

PROPOSED 65 MW RHINO SOLAR PHOTOVOLTAIC PROJECT NORTH-WEST OF RUSTENBURG, NORTH WEST PROVINCE

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DFFE REFERENCE No.: 14/12/16/3/3/2/2321

DRAFT

JUNE 2023

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TITLE AND APPROVAL PAGE

Project Name:	65 MW Rhino Solar Photovoltaic Project north-west of Rustenburg, North West Province
Report Title:	Environmental Impact Assessment Report
Authority Reference:	14/12/16/3/3/2/2321
Report Status:	Draft

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Report Reference:	10766-20230619	R-PRO-REP 20170216	

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EXECUTIVE SUMMARY

A. PROJECT BACKGROUND AND MOTIVATION

Electricity generation sources need to be diversified to ensure security of supply and reduction in the carbon footprint created by the current heavy reliance of South Africa (SA) on coal to produce electricity. Rhino Solar PV (Pty) Ltd (the “Applicant”) has proposed the development of the 65 MW Rhino Solar Photovoltaic (PV) Project north-west of Rustenburg, in the North West Province (the “Project”). The electricity generated by the Project will be transferred via up to 132 kV powerlines from the Eskom collector switching station, located adjacent to the facility substation, to the grid network. The Applicant intends to bid for the current and future Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) bid windows and/or other renewable energy markets within SA.

This document serves as the **draft Environmental Impact Assessment (EIA) Report** for the proposed Project.

B. PROJECT LOCATION

The Project Area is located approximately 10km west of Rasimone and 30km north-west of Rustenburg’s central business district (CBD). The site falls within the Kgetlengrivier Local Municipality (KLM) and the Bojanala Platinum District Municipality (BPDM). The site is accessed by tar and gravel roads, which are linked to the R556 that runs to the east of the Project Area. The project footprint covers a combined area of up to approximately 125 hectares.

C. LEGISLATION AND GUIDELINES CONSIDERED

Pertinent legislation that has possible bearing on the proposed Project from an environmental perspective is briefly discussed in this EIA Report.

The relationship between the Project and the following key pieces of environmental legislation is also explained:

- ❑ National Environmental Management Act (Act No. 107 of 1998) (NEMA);
- ❑ National Environmental Management: Waste Act (Act No. 59 of 2008);
- ❑ National Water Act (Act No. 36 of 1998);
- ❑ National Environmental Management Air Quality Act (Act No. 39 of 2004);
- ❑ National Environmental Management: Biodiversity Act (Act No. 10 of 2004); and
- ❑ National Heritage Resources Act (Act No. 25 of 1999).

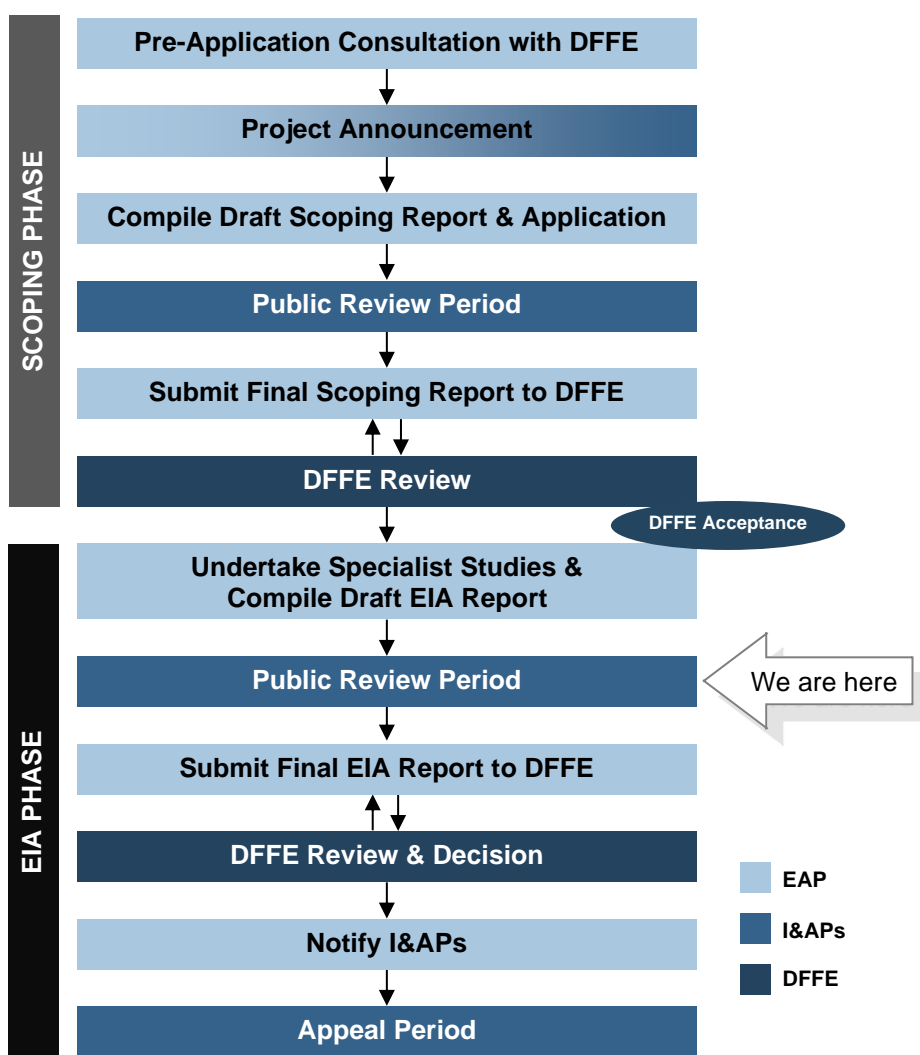
D. SCOPING AND EIA PROCESS

The process for seeking Environmental Authorisation for the Project under the NEMA is being undertaken in accordance with the EIA Regulations of 2014 (as amended), published under Government Notice (GN) No. 982 in Gazette No. 38282 of 4 December 2014 and amended by GN 326 of 7 April 2017 published in Gazette No. 40772 (the “EIA Regulations”). In terms of NEMA, the

lead decision-making authority for the environmental assessment is the Department of Forestry, Fisheries and the Environment (DFFE). Nema Consulting was appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the environmental assessment for the proposed Project.

Based on the types of activities involved the requisite environmental assessment for the Project is a Scoping and Environmental Impact Reporting (S&EIR) process. An outline of the process is provided in the diagram to follow.

DFFE accepted the Scoping Report and Plan of Study for the EIA on 24 May 2023, which allowed the commencement of the EIA phase.



Overview of S&EIR Process

E. PROJECT’S TECHNICAL DESCRIPTION

The technical details of the proposed Project are captured below.

Technical details of the proposed Project

No.	Component	Description / Dimensions	
		Layout Alternative 1	Layout Alternative 2
1.	Height of PV panels	Up to 5.5 m	Up to 5.5 m
2.	Area of PV Array	Up to approximately 117 ha	Monofacial or Bifacial PV panels, mounted on either fixed-tilt, single-axis tracking, and/or double-axis tracking systems Area: Up to 115 ha
3.	Area occupied by substations	Up to 1 ha	It is estimated that the maximum size of the facility substation will not exceed 1 ha Each facility will require inverter-stations, transformers, switchgear and internal electrical reticulation (underground cabling)
4.	Capacity of on-site substation	High voltage (up to 132 kV)	The facility substation will collect the power from the facility and transform it from medium voltage (up to 33 kV) to high voltage (88 or 132 kV)
5.	BESS	Area up to ± 4 ha	Area up to ± 4 ha
6.	Area occupied by both permanent and construction laydown areas	Temporary: Up to 5 ha Permanent: Up to 1 ha (located within the area demarcated for temporary construction laydown)	Temporary construction laydown area up to 5 ha Permanent laydown area up to 1 ha (to be located within the area demarcated for the temporary construction laydown)
7.	Area occupied by buildings	Up to 1 ha	Up to 1 ha
8.	Length of internal roads	Up to 10 km	Up to 10 km
9.	Width of internal roads	The internal roads will be up to 6 m wide. The access roads will be up to 8 m wide.	The internal roads will be up to 6 m wide. The access roads will be up to 8 m wide.
10.	Proximity to grid connection	Approximately 750 m to the Eskom Rhino Substation	Approximately 410 m to connect to existing powerline
11.	Height of fencing	Up to 3.5 m	Up to 3.5m
12.	Type of fencing	Type will vary around the site, welded mesh, palisade and electric fencing	Type will vary around the site, welded mesh, palisade and electric fencing

The EIA Report provides an overview of the components of the proposed Solar PV Facility, as well as the BESS and grid connection. It further explains the project life-cycle, as well as the resources required to execute the Project.

The alternatives under consideration for the Project include layout alternatives, technology alternatives and the no-go option.

F. PROFILE OF THE RECEIVING ENVIRONMENT

The EIA Report provides a general description of the status quo of the receiving environment in the Project Area. This serves to provide the context within which the assessment was conducted and allows for an appreciation of sensitive environmental features and possible receptors of the effects of the proposed Project.

The receiving environment is explained in terms of the following:

- Land Use and Land Cover
- Agriculture

- Climate
- Geology
- Soils
- Topography
- Surface Water
- Terrestrial Ecology
- Socio-Economic Environment
- Air quality
- Noise
- Cultural Heritage
- Palaeontological Features
- Planning
- Existing Structures and Infrastructure
- Transportation

G. SPECIALIST STUDIES

The specialist studies 'triggered' by the nature of the proposed development and its receiving environment, which aimed at addressing the key issues and compliance with legal obligations, include the following:

1. Aquatic Compliance Statement;
2. Terrestrial Biodiversity Compliance Statement;
3. Avifauna Impact Assessment;
4. Agricultural Compliance Statement;
5. Heritage Impact Assessment;
6. Desktop Paleontological Impact Assessment;
7. Visual Impact Assessment;
8. Social Impact Assessment; and
9. Transport Impact Assessment.

The information obtained from the respective specialist studies was incorporated into the EIA Report in the following manner (amongst others):

- The information was used to complete the description of the receiving environment in a more detailed and site-specific manner;
- A summary of each specialist study is provided, focusing on the approach to each study, key findings and conclusions drawn;
- The specialists' impacts assessments, and the identified mitigation measures, were included in the overall project impact assessment;
- The evaluations performed by the specialists on the alternatives of the Project components were taken into consideration in the identification of the most favourable options; and
- Salient recommendations made by the specialists were taken forward to the final Conclusions.

H. IMPACT ASSESSMENT

The EIA Report assessed the pertinent environmental impacts that could potentially be caused during the pre-construction, construction and operational phases of the Project.

Impacts were identified as follows:

- Impacts associated with listed activities contained in the EIA Regulations' Listing Notices;
- Impacts identified during the Scoping phase;
- An appraisal of the Project's activities and components;

- ❑ An assessment of the receiving biophysical, social, economic and built environments;
- ❑ Findings from specialist studies;
- ❑ Issues highlighted by environmental authorities; and
- ❑ Comments received during public participation from Interested and Affected Parties (I&APs).

The impacts and the proposed management measures are discussed on a qualitative level and thereafter quantitatively assessed to ultimately determine the significance of the impacts. The assessment considered impacts before and after mitigation, where in the latter instance the residual impact following the application of the mitigation measures is evaluated.

The proposed mitigation of the impacts associated with the Project includes specific measures identified by the technical team (including engineering solutions) and environmental specialists, stipulations of environmental authorities and environmental best practices. The Environmental Management Programme (EMPr) for the PV Site and Generic EMPr's for the Power Line and Substation provide a comprehensive list of mitigation measures for specific elements of the Project, which extends beyond the impacts evaluated in the body of the EIA Report.

The implications of the "no-go option" are also assessed. The "no go option" was considered in light of the motivation as well as the need and desirability of the overall Project. Should the proposed Project not go ahead, any potentially significant environmental issues associated with the Project would be irrelevant and the status quo of the local receiving environment would not be affected by the Project-related activities. The objectives of this Project would, however, not be met. This will *inter alia* mean that the Project's intended benefits will not materialise. The "no-go option" is thus not preferred.

Cumulative impacts in relation to the Project were assessed individually in the EIA Report and mitigation measures were developed for each of the impact categories.

I. ANALYSIS OF ALTERNATIVES

The extent of the site allows for the identification of layout/design alternatives to manage impacts to environmental sensitivity. Layout Alternative 1 constitutes the initial layout contemplated during the Scoping Phase. During the course of the EIA process, the layout was revised to avoid a small artificial dam in the north-western corner of the site.

Based on the technical and environmental considerations, Layout Alternative 2 was identified as the Best Practicable Environmental Option (BPEO).

J. PUBLIC PARTICIPATION

The EIA Report provides the details of the following tasks undertaken as part of the public participation process:

- ❑ Maintaining the database of I&APs;
- ❑ Review period for the draft EIA Report;

- ❑ Notification of review of the draft EIA Report;
- ❑ Means of accessing the draft EIA Report; and
- ❑ Comments received on the draft EIA Report.

K. CONCLUSIONS

The following key tasks were undertaken during the EIA phase for the proposed Project:

- ❑ The specialist studies identified in the Plan of Study for the EIA were undertaken and the findings were incorporated into the EIA Report in terms of understanding the environmental status quo and sensitive features, assessing the potential impacts and establishing concomitant mitigation measures, as well as identifying the preferred alternatives;
- ❑ Potentially significant impacts pertaining to the pre-construction, construction and operational phases of the Project were identified and assessed, and mitigation measures were provided; and
- ❑ Alternatives for achieving the objectives of the proposed activity were considered, and the BPEO was identified. The “no-go” option is not supported when considering the implications of not implementing the Project.

Attention is drawn to specific sensitive environmental features for which mitigation measures are included in the EIA Report and EMPr's. A combined sensitivity map overlaid with the Project's BPEO is also provided.

An Environmental Impact Statement is also provided, which includes highlighting key findings from the EIA, which may also influence the conditions of the Environmental Authorisation (if granted).

