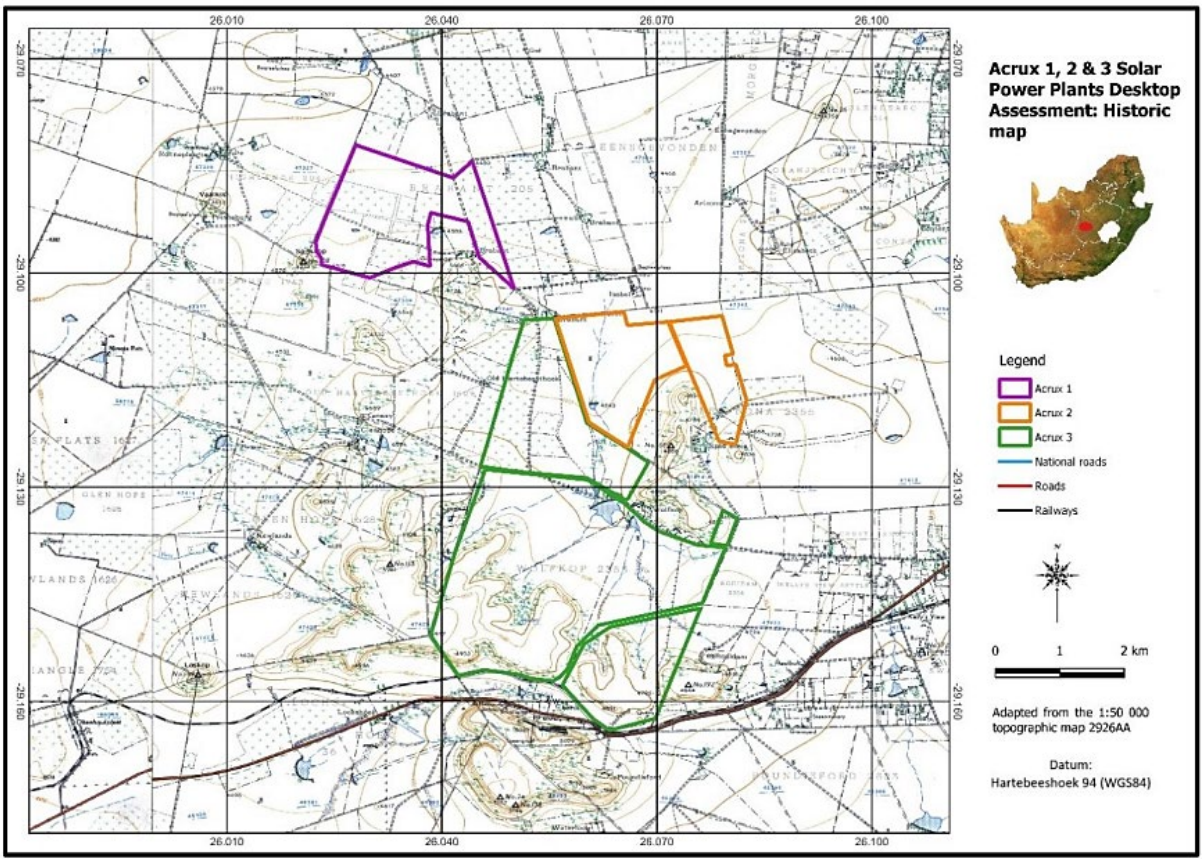


Figure 5.22: The project area indicated on the 1949 version of the 1:50 000 topographic map

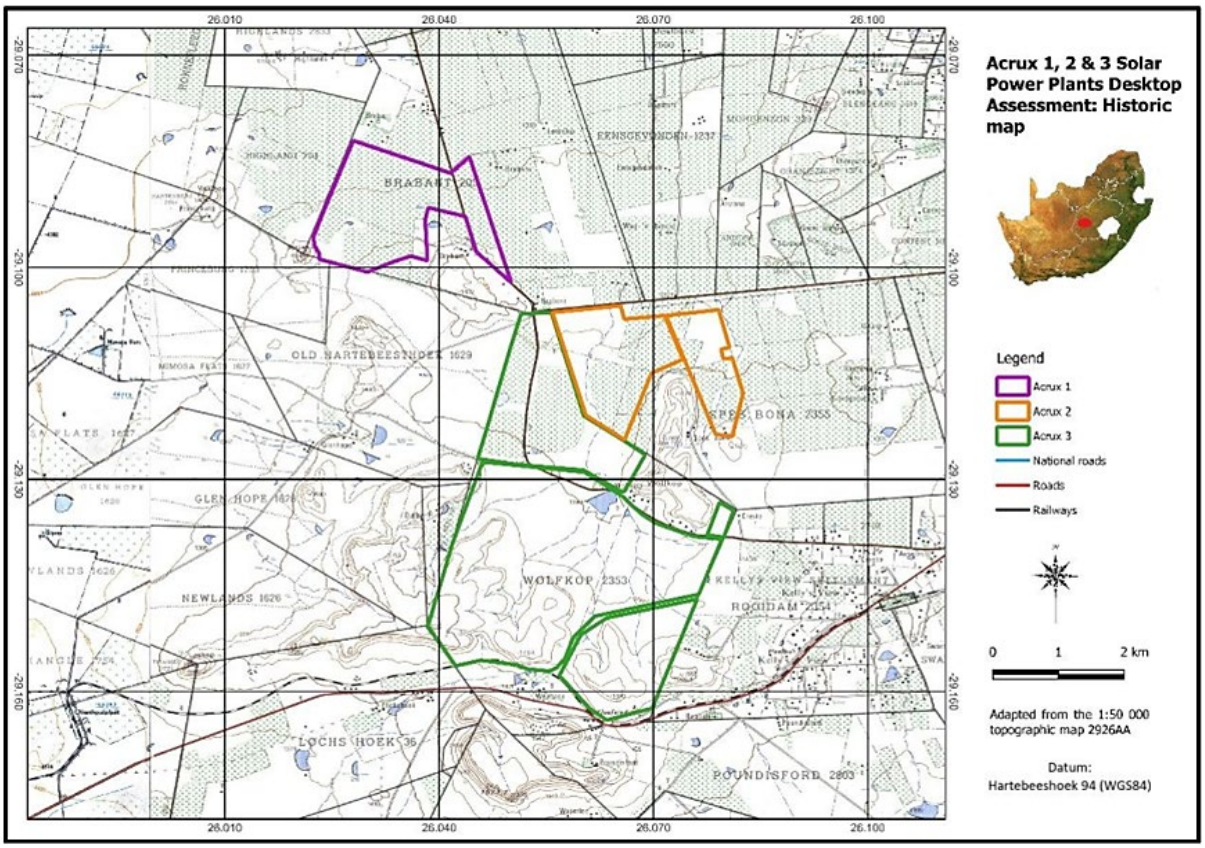


Figure 5.23: The project area indicated on the 1974 version of the 1:50 000 topographic map

The cultural landscape qualities of the region are made up of a pre-colonial element consisting of very limited Stone Age and Iron Age occupation, as well as a much later colonial (farmer) component, which eventually gave rise to an urban component.

During the desktop screening, the following sites, features and objects of cultural significance were identified that could potentially lie within the project area.

Stone Age

Little is known about the Stone Age of the Bloemfontein region, as it was all destroyed by the rapid urban development in the region (Henderson 2004). Most sources indicate the presence of low density surface scatters of MSA and LSA stone tools, mostly occurring on hills and outcrops surrounding the city.

Material dating to all phases of the Stone Age seems largely to be absent in the larger region. Only one previous heritage impact assessment done in the larger region indicated the presence of two tools dating from the Middle Stone Age. Although current information seems to indicate an absence of material dating to the Stone Age, it is expected that more will be found, especially near outcrops, stream beds and in sheltered valleys.

Iron Age

Iron Age people started to settle in southern Africa c. AD 300, with one of the oldest known sites at Broederstroom south of Hartebeespoort Dam dating to AD 470. Having only had cereals (sorghum, millet) that need summer rainfall, Early Iron Age (EIA) people did not move outside this rainfall zone,

and neither did they occupy the central interior highveld area. Because of their specific technology and economy, Iron Age people preferred to settle on the alluvial soils near rivers for agricultural purposes, but also for firewood and water.

The occupation of the larger geographical area (including the study area) did not start much before the 1500s. By the 16th century things changed, with the climate becoming warmer and wetter, creating conditions that allowed Late Iron Age (LIA) farmers to occupy areas previously unsuitable, for example the Witwatersrand and the treeless plains of the Free State.

Similar to the Stone Age, information on Iron Age settlement in the larger Bloemfontein region is lacking due to the urbanisation process.

Only one reference to Iron Age sites in the larger region have been found. This is on Wolfkop and the eastern foot of the hill near the western portion of the farm. Unfortunately, not much information is given on these sites, although it is attributed to the Late Iron Age, c. 1600 and later. It is possible that more such sites can occur in this region, as well as in other areas where hills and outcrops occur.

Historic Period

When Major H D Warden was commissioned to serve as British Resident in the region between the Orange and Vaal Rivers, he bought the farm Bloemfontein from J N Brits in 1846 and established himself there. When the British government annexed the territory in 1848, Bloemfontein became the seat of the new administration. When the republic of the Orange Free State was established in 1854, the seat of government was moved from Winburg to Bloemfontein. The rise of Bloemfontein coincided with the discovery of diamonds in the decade 1860-1870 and the later discovery of gold in the ZAR (SESA 1970:366-372).

During the Second South African War (1899-1902), the town housed a large contingent of British troops. Most of their activities centred around what was to become known as Naval Hill. A concentration camp for women and children was set up on the western side of town, at the Tempe military base. Soldiers built long walls across the landscape, probably for defence, but also to keep busy and as a relieve of boredom. Numerous lookout posts, also referred to as sangars[2] were constructed on hills and outcrops around the area where they kept watch over the landscape, fearing attacks from the Republicans (see Bennyworth 2004; Henderson 2004, 2006).

Two sites identified by SAHRA are of National significance (Grade I) are located in Bloemfontein to the east of the project areas:

- The grave of Mr Thomas Mapikela, a founding father of the ANC and an iconic leader of the liberation struggle, buried in the Hero's Acre in Phahameng Cemetery;
- The Waaihoek Wesleyan Church, seen as the birth place of the South African Native National Congress (SANNC), predecessor of the ANC.

There are approximately 31 sites identified by SAHRA as of Provincial significance (Grade II), located in Bloemfontein:

[2] A term originally used in Persia to refer to a small, temporary fortified position on the perimeter of a base, and mostly used by sentries while on watch. The term was taken over by the British army and used all over the world.

- These invariably consists of historic buildings and burial sites.

From a study of the available maps and aerial photographs, it seems as if elements of the built environment, i.e., farm houses, stock pens, water points and labourer accommodation and such is lacking in the proposed project area. This contrasts with the situation on other historic significant farms in the larger region: Bains Vlei, settled in 1847 by Andrew Hudson Bain; Onze Rust, which belongs to former president of the Orange Free State, M.T. Steyn; Kwaggafontein that belonged to Sir Cornelis Hermanus Wessels, well-known political leader in the former Orange Free State Republic. At present it is unclear if any built features of significance occur in the project areas and this can only be verified during the site visit.

Although only a few have been identified during this desktop assessment, burial sites seem to have occurred all over in the larger countryside. They are usually indicated on the 1:50 000 topographic map and can then also be georeferenced in Google Earth. Significantly, all burial sites indicated on the older versions of map 2926AA, 1949 version, does not appear on the later maps and also cannot be seen on Google Earth. It is expected that informal type of burial sites will be identified in the project areas. For this, the input of local farm owners and workers would be invaluable as in many cases these sites are not very easy to detect.

The railway line between Bloemfontein and Kimberley, completed in 1908, passes on the south of the sites, bordering specifically on the southern side of the farm Wolfkop. It is expected that bridges and culverts dating to the original line and still in use will be located at river crossings. Typically, these are rough sandstone ashlar culverts for smaller stream crossings, whereas bridges would have longer spans, with the abutments and piers of sandstone. It is anticipated that these structures would not be impacted upon by the proposed development.

Based on the desktop assessment it is possible, with a large amount of certainty, to indicate that there are no obvious red flag issues that would prevent the project from proceeding to the next level of investigation, i.e., a full heritage impact assessment. However, this statement is subject to review until such time as a full field survey has been conducted.

Palaeontology

According to the Palaeontological Impact Assessment (refer to Appendix E5), the proposed Acrux Solar PV Project One is underlain by Quaternary superficial sediments, Jurassic dolerite, Balfour Formation (Adelaide Subgroup, Beaufort Group, Karoo Supergroup) as well as the Tierberg Formation of the Ecca Group. According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) the combined Palaeontological Sensitivity of the Quaternary sediments and that of the Tierberg Formation in this area is Moderate, while that of the Balfour Formation, Adelaide Subgroup is Very High. Due to the Very High Sensitivity in the development a site visit is triggered.