With the selection of the BPEO, the adoption of the mitigation measures included in the EIA Report and the dedicated implementation of the EMPr's, it is believed that the significant environmental aspects and impacts associated with this Project can be suitably mitigated. With the aforementioned in mind, it can be concluded that there are no fatal flaws associated with the Project and that authorisation can be issued, based on the findings of the specialists and the impact assessment, through the compliance with the identified environmental management provisions.

AMENDMENTS PAGE

Date	Nature of Amendment	Amendment No.	Signature
June 2023	Draft for Review by Authorities and the Public	0	

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LIST OF ACRONYMS & ABBREVIATIONS

AC	Alternating Current
AEL	Atmospheric Emission Licence
ASAPA	Association for Southern African Professional Archaeologists
BESS	Battery Energy Storage System
BPDM	Bojanala Platinum District Municipality
BPEO	Best Practicable Environmental Option
CBA	Critical Biodiversity Area
CBD	Central Business District
CCTV	Closed-Circuit Television
COD	Commercial Operation Date
CPV	Concentrated Photovoltaics
C&R	Comments and Response
CR	Critically Endangered
CRR	Comments and Responses Report
DALRRD	Department of Agriculture, Land reform and Rural Development
DARD	Department of Agriculture and Rural Development
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DEAT	Department of Environmental Affairs and Tourism
DEDECT	Department of Economic Development, Environment, Conservation and Tourism
DEL	Department of Employment and Labour
DFFE	Department of Forestry, Fisheries and the Environment
DC	Direct Current
DMRE	Department of Mineral Resources and Energy
DoE	Department of Energy
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EHS	Environmental, Health, and Safety
EMF	Electromagnetic Field
EMI	Electromagnetic Interference
EMPr	Environmental Management Programme
EMS	Environmental Management System
EN	Endangered
EPC	Engineering, Procurement and Construction
ESA	Ecological Support Area
GCS	
GHG	Greenhouse Gas
GIS	Geographical Information System
GN	Government Notice
GPS	Global Positioning System

H	High
HIA	Heritage Impact Assessment
HIV/AIDS	Human Immunodeficiency Virus, Acquired Immunodeficiency Syndrome
HV	High Voltage
I&APs	Interested and Affected Parties
IBA	Important Bird & Biodiversity Area
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
IRP	Integrated Resource Plan
IUCN	International Union for Conservation of Nature
KLM	Kgetlengrivier Local Municipality
KZN	KwaZulu-Natal
L	Low
LC	Least Concern
M	Moderate
mamsl	Metres above mean sea level
Na	Sodium
NaS	Sodium-Sulphur
NEMA	National Environmental Management Act (No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Act (Act No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEM:PAA	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
NEM:WA	National Environmental Management: Waste Act (Act No. 59 of 2008)
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NP	Not Protected
NPAES	National Protected Area Expansion Strategy
NT	Near Threatened
NWA	National Water Act (Act No. 36 of 1998)
NWHRA	North West Heritage Resources Authority
OHS	Occupational Health and Safety
PAOI	Project Area of Influence
POSA	Plants of Southern Africa
PPA	Power Purchase Agreement
PPE	Personal Protective Equipment
PS	Performance Standards
PSSA	Palaeontological Society of South Africa
PV	Photovoltaic
READ	Department of Rural, Environmental and Agricultural Development
REDZ	Renewable Energy Development Zones
REEA	Renewable Energy EIA Application
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RFI	Radio Frequency Interference
S	Sulphur
S&EIR	Scoping and Environmental Impact Reporting

SA	South Africa
SABAP2	South African Bird Atlas Project 2
SACAA	South African Civil Aviation Authority
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency
SANS	South African National Standard
SAPAD	South African Protected Areas Database
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SEI	Site Ecological Importance
SLA	Service Level Agreement
SMME	Small, Medium and Micro Enterprises
SOTER	Soil and Terrain
STD	Sexually Transmitted Disease
STI	Sexually Transmitted Infection
ToR	Terms of Reference
VAC	Visual Absorption Capacity
VU	Vulnerable
WMA	Water Management Area

UNITS OF MEASUREMENT

%	Percentage
°C	Degrees Celsius
ha	Hectare
hz	Hertz
km	Kilometre
kV	Kilovolt
m	Metre
m²	Square metre
MVA	Megavolt Amperes
MW	Megawatt
MWh	Megawatt hour
V	Volt

1 PURPOSE OF THIS DOCUMENT

Nemai Consulting was appointed by Rhino Solar PV (Pty) Ltd (the “Applicant”) to conduct the Environmental Impact Assessment (EIA) for the **proposed 65 MW Rhino Solar Photovoltaic (PV) Project north-west of Rustenburg, in the North West Province** (the “Project”).

The EIA is being undertaken according to the process prescribed in the EIA Regulations of 2014, published under Government Notice (GN) No. 982 in Gazette No. 38282 of 4 December 2014 and amended by GN 326 of 7 April 2017 published in Gazette No. 40772 (the “EIA Regulations”). The EIA Regulations were promulgated in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA). This document serves as the **draft EIA Report** for the proposed Project.

To date, the Scoping phase of the overall environmental assessment for the Project has been completed. The final Scoping Report and Plan of Study for the EIA were approved by the Department of Forestry, Fisheries and the Environment (DFFE) on 14 May 2023. DFFE is the competent authority to decide on the application in terms of NEMA.

According to the EIA Regulations, the objectives of the EIA process are to undertake the following, through a consultative process:

- 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 development footprint on the approved site as contemplated in the accepted Scoping Report.
- Identify the location of the development footprint within the approved site as contemplated in the accepted Scoping Report 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 -
 - Nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives.
 - Degree to which these impacts -
 - Can be reversed;
 - May cause irreplaceable loss of resources; and
 - Can be avoided, managed or mitigated.
- Identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted Scoping Report based on the lowest level of environmental sensitivity identified during the assessment.
- Identify, assess, and rank the impacts the activity will impose on the development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity.

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

The draft EIA Report will be made available to Interested and Affected Parties (I&APs) for a 30-day review period from **20 June until 20 July 2023**. All comments that are received will be addressed in the final EIA Report and will also be included in the Comments and Responses Report. The final EIA Report will then be submitted to the DFFE for review and decision-making.

2 DOCUMENT ROADMAP

As a minimum, this EIA Report aims to satisfy the requirements stipulated in Appendix 3 of the EIA Regulations. **Table 1** below presents the document's composition in terms of the aforementioned regulatory requirements.

Table 1: EIA Report Roadmap

Chapter	Title	Correlation with GN No. R. 982	GN No. R. 982 Description
1	Purpose of this Document	–	–
2	Document Roadmap	–	–
3	Project Background and Motivation	–	–
4	Project Location	3(1)(b)	The location of the development footprint of the activity on the approved site as contemplated in the accepted Scoping Report, including: <ul style="list-style-type: none"> (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.
		3(1)(c)	A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is - <ul style="list-style-type: none"> (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; and (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken.
5	Legislation and Guidelines Considered	3(1)(e)	A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context.
6	Scoping and EIA Process	3(1)(a)	Details of- <ul style="list-style-type: none"> (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae.
		3(1)(u)	An indication of any deviation from the approved scoping report, including the plan of study, including- <ul style="list-style-type: none"> (i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation.
		3(1)(v)	Any specific information that may be required by the competent authority.

Chapter	Title	Correlation with GN No. R. 982	GN No. R. 982 Description
7	Assumptions and Limitations	3(1)(p)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.
8	Need and Desirability	3(1)(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 development footprint within the approved site as contemplated in the accepted Scoping Report.
9	Project Description	3(1)(d)	A description of the scope of the proposed activity, including- (i) all listed and specified activities triggered and being applied for; and (ii) a description of the associated structures and infrastructure related to the development.
		3(1)(g)	A motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report.
		3(1)(h)(i)	A full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including: (i) details of the development footprint alternatives considered.
		3(1)(h)(ix)	If no alternative development footprints for the activity were investigated, the motivation for not considering such.
		3(1)(t)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.
10	Alternatives	3(1)(h)(i)	Details of the development footprint alternatives considered.
11	Profile of the Receiving Environment	3(1)(h)(iv)	The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.
12	Summary of Specialist Studies	3(1)(k)	Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.
13	Impact Assessment	3(1)(h)(v)	The impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- (i) can be reversed; (ii) may cause irreplaceable loss of resources; and (iii) can be avoided, managed or mitigated.
		3(1)(h)(vi)	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks.
		3(1)(h)(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

Chapter	Title	Correlation with GN No. R. 982	GN No. R. 982 Description
			on the geographical, physical, biological, social, economic, heritage and cultural aspects.
		3(1)(h)(viii)	The possible mitigation measures that could be applied and level of residual risk.
		3(1)(i)	A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including - (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.
		3(1)(j)	An assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be mitigated.
		3(1)(m)	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the Environmental Management Programme (EMPr) as well as for inclusion as conditions of authorisation.
14	Analysis of Alternatives	3(1)(h)(ix)	If no alternative development locations for the activity were investigated, the motivation for not considering such.
		3(1)(h)(x)	A concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted Scoping Report.
		3(1)(n)	The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment.
15	Public Participation – EIA Phase	3(1)(h)(ii)	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs.
16	EIA Conclusions	3(1)(l)	An environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the

Chapter	Title	Correlation with GN No. R. 982	GN No. R. 982 Description
			<p>environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and</p> <p>(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.</p>
		3(1)(o)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.
		3(1)(q)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.
17	References	-	-
Appendix A	Locality Maps	3(1)(c)	A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale.
Appendix E	Specialists' Reports	R23(5)	Specialist Reports containing all information set out in Appendix 6 of GN No. R. 982 of 4 December 2014 (as amended).
Appendix H	EMPr's	R23(4)	Environmental Management Programme containing all information set out in Appendix 4 of GN No. R. 982 of 4 December 2014 (as amended).
Appendix G	Comments and Responses Report	3(1)(h)(ii)	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs.
		3(1)(h)(iii)	A summary of the issues raised by Interested and Affected Parties (IAPs), and an indication of the manner in which the issues were incorporated, or the reasons for not including them.
Appendix I	Oath of Environmental Assessment Practitioner	3(1)(s)	<p>An undertaking under oath or affirmation by the EAP in relation to:</p> <p>(i) the correctness of the information provided in the reports;</p> <p>(ii) the inclusion of comments and inputs from stakeholders and IAPs;</p> <p>(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and</p> <p>(iv) any information provided by the EAP to IAPs and any responses by the EAP to comments or inputs made by IAPs.</p>
	N/A	3(1)(r)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised.
	N/A	3(1)(w)	Any other matters required in terms of section 24(4)(a) and (b) of the Act.

3 PROJECT BACKGROUND AND MOTIVATION

The South African Government ratified the Paris Agreement in 2016, and thereby showed the country's commitment to contribute to the global effort to address the challenge of climate change. Electricity generation sources need to be diversified to ensure security of supply and reduction in the carbon footprint created by the current heavy reliance of South Africa (SA) on coal to produce electricity. The electricity demand is increasing in SA, and in order to match that demand there is a need to supply a diversified power generation that includes renewable energy technologies. These technologies include solar, wind, small utility scale hydro, biomass, biogas and energy storage that the Department of Mineral Resources and Energy (DMRE) intends to develop and implement as identified in the approved Integrated Resource Plan (IRP) 2019.

The Applicant has proposed the development of the 65 MW Rhino Solar PV Project north-west of Rustenburg, in the North West Province. The electricity generated by the Project will be transferred via up to 132 kV powerlines from the Eskom collector switching station, located adjacent to the facility substation, to the grid network.

The Applicant intends to bid for the current and future Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) bid windows and/or other renewable energy markets within SA.

4 PROJECT LOCATION

4.1 Location of the Project relative to Solar Yield Area

The location of the Project in relation to SA’s PV power potential is shown in **Figure 1** below. The Project Area is considered to have favourable solar irradiation levels, which makes it ideal for the production of solar power via PV Panels.

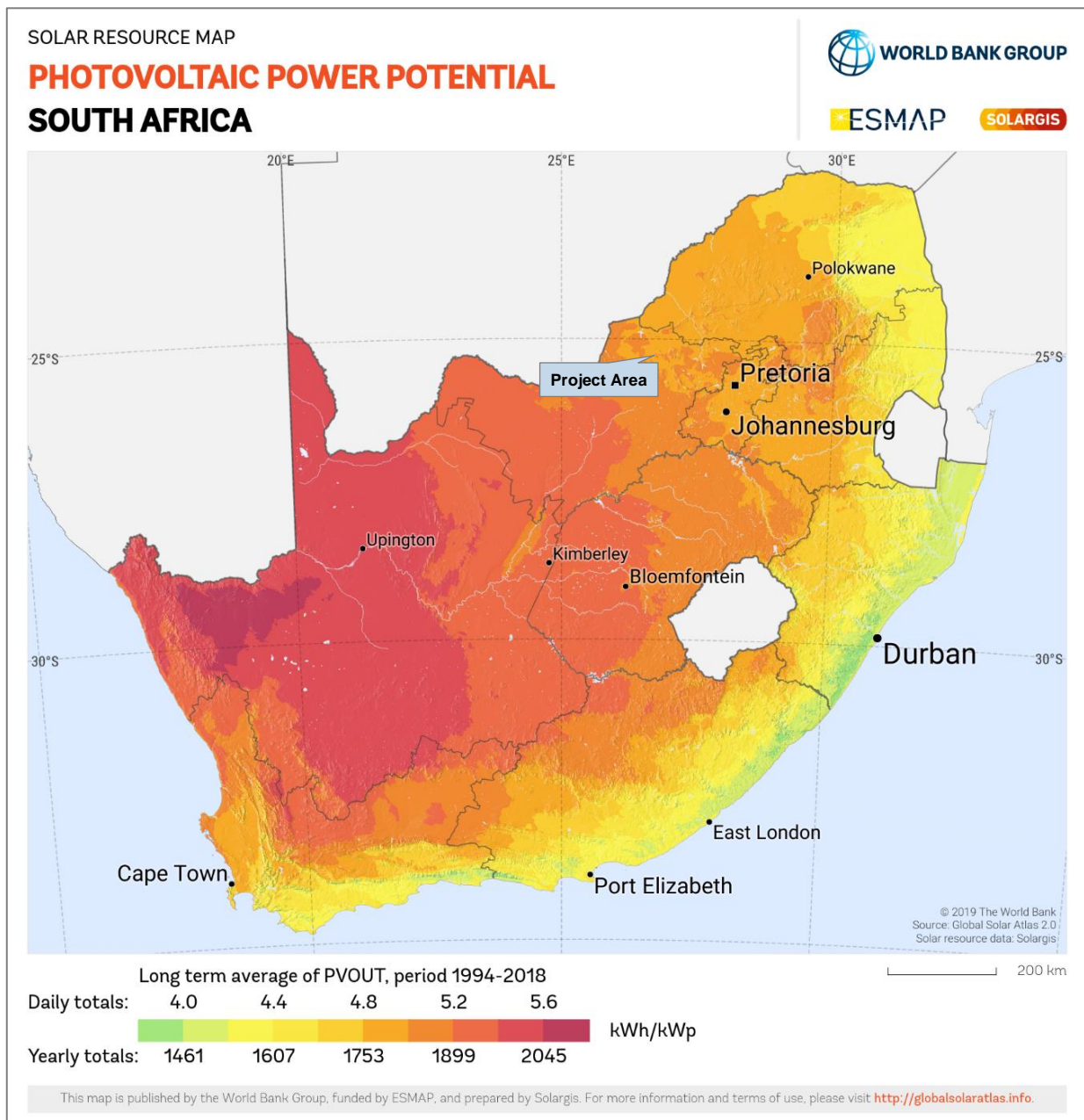


Figure 1: Location of the Project relative to PV Power Potential
 (© 2019 The World Bank, Source: Global Solar Atlas 2.0, Solar resource data: Solargis)