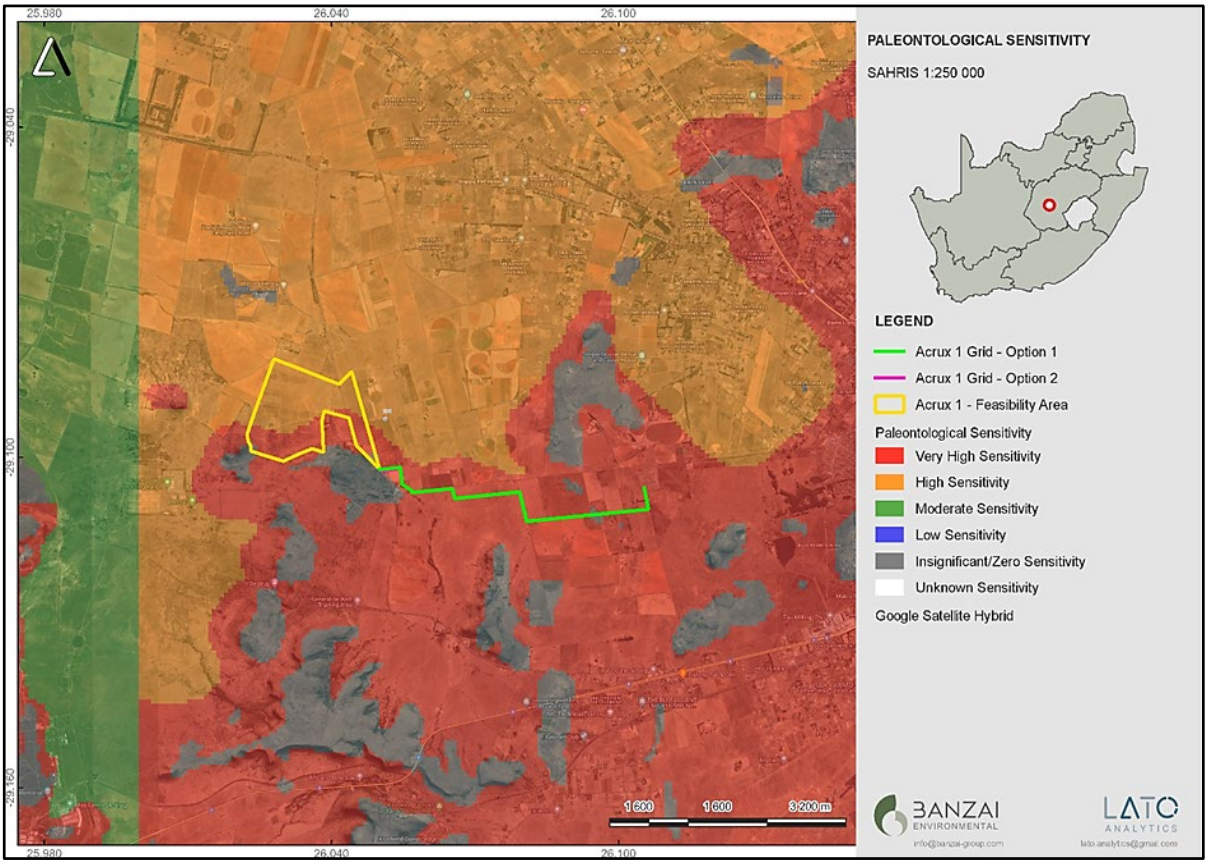


Figure 5.24: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences) indicating that Acrux Solar PV Project One is underlain by sediments with a High (orange), Very High (red) and Zero (grey) Palaeontological Sensitivity

It is thus recommended that an EIA level palaeontology report must be conducted to assess the value and prominence of fossils in the development area and the effect of the proposed development on the palaeontological heritage. The purpose of the EIA Report is to elaborate on the issues and potential impacts identified during the scoping phase. A Phase 1 field-based assessment would be conducted with research in the site-specific study area, as well as a comprehensive assessment of the impacts identified during the scoping phase.

5.4 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 PV Development 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 Portion 6 of Farm Brabant No.

205where 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 150 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 Portion 6 of Farm Brabant No. 205, 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 150 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 N8 (National 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 Acrux Solar PV Project One overhead power line route will connect directly into the existing Harvard Substation or via a Loop-In-Loop-Out (LILO) connection into existing Eskom infrastructure. 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. The grid alternative 1, proposes a 132 kV overhead power line which will be approximately 7 km long and will be constructed within the identified grid connection corridor. The OHPL will connect directly into the existing Harvard substation. The grid alternative 2 proposes a LILO connection into existing Eskom infrastructure.

- 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 PAOI, 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 Portion 6 of Farm Brabant No. 205, 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.

5.5 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 150 MW Acrux Solar PV Project Once on the Remaining Extent Remaining Extent of Portion 6 of Farm Brabant No. 205 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 independent consultant 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	×			The PAOI overlaps with a single depression (DEPR) wetland listed as Least Threatened (LT). The PAOI overlaps with unclassified FEPA wetlands, while several FEPA wetlands types are located within the PAOI.
II. A conservation or open space area	×			The PAOI overlaps with areas predominantly classified as Other Natural Areas and Degraded Areas. Notable areas classified as CBA 1 are also located within the PAOI.
III. An area that is of cultural importance			X	Based on the desktop assessment it is possible, with a large amount of certainty, to indicate that there are no obvious red flag issues that would prevent the project from proceeding to the next level of investigation, i.e., a full heritage impact assessment.
IV. Site of geological significance		×		None.
V. Areas of outstanding natural beauty		×		None.
VI. Highly productive agricultural land	×			Numerous areas identified as crop fields are located within the PAOI.
VII. Floodplain		×		None.
VIII. Indigenous Forest		×		None.
IX. Grass land	×			The project area is situated within the Grassland Biome.
X. Bird nesting sites		×		The PAOI is located more than 20 km south of the Soetdoring nature Reserve Important Bird Area (IBA).
XI. Red data species		×		The Desktop Assessment did not record any Red Data Species on site.
XII. Tourist resort		×		None.

2. Will the project potentially result in potential?				
I. Removal of people		×		None.
II. Visual Impacts	×			The significance of the visual impact will be a "Negative Low Impact" after mitigation for the SEF combined with either grid options. The only receptors likely to be impacted by the proposed development are the nearby property owners and nearby roads.
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 N8 National 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 1 000 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 30 500m^3. The estimated maximum amount of water required during the operational phase is 10 000m^3 per annum.
VIII. Job creation	×			Approximately 1 000 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	×			The PAOI overlaps with a single depression (DEPR) wetland listed as Least Threatened (LT). The PAOI overlaps with unclassified FEPA wetlands, while several FEPA wetlands types are located within the PAOI.
II. A conservation or open space area	×			The PAOI overlaps with areas predominantly classified as Other Natural Areas and Degraded Areas. Notable areas classified as CBA 1 are also located within the PAOI.
III. An area that is of cultural importance			×	Based on the desktop assessment it is possible, with a large amount of certainty, to indicate that there are no obvious red flag issues that would prevent the project from proceeding to the next level of investigation, i.e., a full heritage impact assessment.
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 within the PAOI.
VII. A tourist resort		×		None.
VIII. A formal or informal settlement	×			Bloemfontein is located approximately 17 km east of the proposed development.

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) (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."* Activity 12 (ii)(c) (GN.R. 327): *"The development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more; (c) within 32 meters of a watercourse measured from the edge of a watercourse."* Activity 14 (GN.R. 327): *"The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in*	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 exact method will depend on the detailed geotechnical analysis. • Construction of access and inside roads/paths – existing paths will be used were reasonably possible.	BIOPHYSICAL ENVIRONMENT	Air	• Air pollution due to the increase of traffic of construction vehicles and the undertaking of construction activities.	-		S	S	D	CR	NL	Yes	- 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.	L	-
			Geology	• Collapsible soil. • Seepage. • Active soil (high soil heave). • Erodible soil. • Hard/compact geology. If the bedrock occurs close to surface it may present problems when driving solar panel columns. • The presence of undermined ground. • Instability due to soluble rock.	-		S	S	Pr	CR	NL	Yes	- The most effective mitigation will be the minimisation of the project footprint by using the existing roads in the area where possible and not create new roads to prevent other areas also getting compacted. - Retention of vegetation where	L	-

containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres." 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."* Activity 27 (GN.R 327): *"The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation…"* 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."* 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*	Additionally, the turning circle for trucks will also be taken into consideration. Transportation and installation of PV panels into an Array 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. Wiring to the Central 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.													
				• Steep slopes or areas of unstable natural slopes. • Areas subject to seismic activity.										possible to avoid soil erosion.		
			Existing services infrastructure	• Generation of waste that need 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
			Groundwater	• Pollution due to construction vehicles and the storage and handling of dangerous goods.	-		S	S	Pr	CR	ML	Yes	- A groundwater monitoring programme (quality and groundwater levels) should be designed and installed for the site. - Monitoring boreholes should be securely capped, and must be fitted with a suitable sanitary seal to prevent surface water flowing down the outside of the casing. - Full construction details of monitoring boreholes must be recorded when they are drilled. - Sampling of monitoring boreholes should be done according to recognised standards.	L	-
			General Environment (risks associated with BESS)	• Mechanical breakdown / Exposure to high temperatures • Fires, electrocutions and spillage of toxic substances	-		S	M	Pr	PR	ML	Yes	- See Table 6.6	L	-

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 indigenous vegetation..."* Activity 4 (b)(i)(bb)(ee)(gg) (GN.R 324): *"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 (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)(bb)(ee)(gg)(hh) (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*				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. • Generation of hazardous waste											
			Local unemployment rate	• The creation of direct and indirect employment opportunities		+	L	S	D	CR	NL	Yes	- See Table 6.3	M	Social Impact Assessment (Appendix E3)
			Economic multiplier effects	• Significance of the impact from the economic multiplier effects from the use of local goods and services.		+	L	S	Po	CR	NL	Yes	- See Table 6.3	M	Social Impact Assessment (Appendix E3)
			Potential loss of productive farmland	• The potential loss in productive farmland during the construction phase, due to factors such as the construction of roads, the preparation of foundations, power lines, offices etc.	-		S	S	Pr	BR	ML	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E3)
			Influx of jobseekers and	• In-migration of labourers in search of employment opportunities, and a resultant change in	-		L	P	Po	IR	SL	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E3)

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 (hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland." <u>Activity 12 (b)(ii)(iv) (GN.R 324):</u> "*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 (iv) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland."* <u>Activity 14 (ii)(c)(b)(i)(bb)(ff)(hh) (GN.R 324):</u> *"The development of (ii) infrastructure or structures with a physical footprint of 10 square metres or more, where such development occurs (c)*			change in population	population, and increase in pressure on local resources and social networks, or existing services and infrastructure.	-		L	S	Pr	CR	NL	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E3)
			Safety and security impacts	• Temporary increase in safety and security concerns associated with the influx of people during the construction phase.	-		L	S	Pr	CR	NL	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E3)
		SOCIAL/ECONOMIC ENVIRONMENT	Impacts on daily living and movement patterns	• Temporary increase in traffic disruptions and movement patterns during the construction phase.		-	L	S	D	PR	ML	Yes	- See Table 6.3	M	Social Impact Assessment (Appendix E3)
			Nuisance impacts (noise and dust)	• Nuisance impacts in terms of temporary increase in noise and dust, and wear and tear on access roads to the site.		-	L	S	D	CR	NL	Yes	- See Table 6.3	M	Social Impact Assessment (Appendix E3)
			Increased risk of potential veld fires	• The potential loss of livestock, crops, and farmsteads in the area. This also includes the damage and loss of farm infrastructure and the threatening of human lives that are associated with the increased risk of veld fires.	-		L	S	Pr	PR	SL	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E3)
			Visual and sense of place impacts	• Intrusion impacts from construction activities will have an impact on the area's "sense of place".	-		L	S	D	PR	NL	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E3)
			Visual landscape	• Visual impact of construction activities on sensitive visual receptors: SEF	-		L	S	D	CR	ML	Yes	- See Table 6.3	L	Visual Impact Assessment (Appendix E2)
			Visual landscape	• Visual impact of construction activities on	-		L	S	D	CR	ML	Yes	- See Table 6.3	L	Visual Impact Assessment (Appendix E2)

within 32 metres of a watercourse, measured from the edge of a watercourse (b) Free State, (i) Outside urban areas (bb) National Protected Area Expansion Strategy Focus areas (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the Competent Authority or in bioregional plans (hh) 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." *<u>Activity 18 (b)(i)(bb)(ee)(hh) (GN.R 324):</u> "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 (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 (hh) Areas within a watercourse or wetland; or*				sensitive visual receptors: Grid Option 1											
			Visual landscape	• Visual impact of construction activities on sensitive visual receptors: Grid Option 2	-		L	S	Pr	CR	ML	Yes	- See Table 6.3	L	Visual Impact Assessment (Appendix E2)
			Tourism industry	• Since there are no sensitive tourism facilities in close proximity to the site, the proposed activities will not have an impact on tourism in the area.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	- N/A	N/A	N/A