4.2 Geographical Context

The Project Area is located approximately 10km west of Rasimone and 30km north-west of Rustenburg's central business district (CBD), and falls within the Kgetlengrivier Local Municipality (KLM) and the Bojanala Platinum District Municipality (BPDM) in the North West Province. The site is accessed by tar and gravel roads, which are linked to the R556 that runs to the east of the Project Area. The locality map is provided in **Figure 2** and the alternative layouts are shown in **Figure 3** and **Figure 4** below (also contained in **Appendix A**).

The project footprint covers a combined area of up to approximately 125 hectares (ha). The details of the affected properties are provided in **Table 2** below.

Table 2: Details of the affected properties

Layout Alternative	Farm Details	21-digit Surveyor General No.
PV Site		
Layout Alternatives 1 & 2	Portion 11 of the Farm Rhebokhoek 101	T0JQ0000000010100011
Access Road		
Layout Alternatives 1 & 2	Farm Paul Bodenstein Landgoed 571	T0JQ00000000057100000
Powerline Route		
Layout Alternative 1	Portion 31 of the Farm Stroomrivier 236	T0JQ00000000023600031
	Portion 26 of the Farm Stroomrivier 236	T0JP00000000023600026
Layout Alternative 2	Portion 13 of the Farm Rhebokhoek 101	T0JQ00000000010100013
	Remaining Extent of Portion 7 of the Farm Rhebokhoek 101	T0JQ00000000010100007
	Portion 31 of the Farm Stroomrivier 236	T0JP00000000023600031

The coordinates for the Project's layout alternative are listed in **Table 3** and shown in **Figure 5** (Alternative Layout 1) and **Figure 6** (Alternative Layout 2) below.

Table 3: Coordinates of Alternative Layouts

Project Components	Layout Alternative 1	Layout Alternative 2
PV Site property	1. 25°28'53.32"S; 27° 0'50.24"E	1. 25°28'53.37"S; 27° 0'50.23"E
	2. 25°29'31.07"S; 27° 0'58.17"E	2. 25°29'30.99"S; 27° 0'58.14"E
	3. 25°29'31.91"S; 27° 0'35.72"E	3. 25°29'12.31"S; 27° 0'27.55"E
	4. 25°28'32.12"S; 27° 0'10.82"E	4. 25°28'32.53"S; 27° 0'15.37"E
	5. 25°28'28.35"S; 27° 0'16.76"E	5. 25°28'28.43"S; 27° 0'21.35"E
	6. 25°28'28.55"S; 27° 0'27.67"E	6. 25°28'28.64"S; 27° 0'27.65"E
	7. 25°28'49.53"S; 27° 0'36.39"E	7. 25°28'49.70"S; 27° 0'36.44"E
	8. 25°28'55.75"S; 27° 0'33.75"E	8. 25°28'55.77"S; 27° 0'33.87"E
Powerline Route	9. 25°28'33.84"S; 27° 0'11.07"E	9. 25°29'31.84"S; 27° 0'37.36"E
	10. 25°28'40.43"S; 27° 0'01.52"E	10. 25°29'37.43"S; 27° 0'37.96"E
	11. 25°28'56.01"S; 26°59'55.70"E	11. 25°29'44.10"S; 27° 0'40.23"E
Access Roads	12. 25°28'0.44"S; 27° 0'53.79"E	12. 25°28'0.44"S; 27° 0'53.79"E
	13. 25°28'26.90"S; 27° 0'47.69"E	13. 25°28'26.90"S; 27° 0'47.69"E
	14. 25°28'28.41"S; 27° 0'24.06"E	14. 25°28'28.41"S; 27° 0'24.06"E
Laydown Area	A. 25°28'34.83"S; 27° 0'18.47"E	A. 25°28'35.42"S; 27° 0'16.40"E
Building Area	B. 25°28'36.69"S; 27° 0'14.60"E	B. 25°28'30.15"S; 27° 0'22.49"E
BESS	C. 25°27'23.57"S; 27° 1'12.04"E	C. 25°29'27.58"S; 27° 0'36.82"E
Substation	D. 25°28'33.01"S; 27° 0'13.19"E	D. 25°29'30.58"S; 27° 0'36.97"E

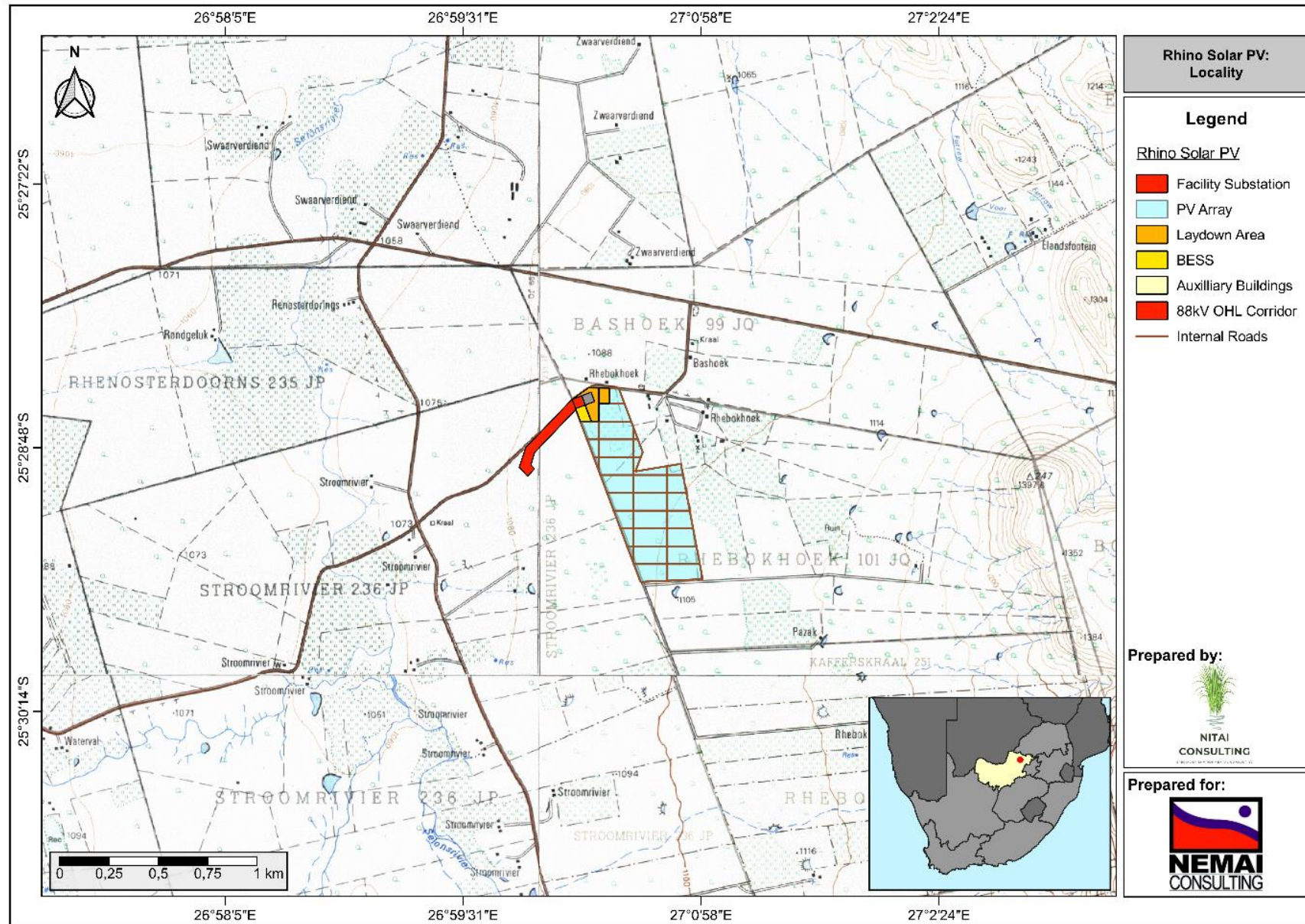


Figure 2: Locality map (Layout Alternative 1 shown)

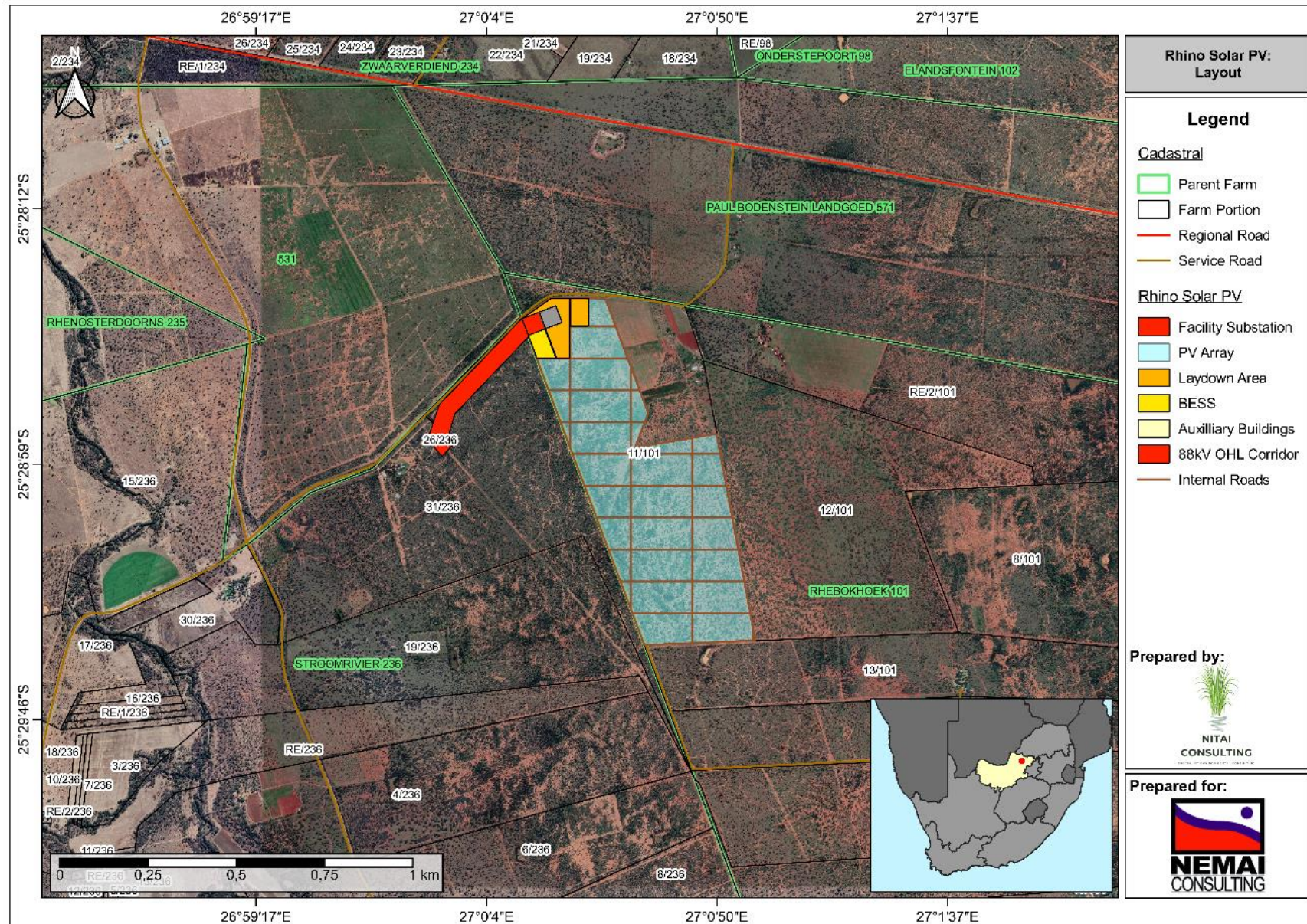
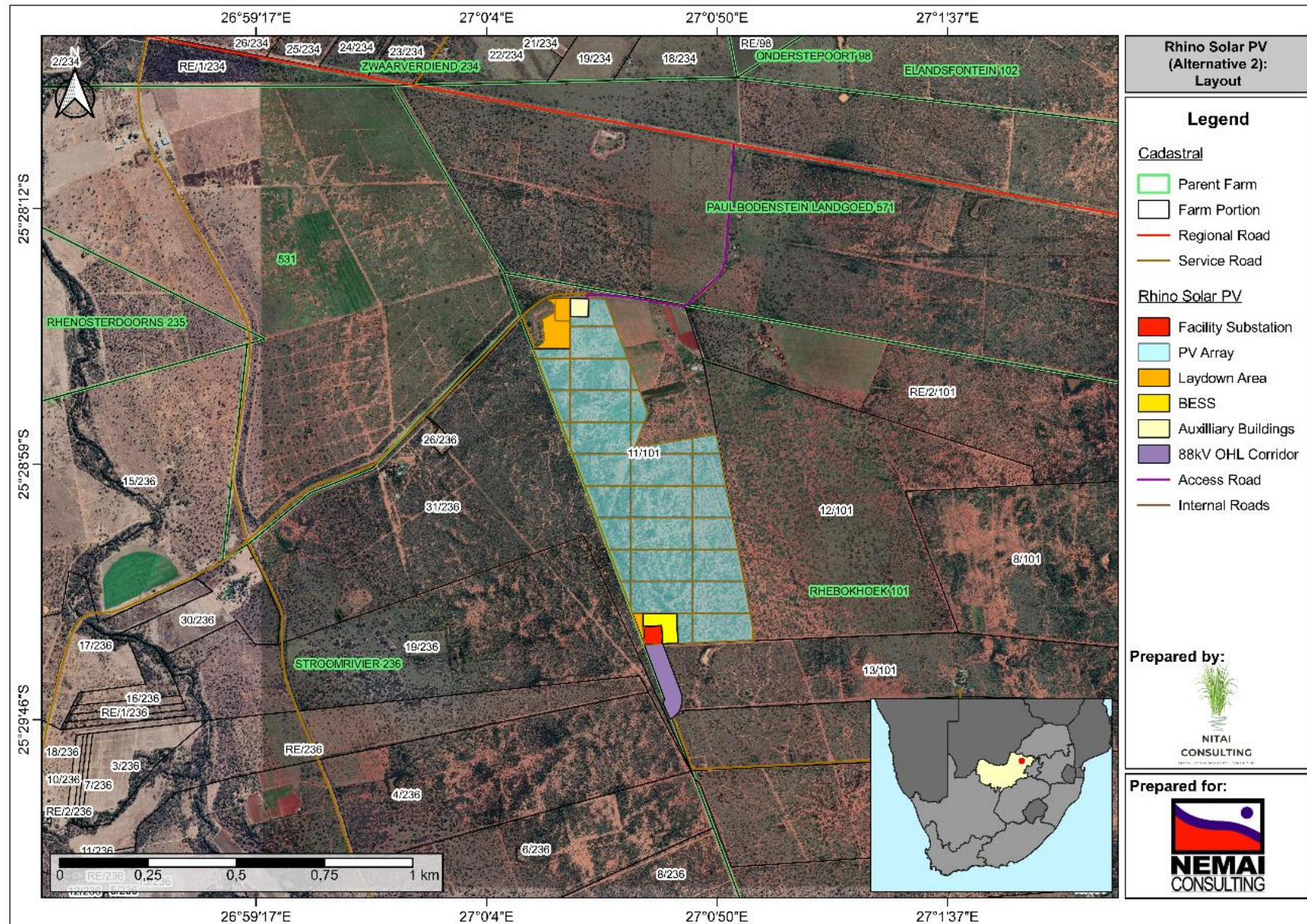