within 100 metres from the edge of a watercourse or wetland."														
OPERATIONAL PHASE														
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."* Activity 14 (GN.R. 327): *"The development and related operation of facilities or 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 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 10 (b)(i)(bb)(ee)(gg)(hh) (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*	The key components of the proposed project are described below: • PV Panel Array - To produce 150 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 be tilted at a northern angle in order to capture the most sun. • Wiring to Central Inverters Sections of the PV array will be wired to central 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 480 V up to 33 kV up to 132 kV. The normal components and dimensions of a distribution rated electrical	BIOPHYSICAL ENVIRONMENT	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
			Geology	• Collapsible soil. • Active soil (high soil heave). • Erodible soil. • Hard/compact geology. If the bedrock occurs close to surface it may present problems when driving power line columns. • The presence of undermined ground. • Instability due to soluble rock. • Steep slopes or areas of unstable natural slopes. • Areas subject to seismic activity. • Areas subject to flooding.	-		S	S	Po	PR	ML	Yes	- Surface drainage should be provided to prevent water ponding. - Mitigation measures proposed by the detailed engineering geological investigation should be implemented.	L	-
			Groundwater	• Leakage of hazardous materials. The development will comprise of a distribution 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	-
			Direct and Indirect employment	• The creation of employment opportunities and skills development		+	P	L	Pr	BR	NL	Yes	See Table 6.4	M	Social Impact Assessment (Appendix E3)

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 (hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland."	substation will be required. Output voltage from the inverter is 480 V and this is fed into step up transformers to 132 kV. An onsite substation will be required on the site to step the voltage up to 132 kV, after which the power will be evacuated into the national grid. It is expected that generation from the facility will connect to the national grid via the existing Harvard Substation. The Project will inject up to 150 MW into the National Grid. The installed capacity will be approximately 150 MW. In order to evacuate the energy generated by the facilities to the national grid, Acrux Solar PV Project One (Pty) Ltd is proposing two (02) solar grid alternatives: • *Alternative 1:* A 132 kV single or double circuit overhead powerline (OHPL) is proposed and will transmit energy generated by the solar PV facility directly into the existing Harvard substation. The proposed OHPL will be approximately 7 km long and will be located within a 200 m wide grid corridor.	SOCIAL/ECONOMIC	opportunities and skills development	• Employment opportunities during the operation phase for the country and local economy.		+	I	L	D	CR	ML	Yes	- See Table 6.4	M	Social Impact Assessment (Appendix E3)
			Development of non-polluting, renewable energy infrastructure	• Development of non-polluting, renewable energy infrastructure.		+	I	L	D	CR	ML	Yes	- See Table 6.4	M	Social Impact Assessment (Appendix E3)
			Potential loss of agricultural land	• Loss of agricultural land and overall productivity as a result of the operation of the proposed project on an agricultural property.	-		S	L	Pr	PR	SL	Yes	- See Table 6.4	L	Social Impact Assessment (Appendix E3)
			Contribution to Local Economic Development (LED) and social upliftment	• Contribution to LED and social upliftment during the operation of the project.		+	I	L	D	PR	NL	Yes	- See Table 6.4	H	Social Impact Assessment (Appendix E3)
			Impact on tourism	• The potential impact on tourism due to the establishment of the PV.	+ -		L	L	Pr	CR	NL	Yes	- See Table 6.4	L	Social Impact Assessment (Appendix E3)
			Visual and sense of place impacts	• Visual impacts and sense of place impacts associated with the operation phase of the PV.	-		L	L	D	CR	SL	Yes	- See Table 6.4	L	Social Impact Assessment (Appendix E3)
			Visual landscape	• Visual impact on sensitive visual receptors within a 1km radius: SEF		-	L	L	D	IR	ML	Yes	- See Table 6.4	M	Visual Impact Assessment (Appendix E2)
			Visual landscape	• Visual impact on sensitive visual receptors within a 1km radius: Grid Option 1		-	L	L	D	IR	ML	Yes	- See Table 6.4	M	Visual Impact Assessment (Appendix E2)
			Visual landscape	• Visual impact on sensitive visual receptors within a 1km radius: Grid Option 2	-		L	L	Po	IR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E2)
			Visual landscape	• Visual impact on sensitive visual receptors between a 1km and 3km radius: SEF	-		L	L	Pr	IR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E2)

	• *Alternative 2:* The second alternative will also be 132 kV single or double circuit overhead powerline (OHPL) which will follow the same route to connect directly into the existing Harvard substation. This alternative will also be located within the 7km long and will be located within a 200 m wide grid corridor. Confirmation in terms of the preferred alternative will be based on feedback provided by the Eskom Grid Access Unit. • <u>Supporting Infrastructure</u> 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 The project requires the need for both temporary and permanent laydown areas. • <u>Roads</u> – The majority of the access road will follow existing, gravel farm roads that may require widening up to 6 -10 m (inclusive of storm water		Visual landscape	• Visual impact on sensitive visual receptors between a 1km and 3km radius: Grid Option 1		-	L	L	Pr	IR	ML	Yes	- See Table 6.4	M	Visual Impact Assessment (Appendix E2)
			Visual landscape	• Visual impact on sensitive visual receptors between a 1km and 3km radius: Grid Option 2	-		L	L	Po	IR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E2)
			Visual landscape	• Visual impact on sensitive visual receptors between a 3km and 5km radius: SEF	-		L	L	Po	IR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E2)
			Visual landscape	• Visual impact on sensitive visual receptors between a 3km and 5km radius: Grid Option 1	-		L	L	Po	IR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E2)
			Visual landscape	• Visual impact on sensitive visual receptors between a 3km and 5km radius: Grid Option 2	-		L	L	U	IR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E2)
			Visual landscape	• Visual impact on sensitive visual receptors between a 5km and 10km radius: SEF	-		L	L	Po	PR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E2)
			Visual landscape	• Visual impact on sensitive visual receptors between a 5km and 10km radius: Grid Option 1	-		L	L	Po	IR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E2)
			Visual landscape	• Visual impact on sensitive visual receptors between a 5km and 10km radius: Grid Option 2	-		L	L	U	PR	NL	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E2)
			Visual landscape	• Visual impacts of lighting at night on sensitive visual receptors in close proximity.	-		L	L	D	CR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E2)
			Visual landscape	• Visual impacts of glint and glare as a visual distraction and possible air travel hazard.	-		L	L	U	CR	NL	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E2)
			Visual landscape	• Visual impacts on sense of place associated with the operational phase: SEF	-		L	L	Po	PR	SL	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E2)

	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 of approximately 40 km, each with a width of up to 6 m, will be constructed to provide access to the various components of the PV development. Access will be obtained via the R703 Regional Road to the south of the site. The access and internal roads will be constructed within a 25-meter corridor. Access is most likely to be obtained via existing roads just off the N8 National Road. An internal site road network will also be required to provide access to the solar field and associated infrastructure. • <u>Fencing</u> - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm. Fencing with a height of up to 3 meters will be used.		Visual landscape	• Visual impacts on sense of place associated with the operational phase: Grid Option 1	-		L	L	Po	PR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E2)
			Visual landscape	• Visual impacts on sense of place associated with the operational phase: Grid Option 2	-		L	L	Po	PR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E2)
			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	N/A
			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	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	N/A	-
DECOMMISSIONING PHASE																