Figure 3: Layout map for Alternative 1



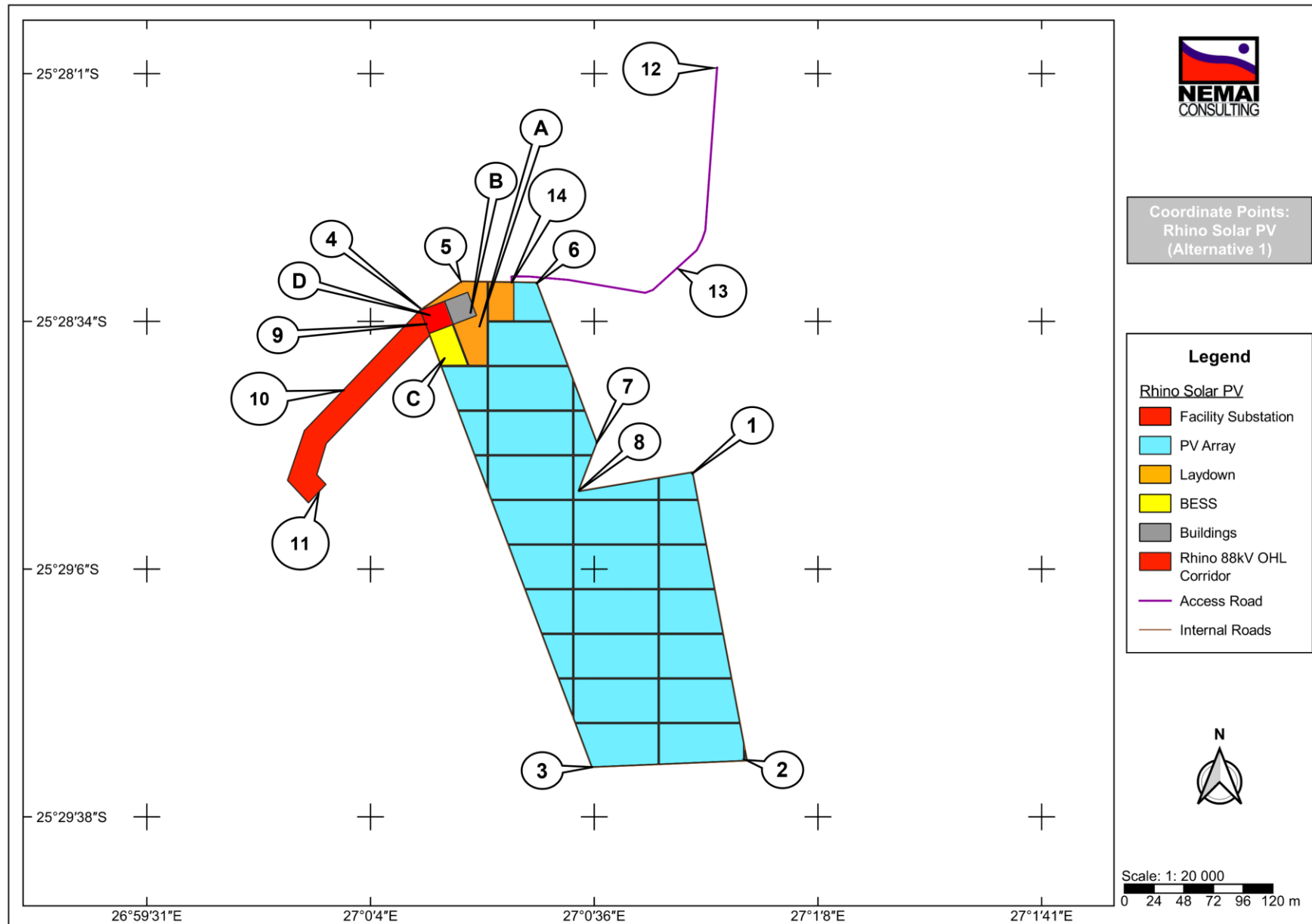


Figure 5: Project's coordinate points for Alternative 1

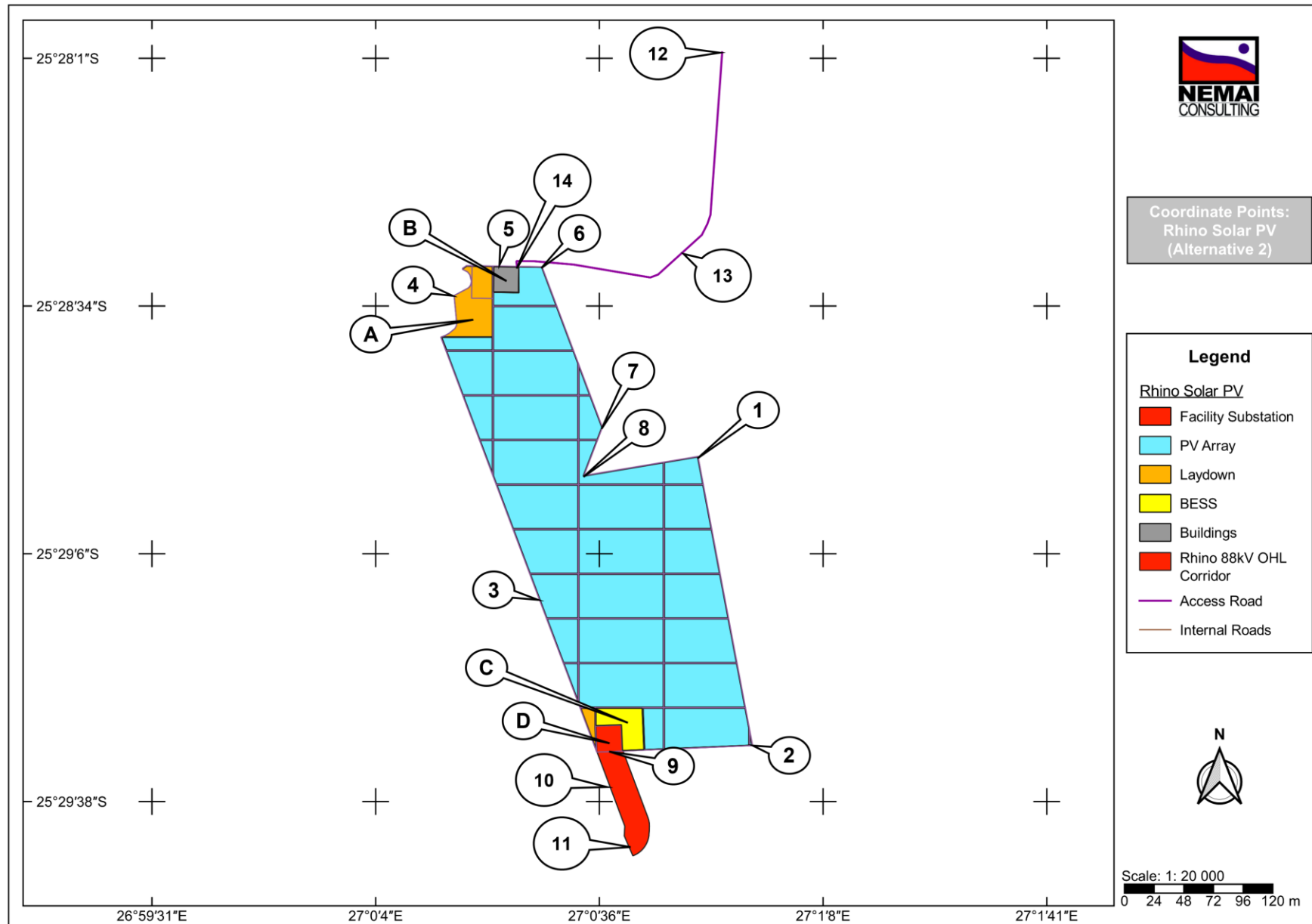


Figure 6: Project's coordinate points for Alternative 2

5 LEGISLATION AND GUIDELINES CONSIDERED

5.1 International Finance Corporation - Performance Standards & Guidelines

Where relevant, the Project would strive to satisfy and incorporate the International Finance Corporation (IFC) Performance Standards (PS), which serve as an international benchmark for identifying and managing environmental and social risks.

The IFC PS offer a framework for understanding and managing environmental and social risks for high profile, complex, international and potentially high impact projects. The IFC PS encompass the following eight topics:

- ❑ Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;
- ❑ Performance Standard 2: Labour and Working Conditions;
- ❑ Performance Standard 3: Resource Efficiency and Pollution Prevention;
- ❑ Performance Standard 4: Community Health, Safety, and Security;
- ❑ Performance Standard 5: Land Acquisition and Involuntary Resettlement;
- ❑ Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- ❑ Performance Standard 7: Indigenous Peoples; and
- ❑ Performance Standard 8: Cultural Heritage.

IFC's Environmental, Health, and Safety (EHS) Guidelines provide technical guidelines with general and industry-specific examples of good international industry practice to meet IFC PS.

5.2 Legislation

5.2.1 Environmental Statutory Framework

The legislation that has possible bearing on the proposed Project from an environmental perspective is captured in **Table 4** below. Note this list does not attempt to provide an exhaustive explanation, but rather represents an identification of some of the most appropriate sections from pertinent pieces of legislation.

Table 4: Environmental Statutory Framework

Legislation	Description and Relevance
Constitution of the Republic of South Africa (No. 108 of 1996)	<ul style="list-style-type: none"> ▪ Chapter 2 – Bill of Rights. ▪ Section 24 – Environmental Rights.
National Environmental Management Act (Act No. 107 of 1998)	<ul style="list-style-type: none"> ▪ Key sections (amongst others): <ul style="list-style-type: none"> ○ Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment).