-	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.		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	-
			Geology	• It is not foreseen that the decommissioning phase will impact on the geology of the site or vice versa.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			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	-
			Groundwater	• Pollution due to construction vehicles.	-		S	S	Pr	CR	ML	Yes	-	L	-
			Surface water	• Increase in stormwater run-off. • Pollution of water sources due to soil erosion.		-	L	S	Pr	PR	ML	Yes	- Removal of any historically contaminated soil as hazardous waste. - Removal of hydrocarbons and other hazardous substances by a suitable contractor to reduce contamination risks. - Removal of all substances which can result in groundwater (or surface water) contamination.	M	-
			Tourism industry	• Since there are no tourism facilities in close proximity to the site, the decommissioning activities	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

				will not have an impact on tourism in the area.											

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:

- 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."*
- Activity 12 (ii)(c) (GN.R. 327): "*The development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more; (c) within 32 meters of a watercourse measured from the edge of a watercourse."*
- Activity 14 (GN.R. 327): *"The development and related operation of facilities or 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 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."*
- Activity 27 (GN.R. 327): *"The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation…"*
- 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."*
- 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 indigenous vegetation..."*
- Activity 4 (b)(i)(bb)(ee)(gg) (GN.R 324): *"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 (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)(bb)(ee)(gg)(hh) (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 (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 (hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland."*

- Activity 12 (b)(ii)(vi) (GN.R 324): "*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 (iv) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland".*

- Activity 14(ii)(a)(c)(b)(i)(bb)(ff)(hh) (GN.R 324): *"The development of (ii) infrastructure or structures with a physical footprint of 10 square metres or more, where such development occurs (c) within 32 metres of a watercourse, measured from the edge of a watercourse (b) Free State, (i) Outside urban areas (bb) National Protected Area Expansion Strategy Focus areas (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the Competent Authority or in bioregional plans (hh) 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."*

- Activity 18 (b)(i)(bb)(ee)(hh) (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(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 (hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland."*

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
Visual Impact Assessment (Appendix E2)	Visual impact of construction activities on sensitive visual receptors: SEF	Negative Low	Negative Low	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 between 07:00 and 18:00, 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.

	Visual impact of construction activities on sensitive visual receptors: Grid Option 1	Negative Low	Negative Low	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 between 07:00 and 18:00, 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.
	Visual impact of construction activities on sensitive visual receptors: Grid Option 2	Negative Low	Negative Low	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 between 07:00 and 18:00, 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 (Appendix E3)	The creation of direct and indirect employment opportunities during the construction phase of the project	Positive Low	Positive Medium	Enhancement: • A local employment policy should be adopted to maximise opportunities made available to the local labour force. • Labour should be sourced from the local labour pool, and only if the necessary skills aren't available should labour be sourced from (in order of preference) the greater Mangaung MM, 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.

				• Where feasible, 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.
	Significance of the impact from the economic multiplier effects from the use of local goods and services	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.
	The potential loss in productive farmland during the construction phase, due to factors such as the construction of roads, the preparation of foundations, power lines, offices etc.	Negative Medium	Negative Low	• The proposed site for the Acrux Solar PV Project One SEF 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 development footprint area need to be relocated. • All affected areas outside the development footprint, which are disturbed during the construction phase, need to be rehabilitated prior to the operational phase and should be continuously monitored by the Environmental Control Officer (ECO).

				• Implement, manage and monitor a grievance mechanism for the recording and management of social issues and complaints. • Mitigation measures from the Agricultural and Soil Report, should also be implemented.
	In-migration of labourers in search of employment opportunities, and a resultant change in population, and increase in pressure on local resources and social networks, or existing services and infrastructure.	Negative Medium	Negative Low	• 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 to ensure workers can easily access their place of employment and do not need to move closer to the project site. • 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.
	Temporary increase in safety and security concerns associated with the influx of people during the construction phase.	Negative Medium	Negative Low	• 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.

	Temporary increase in traffic disruptions and movement patterns during the construction phase.	Negative Medium	Negative Medium	• 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. • 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 gravel 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 in terms of temporary increase in noise and dust, and wear and tear on access roads to the site.	Negative Medium	Negative Medium	• 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.
	The potential loss of livestock, crops, and farmsteads in the area. This also includes the damage and loss of farm infrastructure and the threatening of human lives that are associated with the increased risk of 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.
	Intrusion impacts from construction activities will have an impact on the area's "sense of place".	Negative Medium	Negative Low	• Implement mitigation measures identified in the Visual Impact Assessment (VIA) prepared for the project. • 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:

- Activity 11(i) (GN.R. 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 (GN.R. 327): *"The development and related operation of facilities or 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 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 10 (b)(i)(bb)(ee)(gg)(hh) (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 (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 (hh) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland."*

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
Visual Impact Assessment (Appendix E2)	Visual impact on sensitive visual receptors within a 1km radius: SEF	Negative Medium	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.
	Visual impact on sensitive visual receptors within a 1km radius: Grid Option 1	Negative Medium	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.
	Visual impact on sensitive visual	Negative Low	Negative Low	Planning • Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint.

	receptors within a 1km radius: Grid Option 2			• 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.
	Visual impact on sensitive visual receptors between a 1km and 3km radius: SEF	Negative Medium	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.
	Visual impact on sensitive visual receptors between a 1km and 3km radius: Grid Option 1	Negative Medium	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.
	Visual impact on sensitive visual	Negative Low	Negative Low	Planning

	receptors between a 1km and 3km radius: Grid Option 2			• 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.
	Visual impact on sensitive visual receptors between a 3km and 5km radius: SEF	Negative Medium	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.
	Visual impact on sensitive visual receptors between a 3km and 5km radius: Grid Option 1	Negative Medium	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.