Legislation	Description and Relevance					
	<ul style="list-style-type: none"> o Section 28 – Duty of care and remediation of environmental damage. ▪ Environmental management principles. ▪ Authorisation type – Environmental Authorisation. ▪ Authorities – DFFE (national) (competent authority for this application) and the North West Department of Economic Development, Environment, Conservation and Tourism (DEDECT) (provincial). 					
EIA Regulations	<ul style="list-style-type: none"> ▪ Purpose - regulate the procedure and criteria as contemplated in Chapter 5 of NEMA relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to EIA, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto. 					
GN No. R. 983 of 4 December 2014 (as amended) (Listing Notice 1)	<ul style="list-style-type: none"> ▪ Purpose - identify activities that would require environmental authorisations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of NEMA. ▪ The investigation, assessment and communication of potential impact of activities must follow a Basic Assessment process, as prescribed in regulations 19 and 20 of the EIA Regulations. However, according to Regulation 15(3) of the EIA Regulations, Scoping and Environmental Impact Reporting (S&EIR) must be applied to an application if the application is for two or more activities as part of the same development for which S&EIR must already be applied in respect of any of the activities. ▪ The following activities under Listing Notice 1 are relevant to this Project: <table border="1"> <tbody> <tr> <td> <p>GN No. R.983 – Activity 11(i):</p> <p><i>The development of facilities or infrastructure for the transmission and distribution of electricity—</i></p> <p><i>(i) <u>outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or</u></i></p> <p><i>(ii) <u>inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;</u></i></p> <p><i>excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —</i></p> <p><i>(a) temporarily required to allow for maintenance of existing infrastructure;</i></p> <p><i>(b) 2 kilometres or shorter in length;</i></p> <p><i>(c) within an existing transmission line servitude; and</i></p> <p><i>(d) will be removed within 18 months of the commencement of development.</i></p> </td> <td> <p><i>The Project will require up to 132 kV electrical infrastructure. This includes an on-site substation with a capacity of up to 132kV. An up to 132kV overhead powerline is also proposed.</i></p> </td> </tr> <tr> <td> <p>GN No. R.983 – Activity 12(ii)(a) & (c):</p> <p><i>The development of -</i></p> <p><i>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or</i></p> <p><i>(ii) <u>infrastructure or structures with a physical footprint of 100 square metres or more;</u></i></p> <p><i>where such development occurs -</i></p> <p><i>(a) within a watercourse;</i></p> <p><i>(b) in front of a development setback; or</i></p> <p><i>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; -</i></p> <p><i>excluding -</i></p> <p><i>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</i></p> <p><i>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</i></p> <p><i>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</i></p> </td> <td> <p><i>The proposed PV facility is located within 32m of a dam/watercourse located to the south of the site. In addition, the proposed access road passes within 32m of a dam/watercourse. The access road will need to be expanded/upgraded to suit the project needs and to allow for heavy motor vehicles to access the construction site.</i></p> </td> </tr> </tbody> </table> 		<p>GN No. R.983 – Activity 11(i):</p> <p><i>The development of facilities or infrastructure for the transmission and distribution of electricity—</i></p> <p><i>(i) <u>outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or</u></i></p> <p><i>(ii) <u>inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;</u></i></p> <p><i>excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —</i></p> <p><i>(a) temporarily required to allow for maintenance of existing infrastructure;</i></p> <p><i>(b) 2 kilometres or shorter in length;</i></p> <p><i>(c) within an existing transmission line servitude; and</i></p> <p><i>(d) will be removed within 18 months of the commencement of development.</i></p>	<p><i>The Project will require up to 132 kV electrical infrastructure. This includes an on-site substation with a capacity of up to 132kV. An up to 132kV overhead powerline is also proposed.</i></p>	<p>GN No. R.983 – Activity 12(ii)(a) & (c):</p> <p><i>The development of -</i></p> <p><i>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or</i></p> <p><i>(ii) <u>infrastructure or structures with a physical footprint of 100 square metres or more;</u></i></p> <p><i>where such development occurs -</i></p> <p><i>(a) within a watercourse;</i></p> <p><i>(b) in front of a development setback; or</i></p> <p><i>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; -</i></p> <p><i>excluding -</i></p> <p><i>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</i></p> <p><i>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</i></p> <p><i>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</i></p>	<p><i>The proposed PV facility is located within 32m of a dam/watercourse located to the south of the site. In addition, the proposed access road passes within 32m of a dam/watercourse. The access road will need to be expanded/upgraded to suit the project needs and to allow for heavy motor vehicles to access the construction site.</i></p>
<p>GN No. R.983 – Activity 11(i):</p> <p><i>The development of facilities or infrastructure for the transmission and distribution of electricity—</i></p> <p><i>(i) <u>outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or</u></i></p> <p><i>(ii) <u>inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;</u></i></p> <p><i>excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —</i></p> <p><i>(a) temporarily required to allow for maintenance of existing infrastructure;</i></p> <p><i>(b) 2 kilometres or shorter in length;</i></p> <p><i>(c) within an existing transmission line servitude; and</i></p> <p><i>(d) will be removed within 18 months of the commencement of development.</i></p>	<p><i>The Project will require up to 132 kV electrical infrastructure. This includes an on-site substation with a capacity of up to 132kV. An up to 132kV overhead powerline is also proposed.</i></p>					
<p>GN No. R.983 – Activity 12(ii)(a) & (c):</p> <p><i>The development of -</i></p> <p><i>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or</i></p> <p><i>(ii) <u>infrastructure or structures with a physical footprint of 100 square metres or more;</u></i></p> <p><i>where such development occurs -</i></p> <p><i>(a) within a watercourse;</i></p> <p><i>(b) in front of a development setback; or</i></p> <p><i>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; -</i></p> <p><i>excluding -</i></p> <p><i>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</i></p> <p><i>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</i></p> <p><i>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</i></p>	<p><i>The proposed PV facility is located within 32m of a dam/watercourse located to the south of the site. In addition, the proposed access road passes within 32m of a dam/watercourse. The access road will need to be expanded/upgraded to suit the project needs and to allow for heavy motor vehicles to access the construction site.</i></p>					

Legislation	Description and Relevance	
	<p>(dd) where such development occurs within an urban area;</p> <p>(ee) where such development occurs within existing roads, road reserves or railway line reserves; or</p> <p>(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.</p>	
	<p>GN No. R.983 – Activity 24(ii):</p> <p>The development of a road -</p> <p>(i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or</p> <p><u>(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road -</u></p> <p>(a) which is identified and included in activity 27 in Listing Notice 2 of 2014;</p> <p>(b) where the entire road falls within an urban area; or</p> <p>(c) which is 1 kilometre or shorter.</p>	<p>New roads will be required for the projects (construction and operational phases).</p> <p>The internal roads will be up to 6 m wide and main access roads will be up to 8 m wide. With the inclusion of side drains and gavel embankments, the width of the road may exceed the threshold of this activity.</p> <p>Also, the bell mouths/turning radii at the road intersections will be wider than 8m.</p>
	<p>GN No. R.983 – Activity 28(ii):</p> <p>Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:</p> <p>(i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or</p> <p><u>(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;</u></p> <p>excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.</p>	<p>Footprint of project on land that was previously used for agricultural purposes, outside of an urban area.</p>
	<p>GN No. R.983 – Activity 48(i)(c):</p> <p>The expansion of—</p> <p>(i) <u>infrastructure or structures where the physical footprint is expanded by 100 square metres or more;</u> or</p> <p>(ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more;</p> <p>where such expansion occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p><u>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;</u></p> <p>excluding—</p> <p>(aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</p> <p>(bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</p> <p>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 23 in Listing Notice 3 of 2014, in which case that activity applies;</p> <p>(dd) where such expansion occurs within an urban area; or</p>	<p>Expansion of the access road within 32m of a dam/watercourse.</p>

Legislation	Description and Relevance	
	<p>(ee) where such expansion occurs within existing roads, road reserves or railway line reserves.</p> <p>GN No. R.983 – Activity 56(ii) The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre— (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.</p>	<p>The existing access road/access point for would need to be widened by more than 6 m to accommodate heavy vehicle turning.</p> <p>The existing road is wider than 8m in some places.</p>
<p>GN No. R. 984 of 4 December 2014 (as amended) (Listing Notice 2)</p>	<ul style="list-style-type: none"> ▪ Purpose - identify activities that would require environmental authorisations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of NEMA. ▪ The investigation, assessment and communication of potential impact of activities must follow a S&EIR process, as prescribed in regulations 21 to 24 of the EIA Regulations. ▪ The following activities under Listing Notice 2 are relevant to this Project: <p>GN No. R.984 – Activity 1: The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs - (a) within an urban area; or (b) on existing infrastructure.</p> <p>GN No. R.984 – Activity 15: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>The proposed Project involves the development of a PV facility with a total generation capacity of up to 65 MW renewable solar energy.</p> <p>Cumulative area to be cleared for entire Project (except linear components) will exceed 20 hectares.</p>
<p>GN No. R. 985 of 4 December 2014 (as amended) (Listing Notice 3)</p>	<ul style="list-style-type: none"> ▪ Purpose - list activities and identify competent authorities under sections 24(2), 24(5) and 24D of NEMA, where environmental authorisation is required prior to commencement of that activity in specific identified geographical areas only. ▪ The investigation, assessment and communication of potential impact of activities must follow a Basic Assessment process, as prescribed in regulations 19 and 20 of the EIA Regulations. However, according to Regulation 15(3) of the EIA Regulations, S&EIR must be applied to an application if the application is for two or more activities as part of the same development for which S&EIR must already be applied in respect of any of the activities. ▪ The following activities under Listing Notice 3 are relevant to this Project: <p>GN No. R.985 – Activity 4 - (h)(iv): The development of a road wider than 4 metres with a reserve less than 13,5 metres.</p> <p><i>h. North West</i> <i>iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority.</i></p> <p>GN No. R.985 – Activity 12 - (h)(iv) & (vi): The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p><i>h. North West</i> <i>iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;</i> <i>vi. Areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland.</i></p>	<p>New internal roads will be wider than 4m and are located within Critical Biodiversity Areas 2 (CBA2) in terms of the North West Biodiversity Plan.</p> <p>More than 300 square meter of indigenous vegetation will be cleared as part of the development. The footprint of the project is within a CBA2 in terms of the North West Biodiversity Plan, as well as within 32m of a dam/watercourse located to the south of the site. In addition, the proposed access road passes within 32m of a watercourse.</p>

Legislation	Description and Relevance	
	<p>GN No. R.985 – Activity 14(ii)(c) – (h)(iv)</p> <p>The development of—</p> <p>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or</p> <p>(ii) <u>infrastructure or structures with a physical footprint of 10 square metres or more;</u> where such development occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) <u>if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</u> excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p>h. North West</p> <p>iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority.</p>	<p>The proposed PV facility is located within a CBA 2 and within 32m of a dam/watercourse located on the property to the south.</p> <p>The proposed access road passes within 32m of a watercourse. The access road will need to be expanded/upgraded to suit the project needs and to allow for heavy motor vehicles to access the construction site.</p>
	<p>GN No. R.985 – Activity 18 - (h)(v) & (ix):</p> <p>The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</p> <p>h. North West</p> <p>v. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority.</p> <p>ix. Areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland.</p>	<p>Existing access roads would need to be widened by more than 4 m to accommodate heavy vehicle turning, within CBA2 in terms of the North West Biodiversity Plan and within 32m of a dam/watercourse.</p>
	<p>GN No. R.985 – Activity 23(ii)(c) – (h)(iv):</p> <p>The expansion of—</p> <p>(i) dams or weirs where the dam or weir is expanded by 10 square metres or more; or</p> <p>(ii) <u>infrastructure or structures where the physical footprint is expanded by 10 square metres or more;</u> where such expansion occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback adopted in the prescribed manner; or</p> <p>(c) <u>if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</u> excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p>h. North West</p> <p>iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority.</p>	<p>The proposed access road passes within 32m of a watercourse, within CBA2 in terms of the North West Biodiversity Plan. The access road may need to be expanded/upgraded (by 10m2 or more) to suit the project needs and to allow for heavy motor vehicles to access the construction site.</p>
National Water Act (Act No. 36 of 1998)	<ul style="list-style-type: none"> ▪ Sustainable and equitable management of water resources. ▪ Key sections (amongst others): <ul style="list-style-type: none"> ○ Chapter 3 – Protection of water resources. ○ Section 19 – Prevention and remedying effects of pollution. ○ Section 20 – Control of emergency incidents. ○ Chapter 4 – Water use. ▪ Authorisation type – General Authorisation / Water Use Licence. ▪ Authority – Department of Water and Sanitation (DWS). 	

Legislation	Description and Relevance
National Environmental Management: Waste Act (Act No. 59 of 2008)	<ul style="list-style-type: none"> ▪ Management of waste. ▪ Key sections (amongst others): <ul style="list-style-type: none"> ○ Section 16 – General duty in respect of waste management. ○ Chapter 5 – licensing of waste management activities listed in GN No. R. 921 of 29 November 2013 (as amended). ▪ Authorisation type – Waste Management Licence (<i>not required for the Project</i>). ▪ Authority – DFFE (national) and DEDECT (provincial).
National Environmental Management Air Quality Act (Act No. 39 of 2004)	<ul style="list-style-type: none"> ▪ Air quality management. ▪ Key sections (amongst others): <ul style="list-style-type: none"> ○ Section 32 – Dust control. ○ Section 34 – Noise control. ▪ Authorisation type – Atmospheric Emission License (<i>not required for the Project</i>). ▪ Authority – DFFE (national), DEDECT (provincial) and municipality.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	<ul style="list-style-type: none"> ▪ Management and conservation of the country's biodiversity. ▪ Protection of species and ecosystems. ▪ Authorisation type – Permit (<i>relevance to the Project to be confirmed</i>). ▪ Authority – DFFE (national) and DEDECT (provincial).
National Forests Act (Act No. 84 of 1998)	<ul style="list-style-type: none"> ▪ Supports sustainable forest management and the restructuring of the forestry sector, as well as protection of indigenous trees in general. ▪ Section 15 – Authorisation required for impacts to protected trees. ▪ Authorisation type – Licence (<i>relevance to the Project to be confirmed</i>). ▪ Authority – DFFE.
National Environmental Management: Protected Areas Act (Act No. 57 of 2003)	<ul style="list-style-type: none"> ▪ Protection and conservation of ecologically viable areas representative of SA's biological diversity and natural landscapes.
Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)	<ul style="list-style-type: none"> ▪ Equitable access to and sustainable development of the nation's mineral and petroleum resources and to provide for matters related thereto. ▪ Key sections (amongst others): <ul style="list-style-type: none"> ○ Section 22 – Application for mining right. ○ Section 27 – Application for, issuing and duration of mining permit. ○ Section 53 – Use of land surface rights contrary to objects of Act. ▪ Authorisation type – Mining Permit / Mining Right (<i>not required for the Project</i>). ▪ Authority – Department of Mineral Resources and Energy (DMRE).
National Heritage Resources Act (Act No. 25 of 1999)	<ul style="list-style-type: none"> ▪ Key sections: <ul style="list-style-type: none"> ○ Section 34 – protection of structure older than 60 years. ○ Section 35 – protection of heritage resources. ○ Section 36 – protection of graves and burial grounds. ○ Section 38 – Heritage Impact Assessment for linear development exceeding 300m in length; development exceeding 5 000m² in extent, etc. ▪ Authorisation type – Permit (<i>relevance to the Project to be confirmed</i>). ▪ Authority – South African Heritage Resources Agency (SAHRA) and North West Heritage Resources Authority (NWHRA).
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	<ul style="list-style-type: none"> ▪ Control measures for erosion. ▪ Control measures for alien and invasive plant species. ▪ Authority – North West Department of Agriculture and Rural Development (DARD).
Occupational Health & Safety Act (Act No. 85 of 1993)	<ul style="list-style-type: none"> ▪ Provisions for Occupational Health & Safety. ▪ Authority – Department of Employment and Labour (DEL). ▪ Relevant regulations, such as Electrical Installation Regulations, Construction Regulations, etc.
Hazardous Substance Act (No 15 of 1973) and Regulations	<ul style="list-style-type: none"> ▪ Provides for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances, and for the control of certain electronic products ▪ Provides for the division of such substances or products into groups in relation to the degree of danger. ▪ Provides for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and products.

The relationship between the Project and certain key pieces of environmental legislation is discussed in the subsections to follow.

5.2.2 National Environmental Management Act

NEMA is the framework legislation regulating the environment in SA. According to Section 2(3) of NEMA, “*development must be socially, environmentally and economically sustainable*”, which means the integration of these three factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

The proposed Project requires authorisation in terms of NEMA and the EIA is being undertaken in accordance the EIA Regulations, which consist of the following:

- EIA procedure - GN No. R 982 (4 December 2014), as amended;
- Listing Notice 1 - GN No. R 983 (4 December 2014), as amended;
- Listing Notice 2 - GN No. R 984 (4 December 2014), as amended; and
- Listing Notice 3 - GN No. R 985 (4 December 2014), as amended.

The Project triggers activities under Listing Notices 1, 2 and 3, and thus needs to be subjected to a Scoping and Environmental Impact Reporting (S&EIR) process. The listed activities are explained within the context of the Project in **Table 4** above and **Table 5** below.

Table 5: Listed Activities Triggered by the Project

Project Components	Relevant Listed Activities	Description of relevance
Solar PV Plant	GN No. R.983 (as amended)	
	Activity 12(ii)(a) & (c)	The proposed PV facility is located within 32m of a dam/watercourse located to the south of the site.
	Activity no. 28(ii)	Footprint of proposed Solar PV Plant on land that was previously used for agricultural purposes, outside of an urban area.
	GN No. R.984 (as amended)	
	Activity no. 1	The planned generation capacity of the proposed Solar PV Plant is 65 MW with BESS.
	Activity no. 15	Although the project footprint covers a combined area of approximately 125 ha, the total area of indigenous vegetation to be cleared will be less due to disturbances on the site related to agricultural practices. Vegetation will be cleared for the hardstanding infrastructure, roads, and PV array structure foundations.
	GN No. R.985 (as amended)	
	Activity 12 - (h)(iv) & (vi)	More than 300 square meter of indigenous vegetation will be cleared as part of the development. The footprint of the project is within a CBA2 in terms of the North West Biodiversity Plan, as well as within 32m of a dam/watercourse located to the south of the site. In addition, the proposed access road passes within 32m of a watercourse.
Activity 14(ii)(c) – (h)(iv)	The proposed PV facility is located within a CBA 2 and within 32m of a dam/watercourse located on the property to the south.	
Power Line & Facility Substation	GN No. R.983 (as amended)	
	Activity no. 11(i)	Proposed on-site substation with a capacity of up to 132kV and a 132kV overhead powerline.
	Activity no. 28(ii)	Footprint of proposed facility substation and powerline on land that was previously used for agricultural purposes, outside of an urban area.
	GN No. R.985 (as amended)	
Activity no. 12 - (h)(iv)	More than 300 square meter of indigenous vegetation will be cleared within the power line corridor. The footprint of the project is within a CBA2 in terms of the North West Biodiversity Plan.	
Roads	GN No. R.983 (as amended)	

Project Components	Relevant Listed Activities	Description of relevance
	<i>Activity 12(ii)(a) & (c)</i>	The proposed access road passes within 32m of a dam/watercourse. The access road will need to be expanded/upgraded to suit the project needs and to allow for heavy motor vehicles to access the construction site.
	<i>Activity 24(ii)</i>	The internal roads will be up to 6 m wide and main access roads will be up to 8 m wide. With the inclusion of side drains and gavel embankments, the width of the road may exceed the threshold of this activity. Also, the bell mouths/turning radii at the road intersections will be wider than 8m.
	<i>Activity 48(i)(c)</i>	Expansion of the access road within 32m of a dam/watercourse.
	<i>Activity 56(ii)</i>	The existing access road/access point for would need to be widened by more than 6 m to accommodate heavy vehicle turning. The existing road is wider than 8m in some places..
GN No. R.985 (as amended)		
	<i>Activity no. 4 - (h)(iv)</i>	New internal roads will be wider than 4m and are located within CBA2 in terms of the North West Biodiversity Plan.
	<i>Activity 12 - (h)(iv) & (vi)</i>	More than 300 square meter of indigenous vegetation will be cleared as part of the upgrading of the access road and for the new internal roads. The footprint of the project is within a CBA2 in terms of the North West Biodiversity Plan, as well as within 32m of a dam/watercourse located to the south of the site. In addition, the proposed access road passes within 32m of a watercourse.
	<i>Activity 14(ii)(c) – (h)(iv)</i>	The proposed access road passes within 32m of a watercourse, within CBA2 in terms of the North West Biodiversity Plan. The access road will need to be expanded/upgraded to suit the project needs and to allow for heavy motor vehicles to access the construction site.
	<i>Activity 18 - (h)(v) & (ix)</i>	Existing access roads would need to be widened by more than 4 m to accommodate heavy vehicle turning, within CBA2 in terms of the North West Biodiversity Plan and within 32m of a dam/watercourse.
	<i>Activity 23(ii)(c) – (h)(iv)</i>	The proposed access road passes within 32m of a watercourse, within CBA2 in terms of the North West Biodiversity Plan. The access road may need to be expanded/upgraded (by 10m ² or more) to suit the project needs and to allow for heavy motor vehicles to access the construction site.

Note that the dimensions of the Project's proposed infrastructure and components should be regarded as approximates due to the dynamic nature of the planning and design process. As a conservative approach, all activities that could possibly be triggered by the Project were included in the Application Form that was submitted to the DFFE with the draft Scoping Report. During the EIR phase the list of activities was refined, based on the findings of the specialist studies and comments received from DFFE on the Scoping Report, Hence, an amended Application Form was compiled and will be submitted to DFFE with the draft EIA Report.

5.2.3 National Environmental Management: Waste Act

Amongst others, the purpose of the National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM:WA) includes the following:

1. To reform the law regulating waste management in the country by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development;
2. To provide for institutional arrangements and planning matters;
3. To provide for specific waste management measures;

4. To provide for the licensing and control of waste management activities;
5. To provide for the remediation of contaminated land; and
6. To provide for compliance and enforcement.

“Waste” is defined in NEM:WA as *“any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act”*.

Schedule 3 of the NEM:WA groups waste into two categories, namely hazardous waste and general waste. The classification of waste determines the associated management and licencing requirements. “Hazardous waste” is defined as *“any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles”*.

GN No. R. 921 of 29 November 2013 (as amended) contains a list of waste management activities that have, or are likely to have, a detrimental impact on the environment. If any of the waste management activities are triggered in Category A and Category B, a Waste Management Licence is required. Activities listed in Category C need to comply with the relevant National Norms and Standards.

No authorisation will be required in terms of NEM:WA, as the Project will not include any listed waste management activities. The following is noted with regards to waste management for the Project:

- Construction phase –
 - Temporary waste storage facilities will remain below the thresholds contained in the listed activities under Schedule 1 of NEM:WA; and
 - The Environmental Management Programme (EMPr) (contained in **Appendix H**) makes suitable provisions for waste management, including the storage, handling and disposal of waste.
- Operational phase –
 - Minimum volumes of waste will be generated during the operational phase;
 - Waste from the on-site office and workshop will be sent to licenced municipal waste disposal sites; and
 - Waste generated during maintenance or replacement of panels and inverters will be sent to suitable disposal sites.

5.2.4 National Water Act

The purpose of the National Water Act (Act No. 36 of 1998) (NWA) is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which take into account amongst other factors:

- Meeting the basic human needs of present and future generations;
- Promoting equitable access to water;
- Redressing the results of past racial and gender discrimination;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Facilitating social and economic development;
- Providing for growing demand for water use; protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources;
- Meeting international obligations;
- Promoting dam safety; and
- Managing floods and droughts.

The Department of Water and Sanitation (DWS) is the custodian of South Africa's water resources.

Some key definitions from this Act include:

- "*Pollution*" – the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it (a) less fit for any beneficial purpose for which it may reasonably be expected to be used; or (b) harmful or potentially harmful;
- "*Waste*" – includes any solid material or material that is suspended, dissolved or transported in water (including sediment) and which is spilled or deposited on land or into a water resource in such volume, composition or manner as to cause, or to be reasonably likely to cause, the water resource to be polluted; and
- "*Water resource*" – includes a watercourse, surface water, estuary, or aquifer.

The regulated area of a watercourse, in terms of Section 21(c) and (i) water uses, is defined as follows in Government Gazette No. 40229 of 26 August 2016:

- The outer edge of the 1 in 100 year flood line and /or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;
- In the absence of a determined 1 in 100 year flood line or riparian area the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to Section 144 of the NWA); or
- A 500 m radius from the delineated boundary (extent) of any wetland or pan.

During the course of the EIA process, the original layout (Layout Alternative 1) was revised to avoid a small artificial dam in the north-western corner of the site. The new layout (Layout Alternative 2)

does not directly encroach into a watercourse, or the regulated areas in terms of riparian habitats or wetlands.

The findings from the Aquatic Compliance Statement are included in **Section 12.4** below.

5.2.5 National Environmental Management: Air Quality Act

The purpose of the National Environmental Management: Air Quality Act (Act No. 39 of 2004) (NEM:AQA) is to reform the law regulating air quality by providing measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. This Act aims to promote justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government, and for specific air quality measures.

Some key definitions from this Act include:

- ❑ “*Air pollution*” – any change in the composition of the air caused by smoke, soot, dust (including fly ash), cinders, solid particles of any kind, gases, fumes, aerosols and odorous substances.
- ❑ “*Atmospheric emission*” or “*emission*” – any emission or entrainment process emanating from a point, non-point or mobile source that results in air pollution.
- ❑ “*Non-point source*” – a source of atmospheric emissions which cannot be identified as having emanated from a single identifiable source or fixed location, and includes veld, forest and open fires, mining activities, agricultural activities and stockpiles.
- ❑ “*Point source*” – single identifiable source and fixed location of atmospheric emission, and includes smoke stacks and residential chimneys.

NEM:AQA provides for the listing of activities which result in atmospheric emissions that pose a threat to health or the environment. No person may without an Atmospheric Emission Licence (AEL) conduct any such listed activity. No AEL is required for the Project. Provision is made in the EMPr to manage impacts to air quality as a result of the Project during the construction phase.

5.2.6 National Environmental Management: Biodiversity Act

The purpose of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM:BA) is to provide for the management and conservation of SA’s biodiversity within the framework of NEMA.

The Act allows for the publication of provincial and national lists of ecosystems that are threatened and in need of protection. The list should include:

- ❑ *Critically Endangered Ecosystems*, which are ecosystems that have undergone severe ecological degradation as a result of human activity and are at extremely high risk of irreversible transformation.

- ❑ *Endangered Ecosystems*, which are ecosystems that, although they are not critically endangered, have nevertheless undergone ecological degradation as a result of human activity.
- ❑ *Vulnerable Ecosystems*, which are ecosystems that have a high risk of undergoing significant ecological degradation.
- ❑ *Protected Ecosystems*, which are ecosystems that are of a high conservation value or contain indigenous species at high risk of extinction in the wild in the near future.

Similarly, the Act allows for the listing of endangered species, including critically endangered species, endangered species, vulnerable species and protected species. A person may not carry out a restricted activity (including trade) involving listed threatened or protected species without a permit.

The Regulations on the management of Listed Alien and Invasive Species were promulgated on 1 August 2014. The Listed Invasive Species were also published on this date and were subsequently amended in GN 864 of 29 July 2016.

Some key definitions from this Act include:

- ❑ “*Alien species*” –
 - A species that is not an indigenous species; or
 - An indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention.
- ❑ “*Biological diversity*” or “*biodiversity*” – the variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems.
- ❑ “*Indigenous species*” – a species that occurs, or has historically occurred, naturally in a free state in nature within the borders of the Republic, but excludes a species that has been introduced in the Republic as a result of human activity.
- ❑ “*Invasive species*” – any species whose establishment and spread outside of its natural distribution range -
 - Threaten ecosystems, habitats or other species or have demonstrable potential; and
 - May result in economic or environmental harm or harm to human health.
- ❑ “*Species*” – a kind of animal, plant or other organism that does not normally interbreed with individuals of another kind, and includes any sub-species, cultivar, variety, geographic race, strain, hybrid or geographically separate population.

The Regulations on the management of Listed Alien and Invasive Species were promulgated on 1 August 2014. The Listed Invasive Species were also published on this date and were subsequently amended in GN 864 of 29 July 2016.

The implications of NEM:BA for the Project *inter alia* include the requirements for managing invasive and alien species, protecting threatened ecosystems and species, as well as for rehabilitating the areas affected by the Project (outside of the development footprint).

The findings from the Aquatic Compliance Statement and Terrestrial Biodiversity Compliance Statement that were prepared for the Project are included in **Section 12.4** and **Section 12.5** below, respectively.

5.2.7 National Heritage Resources Act

The purpose of the National Heritage Resources Act (Act No. 25 of 1999) (NHRA) is to protect and promote good management of SA's heritage resources, and to encourage and enable communities to nurture and conserve their legacy so it is available to future generations.