	Visual impact on sensitive visual receptors between a 3km and 5km radius: Grid Option 2	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.
	Visual impact on sensitive visual receptors between a 5km and 10km radius: SEF	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.
	Visual impact on sensitive visual receptors between a 5km and 10km radius: Grid Option 1	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.
	Visual impact on sensitive visual receptors between a 5km and 10km radius: Grid Option 2	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.
	Visual impacts of lighting at night on sensitive visual receptors in close proximity.	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.
	Visual impacts of glint and glare as a visual	Negative Low	Negative Low	• No mitigation measures are required.

	distraction and possible air travel hazard.			
	Visual impacts on sense of place associated with the operational phase: SEF	Negative Medium	Negative Low	• 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 implementing public awareness campaigns. Though not a requirement, it is recommended that the proponent investigate implementing a "Green Energy" awareness campaign, educating the local community and potentially tourists on the benefits of renewable energy, and/or hosting an 'open day' (subject to the land owner's consent) 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. • Implement good housekeeping measures.
	Visual impacts on sense of place associated with the operational phase: Grid Option 1	Negative Medium	Negative Low	• 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 implementing public awareness campaigns. Though not a requirement, it is recommended that the proponent investigate implementing a "Green Energy" awareness campaign, educating the local community and potentially tourists on the benefits of renewable energy, and/or hosting an 'open day' (subject to the land owner's consent) 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. • Implement good housekeeping measures.
	Visual impacts on sense of place associated with the operational phase: Grid Option 2	Negative Low	Negative Low	• 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 implementing public awareness campaigns. Though not a requirement, it is recommended that the proponent investigate implementing a "Green Energy" awareness campaign, educating the local community and potentially tourists on the benefits of renewable energy, and/or hosting an 'open day' (subject to the land owner's consent) 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.

				• Implement good housekeeping measures.
Social Impact Assessment (Appendix E3)	The creation of employment opportunities and skills development opportunities during the operation phase for the country and local economy.	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 could be established to promote the development of skills, or other investments in local skills development, education and/or local enterprise development initiatives.
	Development of non-polluting, renewable energy infrastructure.	Positive Medium	Positive Medium	Enhancement: • None identified
	Loss of agricultural land and overall productivity as a result of the operation of the proposed project on an agricultural property.	Negative Medium	Negative Low	• The proposed mitigation measures for the construction phase should have been implemented at this stage. • Mitigation measures from the Agricultural and Soil Report, should also be implemented.
	Contribution to LED and social upliftment during the operation of the project.	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).
	The potential impact on tourism due to the establishment of the PV.	Positive/Negative Low	Positive/Negative 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.
		Positive/Negative Low	Positive/Negative Low	
	Visual impacts and sense of place impacts associated with the operation phase of the PV.	Negative Medium	Negative Low	• To effectively mitigate the visual impact and the impact on sense of place during the operational phase of the proposed Acrux Solar PV Project One SEF, it is suggested that the recommendations made in the Visual Impact Assessment (specialist study) should be followed in this regard.

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
N/A	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.

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 surrounding environment. Spillage of hazardous 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. • 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

	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. Generation of hazardous waste			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. • 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).

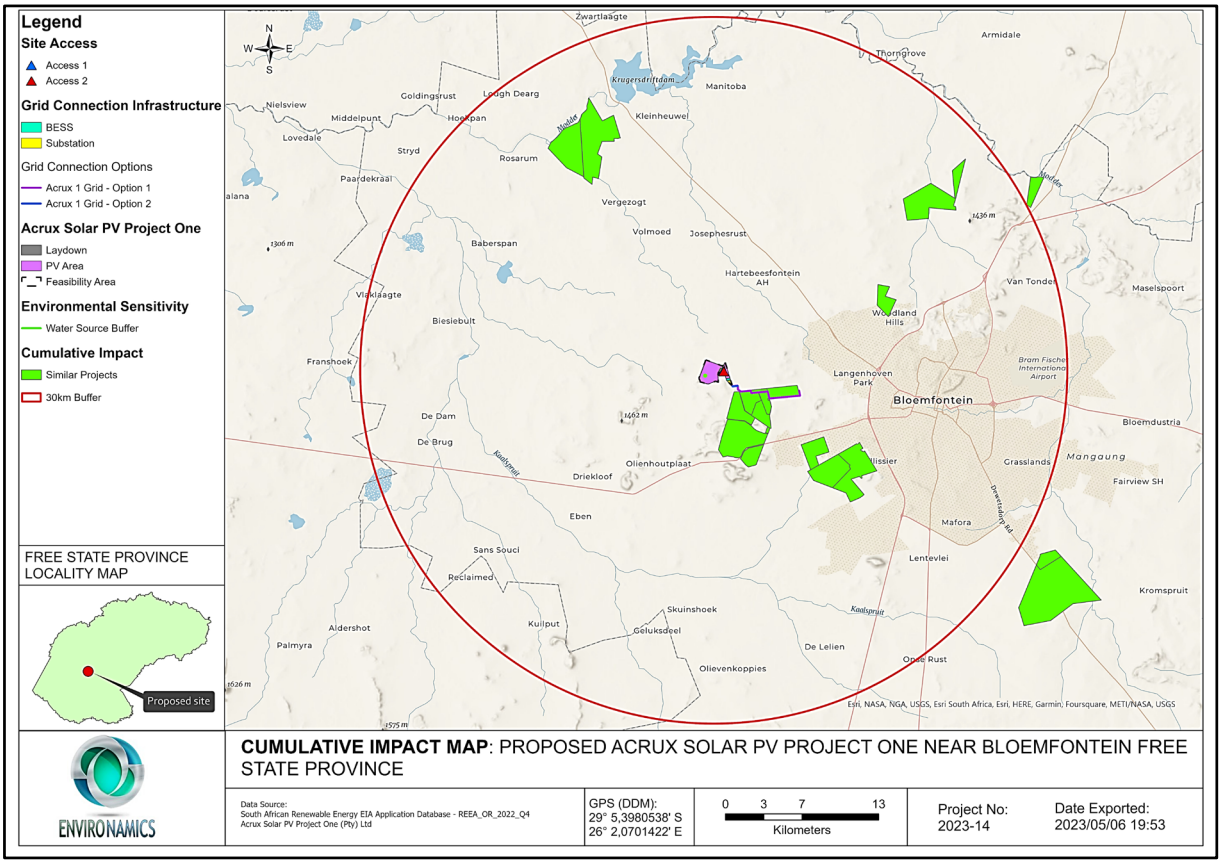


Figure 7.1: Geographic area of evaluation with utility-scale renewable energy generation sites and power lines

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 Existing projects in the area

According to the DFFE's database, 10 solar PV facility applications have been submitted to the Department within the geographic area of investigation (refer to Table 7.1).

Table 7.1: A summary of related projects that may have a cumulative impact, in a 30 km radius of the study area

Site name	Distance from study area	Proposed generating capacity	DFFE reference	EIA process	Project status
Letsatsi solar power farm, Free State Province	18km	100 MW	12/12/20/1972	Scoping and EIA	Approved
Remaining Extent of Portion 6 (Portion of Portion 5) of Farm Spes Bona 2355 Bloemfontein, Free State Province	3km	5 MW	14/12/16/3/3/1/1092	BAR	Approved
Remaining Extent of Portion 6 (Portion of Portion 5) of Farm Spes Bona 2355 Bloemfontein, Free State Province	3km	5 MW	14/12/16/3/3/1/1093	BAR	Approved
The Farm Mara No 2571, Near Woodland Hills Estate,	14km	15 MW	14/12/16/3/3/1/564	BAR	Approved

Bloemfontein In The Free State Province					
Portion 1 and 9 of Spes Bona	750m	75 MW	14/12/16/3/3/2/641	Scoping and EIA	Approved
Proposed Steenbok Solar 1, Steenbok Solar 2 and Steenbok Grid Connection on the remaining extent of the Farm Floradale No. 15 near Bloemfontein, Free State Province	20km	35 MW per project	14/12/16/3/3/2/2235	Scoping and EIA	In process
Acrux Solar PV Project Two	750m	-	To be obtained	Scoping and EIA	In process
Acrux Solar PV Project Three	740m	-	To be obtained	Scoping and EIA	In process
Mira Solar PV Project One	10.6km	-	To be obtained	Scoping and EIA	In process
Mira Solar PV Project Two	9.7km	-	To be obtained	Scoping and EIA	In process

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.

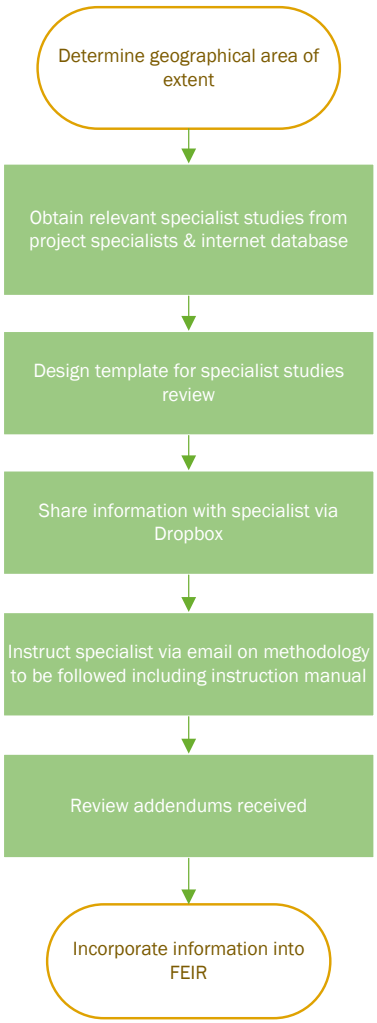


Figure 7.2: Process flow diagram for determining cumulative effects

7.5.1 Visual

The Visual Impact Assessment (refer to Appendix E2) states that the proposed development is located in a close proximity to intensive urban development and might have a cumulative impact on viewers. Ten 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. Although the cumulative impact might be high if all proposed projects be constructed, the location of the solar facilities within the study area will contribute to the consolidation of solar PV structures to this locality and avoid a potentially scattered proliferation of solar energy infrastructure throughout the region. Residents of the area might already be desensitised to a variety of developments due to the large-scale urban development in close proximity to the project. Large scale

urban development, in this case the larger Mangaung Metropolitan area, also includes intensive industrial development.

7.5.2 Social Impact Assessment

The Social Impact Assessment (refer to Appendix E3) states that the potential for cumulative impacts to occur as a result of the projects is therefore likely. Potential cumulative impacts identified for the project include positive impacts on the economy, business development, and employment, as well as negative impacts such as an influx of jobseekers and change in the area's sense of place.

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 7.3. 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 7.3 indicates the potential cumulative effects VECs and the rationale for inclusion/exclusion.

Table 7.2: Potential Cumulative Effects for the proposed project

	Valued Ecosystem Components (VECs)	Rationale for Inclusion / Exclusion	Level of Cumulative Effect
Construction Phase			
Social Impact Assessment	An increase in employment opportunities, skills development and business opportunities with the establishment of more than one solar power facility.	Acrux Solar PV Project One SEF 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	+ High

		are more considerable than that of Acrux Solar PV Project One SEF alone.	
	Negative impacts and change to the local economy with an in-migration of labourers, businesses and jobseekers to the area.	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
Operational Phase			
Visual Impact Assessment	Cumulative visual impacts related to the solar PV facility.	The anticipated cumulative visual impact for the proposed SEF is expected to include the change in sense of place, as well as the precedent being set for Solar PV projects in the area where currently there is only a precedent for agricultural developments to the west of Bloemfontein. The construction and operation of the SEF in the area is likely to have a negative impact.	- High
Decommissioning Phase			
General	Generation of waste	During the decommissioning of the facility waste will be generated that will need to be disposed of where recycling and re-use is not available. This may lead to pressure on waste disposal facilities in the area.	- 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:

- Cumulative effects during construction phase:
  - Loss of habitat, and disruption of surrounding ecological corridors. As well as the influences of pollution (water, noise, air, etc.). (- Medium)
  - Impacts of employment opportunities, business opportunities and skills development (+ Medium)
  - Impact with large-scale in-migration of people (- Medium)
- Cumulative effects during the operational phase:
  - Visual intrusion (- Medium)
- Cumulative effects during the decommissioning phase:
  - Generation of waste (- Medium)

The cumulative impact for the proposed development is high to low, unacceptable impacts related to the project are expected. 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. No 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
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 Remaining Extent of Portion 6 of Farm Brabant No. 205.
- Avifauna Impact Assessment: To determine what the impacts of the proposed activity will have on the birds (avifauna) in the area.
- 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.

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 this final 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 Final 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 (- Medium), and 4) displacement of the indigenous faunal community (- High)
    - Direct disturbance / degradation / loss to wetland soils or vegetation (- Medium) and increased erosion and sedimentation (- Medium)
    - Visual impact of construction activities on sensitive visual receptors in close proximity to the Solar PV facility (- Medium)
    - Loss of Land Capability (- Medium)
    - Loss or damage to sites, features or objects of cultural heritage significance (burial sites and homestead site located on site) (- High)
    - Destroy or permanently seal-in fossils at or below the surface that are then no longer available for scientific study (- 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) and 6) increased risk of potential veld fires.
- 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 (- High)

- Potential for increased stormwater runoff leading to Increased erosion and sedimentation (- Medium) and potential for increased contaminants entering the wetland systems (- Medium)
- Loss of Land Capability, soil erosion and compaction effects (- Medium)
- Social impacts including 1) creation of employment opportunities and skills development (+ Medium), 2) development of non-polluting, renewable energy infrastructure (+ Medium), 3) contribution to Local Economic Development (LED) and social upliftment (+ High), and 4) increase in household earnings.

- Impacts during the decommissioning phase:
  - Potential loss or degradation of nearby wetlands through inappropriate closure (- Medium)
- 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. Ayabulela Manjezi
Environamics Environmental Consultants

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