In terms of Section 38 of the NHRA, certain listed activities require authorisation from provincial agencies, which include the following:

- The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- The construction of a bridge or similar structure exceeding 50 m in length;
- Any development or other activity which will change the character of a site -
 - Exceeding 5 000 m² in extent; or
 - Involving three or more existing erven or subdivisions thereof; and
- The re-zoning of a site exceeding 10 000 m² in extent.

The findings from the Heritage Impact Assessment and Desktop Palaeontological Impact Assessment that were undertaken for the Project are included in **Section 12.8** and **Section 12.9** below, respectively.

5.3 Governance of Energy in SA

SA has expressed and entrenched its commitment to promoting the use of renewable energy and implementing Energy Efficiency through the following (amongst others):

- SA is a signatory to various international treaties and conventions relating to climate change and greenhouse gas (GHG), such as –
 - United Nations Framework Convention on Climate Change;
 - Kyoto Protocol; and
 - Paris Agreement.
- SA has developed the following related policy frameworks –
 - White Paper on Energy Policy (1998);

- White Paper on Renewable Energy (2003);
 - Integrated Energy Plan (2003);
 - IRP 2010;
 - IRP 2019
 - National Climate Change Response White Paper (2011);
 - Post-2015 National Energy Efficiency Strategy;
 - The National Development Plan (2030);
 - Climate Change Bill (2018); and
 - Carbon Tax Bill (2019).
- SA has developed the following related legal frameworks –
- Electricity Regulation Act (Act No. 4 of 2006);
 - National Energy Act (Act No. 34 of 2008); and
 - Income Tax Act (1962) - tax incentive provided for Section 12L.
- The former Department of Environmental Affairs (DEA), which is now known as DFFE, developed EIA Guideline for Renewable Energy Projects (2015).
- SA's related voluntary instruments include –
- South African National Standard (SANS) 941 energy-efficiency of electrical and electronic equipment; and
 - SANS 50001 energy management standard.

5.4 Guidelines

The following guidelines were considered during the preparation of the EIA Report:

- Guideline on Alternatives, EIA Guideline and Information Document Series (DEA&DP, 2010);
- Guideline on Need and Desirability (DEA, 2017);
- Integrated Environmental Management Guideline Series 7: Public Participation in the EIA Process (DEA, 2010);
- EIA Guideline for Renewable Energy Projects (DEA, 2015); and
- Guidelines for Involving Specialists in the EIA Processes Series (Brownlie, 2005).

5.5 National and Regional Plans

The following regional plans, amongst others, were considered during the preparation of the EIA Report:

- KLM's Integrated Development Plan (IDP) and Spatial Development Framework (SDF);
- KLM's Spatial Planning and Land Use Management By-Law;
- North West Biodiversity Plan (2015); and
- Relevant national, provincial and local policies, strategies, plans and programmes.

5.6 Renewable Energy Development Zones

A Strategic Environmental Assessment (SEA) was undertaken by the former DEA, which is now known as DFFE, in order to identify geographical areas most suitable for the rollout of wind and solar PV energy projects and the supporting electricity grid network. These areas are referred to as Renewable Energy Development Zones (REDZs), in which development will be incentivised and streamlined. The proposed Project footprint in relation to the REDZs is shown in **Figure 7** below.

As shown in **Figure 7** below, the Project is not located within any REDZs or Strategic Transmission Corridors. According to GNR 114 of 16 February 2018, where an Application for Environmental Authorisation for large scale wind or solar PV facilities is being made and these facilities fall outside of the REDZs then these applications will be considered in terms of the requirements of the EIA Regulations.

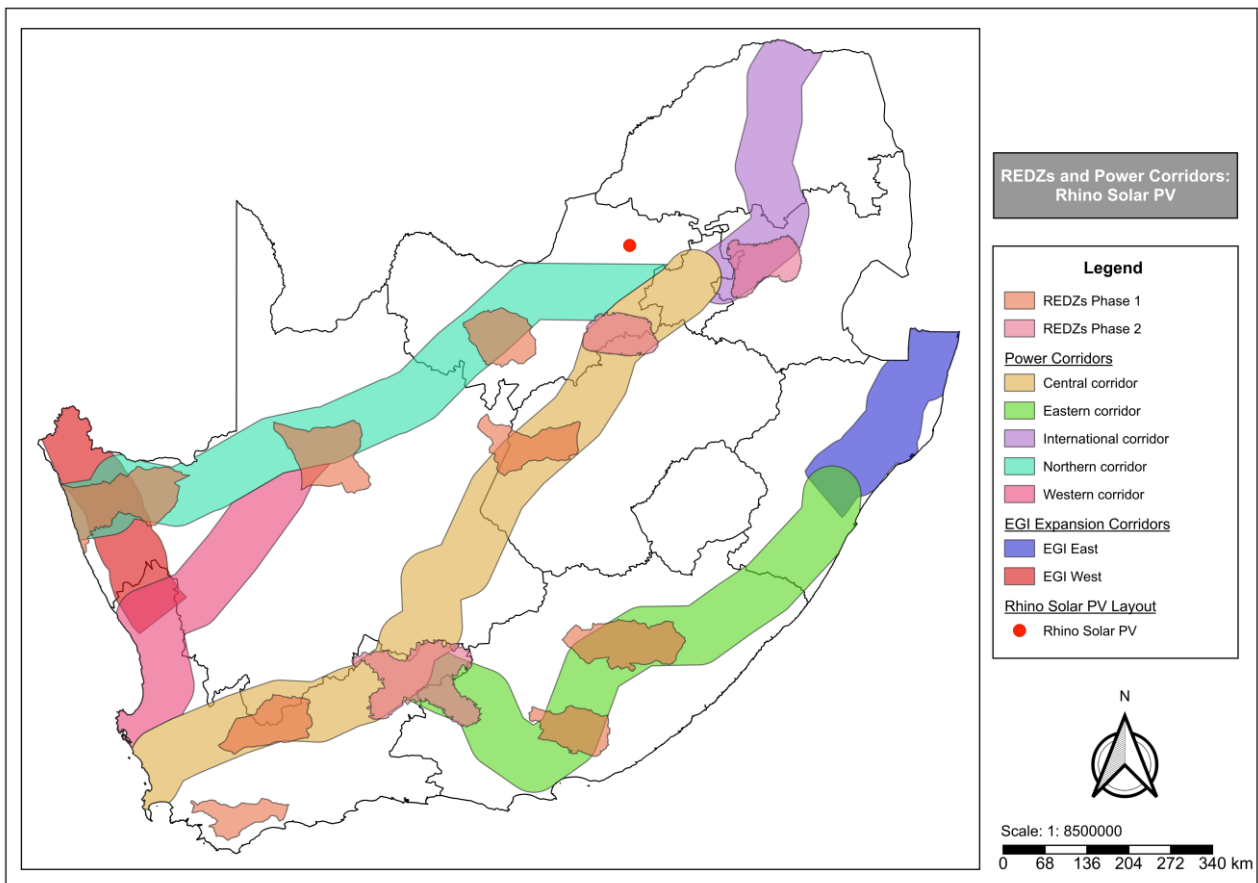


Figure 7: The Project in relation to REDZs

6 SCOPING AND EIA PROCESS

6.1 Environmental Assessment Authorities

In terms of NEMA the competent authority for the environmental assessment is DFFE, as the application is for a renewable energy project (large scale solar PV development) and the Applicant intends to bid for current and future REIPPPP bid windows.

Due to the geographic location of the Project in the North West Province, DEDECT is regarded as one of the key commenting authorities in terms of NEMA during the execution of the EIA, and all documentation will thus be copied to this Department.

Various other authorities with jurisdiction over elements of the receiving environment or project activities will also be consulted during the course of the EIA. Refer to the database of Interested and Affected Parties (I&APs) contained in **Appendix F** for a list of the government departments.

6.2 Environmental Assessment Practitioner

Nemai Consulting was appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the environmental assessment for the proposed Project. In accordance with Appendix 2, Section 2(1)(a) of the EIA Regulations, this section provides an overview of Nemai Consulting and the company's experience with EIA's, as well as the details and experience of the EAP's that form part of the Scoping and EIA team.

Nemai Consulting is an independent, specialist environmental, social development and Occupational Health and Safety (OHS) consultancy. The company is a 100% black female owned company, with a level 1 BBBEE rating. The company is directed by a team of experienced and capable environmental engineers, scientists, ecologists, sociologists, economists and analysts. The company has offices in Randburg (Gauteng) and Durban (KZN).

The core members of Nemai Consulting that are involved with the S&EIR process for the Project are captured in **Table 6** below, and their respective Curricula Vitae are contained in **Appendix D**. The oath of the EAP is contained in **Appendix I**.

Table 6: Scoping and EIA Core Team Members

Name	Qualifications	Selected Experience - Renewable Energy & Bulk Power Projects
D. Henning (22 years' experience)	MSc (River Ecology)	<ul style="list-style-type: none"> ▪ Matjhabeng 400 MW Solar PV Power Plant with 80 MW (320 MWh) Battery Energy Storage Systems, Free State Province, SA. ▪ Beaufort West 75MW Solar PV Project, Western Cape, SA. ▪ Paradise 100MW Solar PV with 40MW Battery Energy Storage Systems Project south of Bloemfontein, Free State Province, SA.

Name	Qualifications	Selected Experience - Renewable Energy & Bulk Power Projects
		<ul style="list-style-type: none"> ▪ Extraction of Gas and Electric Power Production Plant in the Rubavu District, Rwanda. ▪ Impompomo Hydropower Plant, Mpumalanga, SA. ▪ Hydropower Plant within Hydraulic Network at Rand Water's Zoekfontein Site, Gauteng Province, SA. ▪ Neptune-Poseidon Transmission Line, including 200km of 400 kV transmission line, Eastern Cape, SA. ▪ Makalu B (Igesi) Substation and Associated Transmission Loop-In Lines, Free State Province, SA. ▪ Anderson Dinaledi Transmission Line, including 80km of 132 kV transmission line with substations, North-West Province, SA.
D. Naidoo (25 years' experience)	BSc Eng (Chem)	<ul style="list-style-type: none"> ▪ Bronkhorstspruit Biogas Plant, Gauteng Province, SA. ▪ Construction of the Xina Solar One Parabolic Trough Technology 100MW Solar Plant, Northern Cape Province, SA. ▪ Construction of the Biotherm Solar Photovoltaic Power Plants, Northern Cape, SA. ▪ Construction of the Roodeplaat Wind Farm, Eastern Cape, SA. ▪ North-South Strengthening Scheme, including 300km of 400 kV transmission line with substations, Mpumalanga, SA. ▪ Mookodi-Mahikeng 400 kV Transmission Line, North-West Province, SA. ▪ Watershed 275/88/132 kV Substation, North-West Province, SA.
J. Davis (10 years' experience)	BSc Hons Geography and Environmental Sciences	<ul style="list-style-type: none"> ▪ Parys up to 200MW Solar PV and BESS Hybrid Project near the town of Parys, in the Free State Province. ▪ 75MW Beaufort West Photovoltaic Project, Western Cape. ▪ Ferrum-Upington 400kV Powerline, Northern Cape ▪ SERE Solar Photovoltaic Plant Phase 1A and associated infrastructure, Western Cape Province. ▪ Emkhiweni 400kV Powerline Route Deviations, Mpumalanga and Limpopo Provinces. ▪ Proposed Emkhiweni Substation and 400KV Line from Emkhiweni Substation to Silimela, Mpumalanga and Limpopo Provinces.

6.3 Environmental Screening

According to GN 960 of 5 July 2019, an application for Environmental Authorisation must be accompanied by the report generated by the National Web Based Environmental Screening Tool ("Screening Tool"), as contemplated in Regulation 16(1)(b)(v) of the EIA Regulations.

The aims of the Screening Tool include the following:

- To screen a proposed site for any environmental sensitivity;
- To provide site specific EIA process and review information;
- To identify related exclusions and/or specific requirements including specialist studies applicable to the proposed site and/or development, based on the national sector classification and the environmental sensitivity of the site; and
- To allow for a Screening Report to be generated.

The Screening Report for the Project was appended to the Application Form.

6.4 Environmental Assessment Triggers

The process for seeking authorisation under NEMA is being undertaken in accordance with the EIA Regulations, promulgated in terms of Chapter 5 of NEMA. Based on the types of activities involved the requisite environmental assessment for the project is a S&EIR process. Refer to **Section 5.2.1** and **Section 5.2.2** above for the Project’s legal framework and specifically the activities triggered in terms of Listing Notices 1, 2 and 3 of the EIA Regulations.

6.5 S&EIR Process

6.5.1 Formal Process

An outline of the S&EIR process for the proposed Project is provided in **Figure 8** below. The objectives of the EIA process, based on the EIA Regulations, are captured in **Section 1** above.

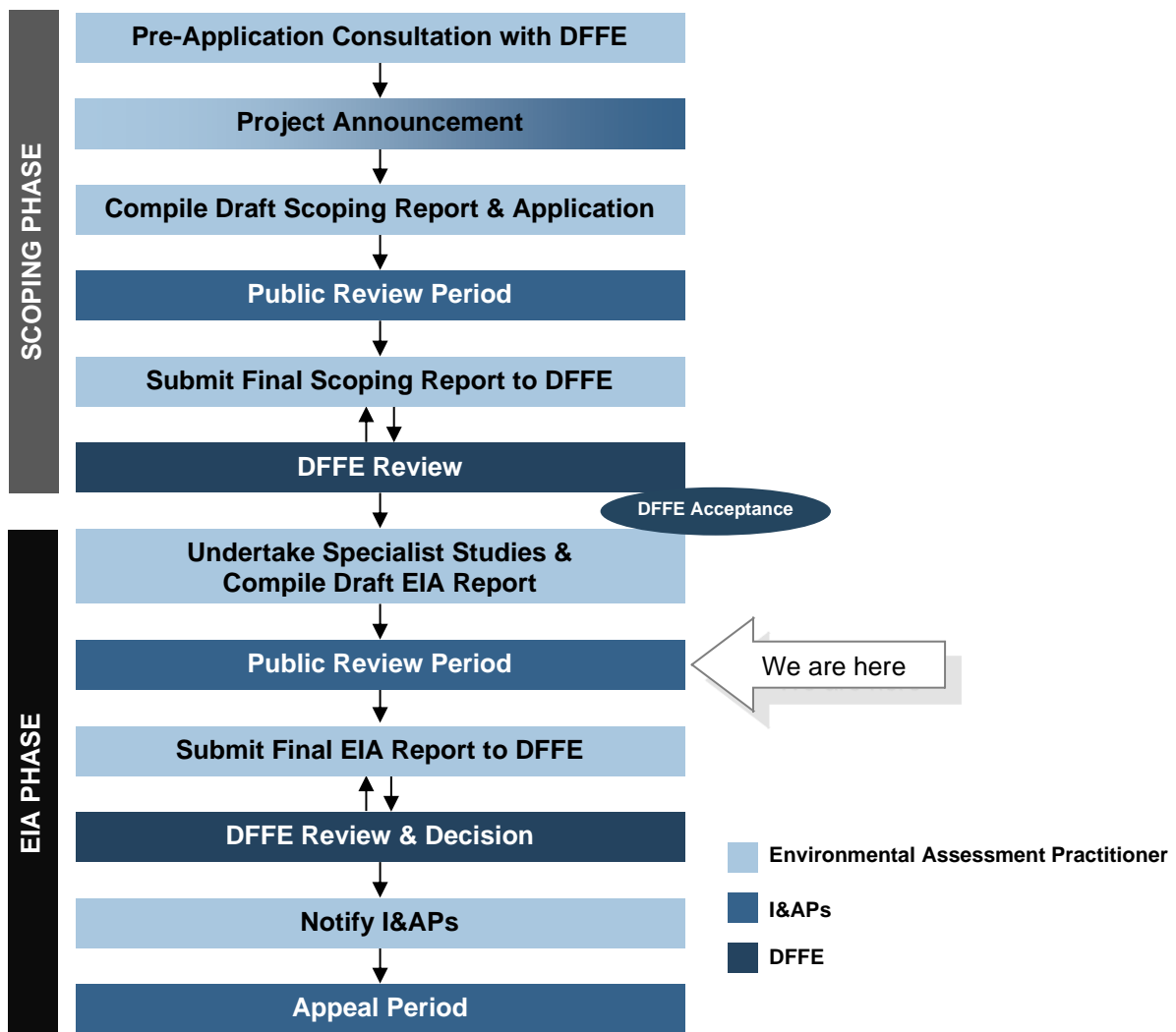


Figure 8: S&EIR process outline

6.5.2 The EIA Process to Date

The following key milestones have been reached to date as part of the EIA process:

1. A Pre-Application Meeting was held with DFFE on 31 January 2023.
2. A draft Scoping Report, which conformed to Appendix 2 of the EIA Regulations, was compiled. This document included the following salient information (amongst others):
 - a. A Scoping-level impact assessment to identify potentially significant environmental issues for detailed assessment during the EIA phase;
 - b. Screening and investigation of feasible alternatives to the project for further appraisal during the EIA phase; and
 - c. A Plan of Study, which explained the approach to be adopted to conduct the EIA for the proposed project.
3. The Application for Environmental Authorisation and draft Scoping Report were submitted to DFFE on 1 March 2023.
4. The draft Scoping Report was lodged for public review from 1 March 2023 until 4 April 2023.
5. The final Scoping Report was submitted to DFFE on 14 April 2023.
6. DFFE accepted the Scoping Report and Plan of Study for the EIA on 24 May 2023 (refer to **Appendix B**), which allowed the commencement of the EIA phase.

6.6 Amended Application Form

An amended Application Form is contained in **Appendix C**, which includes a refinement of the listed activities triggered by the Project and additional properties affected by the revised layout.

6.7 Alignment with the Plan of Study

The Plan of Study, which was contained in the Scoping Report and was accepted by DFFE, explained the approach to be adopted to conduct the Environmental Impact Reporting phase for the proposed Project. The manner in which the EIA Report addresses the requirements of the Plan of Study is shown in **Table 7** below.

Table 7: Alignment of EIA Report with Plan of Study

No.	Plan of Study Requirement	Reference to Section in EIA Report
1.	Assess potentially significant environmental issues identified during Scoping through: <ol style="list-style-type: none"> 1. Applying an appropriate impact assessment methodology. 2. Conducting specialist studies. 3. Identifying suitable mitigation measures. 	<ul style="list-style-type: none"> • Section 12 • Section 13
2.	Assessment of feasible alternatives.	<ul style="list-style-type: none"> • Section 14
3.	Specialist studies to be completed in accordance with Terms of Reference.	<ul style="list-style-type: none"> • Section 12 • Appendix E
4.	Public participation to include the following: <ul style="list-style-type: none"> • Update the database of I&APs. 	Section 15

No.	Plan of Study Requirement	Reference to Section in EIA Report
	<ul style="list-style-type: none"> Allow for the review of the draft EIA Report. Compile and maintain a Comments and Responses Report (CRR). Notification of DFFE's decision. 	
5.	EIA Report to satisfy the minimum requirements stipulated in Appendix 3 of the EIA Regulations.	Section 2
6.	Authority Consultation.	Section 15

6.8 Addressing DFFE's Requirements

The manner in which DFFE's specific requirements, as listed in the letter received from this Department for the acceptance of the Scoping Report (refer to **Appendix B**), have been attended to are described in **Table 8** below.

Table 8: DFFE's Specific Requirements - Acceptance of the Scoping Report

DFFE's Requirements	Response/Status
(i) Listed Activities	
(a) It is noted that certain listed activities applied for will be confirmed during the EIA Phase. Please ensure that only listed activities that are triggered by the proposed development are applied for, in the amended application form and draft EIAR for the proposed development.	The listed activities contained in Table 4 and Table 5 above are the same as those contained in the amended Application Form (Appendix C).
(b) Please ensure that all relevant listed activities are applied for, are specific and can be linked to the development activity or infrastructure as described in the project description. In addition, the onus is thus on the applicant and the environmental assessment practitioner (EAP) to ensure that all the applicable listed activities are included in the application. Failure to do so may result in unnecessary delays in the processing of the application.	<p>The listed activities contained in Table 4 and Table 5 above are the same as those contained in the amended Application Form (Appendix C).</p> <p>The listed activities triggered are explained in the context of the Project in Table 4 and Table 5 above. The findings of the specialist studies were considered in confirming the listed activities triggered.</p>
(c) Listed activities triggered by proposed project under Listing Notice 3 are in complete in the SR. Please ensure that the EIAR include all listed activities triggered and are written in full including the description of sub-listed activities.	Refer to Table 4 and Table 5 above for the sub-listed activity for each listed activity triggered by the Project.
(d) The EIAR must provide an assessment of the impacts and mitigation measures for each of the listed activities applied for.	Refer to Section 13 below for the assessment of the listed activities and the identified mitigation measures.
(e) It is imperative that the relevant authorities are continuously involved throughout the Scoping and EIA process as the development property possibly falls within geographically designated areas in terms of numerous GN R. 985 Activities. Written comments must be obtained from the relevant authorities and submitted to this Department. In addition, a graphical representation of the proposed development within the respective geographical areas must be provided.	The relevant authorities linked to sensitive geographical areas in terms of Listing Notice 3 were notified and consulted. They will also be afforded the opportunity to review the draft EIA Report and to provide comments. Any comments received from these authorities will be incorporated into the final EIA Report. The maps contained in Section 11 and Section 12 show the Project footprint in relation to sensitive geographical areas.
(ii) Public Participation	
(a) Please ensure that comments from all relevant stakeholders are submitted to the Department with the EIAR. This includes but is not limited to the Eskom, Local and District Municipality, North West Department of Economic Development, Environment, Conservation and Tourism (DEDECT), Department of Agriculture, the South African Heritage Resources Agency	Copies of the draft EIA Report will be provided to the key regulatory and commentary authorities listed in Section 15 below. Comments received on the draft EIA Report will be appended to the final EIA Report, which will be submitted to DFFE. These comments will also be incorporated into the CRR.

DFFE's Requirements	Response/Status
(SAHRA), The South African Civil Aviation Authority (SACAA), The Department of Transport, The Department of Water and Sanitation (DWS), DALRRD, The South African National Roads Agency Limited (SANRAL), The Endangered Wildlife Trust (EWT), The Endangered Wildlife Trust (EWT), Square Kilometre Array (SKA), The South African Astronomy Observation (SAAO) and the Department of Environment, Forestry and Fisheries: Directorate Biodiversity and Conservation.	
(b) Please ensure that all issues raised, and comments received during the circulation of the draft SR and draft EIAr from registered I&APs and organs of state which have jurisdiction in respect of the proposed activity are adequately addressed in the final EIAr. Proof of correspondence with the various stakeholders must be included in the final EIAr. Should you be unable to obtain comments, proof should be submitted to the Department of the attempts that were made to obtain comments.	The CRR contained in Appendix G includes comments received during the Scoping phase. The CRR will be updated with comments received during the review of the draft EIA Report.
(c) A Comments and Response trail report (C&R) must be submitted with the final EIAr. The C&R report must incorporate all comments for this development. The C&R report must be a separate document from the main report and the format must be in the table format as indicated in Appendix 1 of this comments letter. Please refrain from summarising comments made by I&APs. All comments from I&APs must be copied verbatim and responded to clearly. Please note that a response such as "noted" is not regarded as an adequate response to I&AP's comments.	The CRR is contained in Appendix G .
(d) Comments from I&APs must not be split and arranged into categories. Comments from each submission must be responded to individually.	The CRR, which is contained in Appendix G , does not categorise the comments received.
(e) The Public Participation Process must be conducted in terms of Regulation 39, 40, 41, 42, 43 & 44 of the EIA Regulations, 2014, as amended.	The approach to Public Participation during the EIA phase is explained in Section 15 below.
(f) The EAP is requested to contact the Department to make the necessary arrangements to conduct a site inspection prior to the submission of the final EIAr.	The EAP will liaise with the DFFE Case Officer once the draft EIAr is submitted to the Department.
(iii) Cumulative Assessment	
(a) Should there be any other similar projects within a 30km radius of the proposed development site, the cumulative impact assessment for all identified and assessed impacts must be refined to indicate the following: <ul style="list-style-type: none"> • Identified cumulative impacts must be clearly defined, and where possible the size of the identified impact must be quantified and indicated, i.e., hectares of cumulatively transformed land. • Detailed process flow and proof must be provided, to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project. • The cumulative impacts significance rating must also inform the need and desirability of the proposed development. • A cumulative impact environmental statement on whether the proposed development must proceed. 	Potential cumulative impacts associated with the Project and these other renewable energy applications are discussed in Section 13.28 .
(iv) Specialist assessments	
(a) The EAP must ensure that the terms of reference for all the identified specialist studies must include the following: <ul style="list-style-type: none"> ▪ A detailed description of the study's methodology; indication of the locations and descriptions of the development footprint, and all other associated infrastructures that they have assessed and are recommending for authorisations. 	Provision was made in the terms of reference for the specialist studies to cater for these requirements. Potential cumulative impacts associated with the Project are discussed in Section 13.28 below.

DFFE's Requirements	Response/Status
<ul style="list-style-type: none"> ▪ Provide a detailed description of all limitations to the studies. All specialist studies must be conducted in the right season and providing that as a limitation will not be allowed. ▪ Please note that the Department considers a 'no-go' area, as an area where no development of any infrastructure is allowed; therefore, no development of associated infrastructure including access roads is allowed in the 'no-go' areas. ▪ Should the specialist definition of 'no-go' area differ from the Departments definition; this must be clearly indicated. The specialist must also indicate the 'no-go' area's buffer if applicable. ▪ All specialist studies must be final, and provide detailed/practical mitigation measures for the preferred alternative and recommendations, and must not recommend further studies to be completed post EA. ▪ Should a specialist recommend specific mitigation measures, these must be clearly indicated. ▪ Regarding cumulative impacts: <ul style="list-style-type: none"> o Clearly defined cumulative impacts and where possible the size of the identified impact must be quantified and indicated, i.e., hectares of cumulatively transformed land. o A detailed process flow to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project. o Identified cumulative impacts associated with the proposed development must be rated with the significance rating methodology used in the process. o The significance rating must also inform the need and desirability of the proposed development. o A cumulative impact environmental statement on whether the proposed development must proceed. 	
<p>(b) Should the appointed specialists specify contradicting recommendations, the EAP must clearly indicate the most reasonable recommendation and substantiate this with defensible reasons; and where necessary, include further expertise advice.</p>	<p>The specialists did not provide contradicting recommendations.</p>
<p>(c) It is further brought to your attention that Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation, which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. "the Protocols"), and in Government Notice No. 1150 of 30 October 2020 (i.e. protocols for terrestrial plant and animal species), have come into effect. Should this study be required, the specialist assessments must be conducted in accordance with these protocols.</p> <p>(d) The screening tool output:</p> <ul style="list-style-type: none"> ▪ The screening tool and the gazetted protocols (GN R320 of 20 March 2020 and GN R 1150 of 30 October 2020) require a site sensitivity verification to be completed to either confirm or dispute the findings and sensitivity ratings of the screening tool. ▪ It is the responsibility of the EAP to confirm the list of specialist assessments and to motivate in the assessment report, the reason for not including any of the identified specialist studies including the provision of photographic evidence of the site situation. The site sensitivity verification 	<p>The relevant specialist studies complied with the requirements of these Protocols.</p> <p>Site sensitivity verifications were undertaken by the Specialists and are included in their respective reports as a separate chapter, as has been accepted by DFFE in other applications. Section 12.2 below provide the reasons for excluding certain specialist studies that were identified during Environmental Screening.</p>

DFFE's Requirements	Response/Status
for each of the recommended studies, as per the protocols, must be compiled and attached.	
(e) Additionally, the protocols specify that an assessment must be prepared by a specialist who is an expert in the field and is SACNASP registered for e.g.an aquatic assessment must be prepared by a specialist registered with SACNASP, with expertise in the field of aquatics sciences.	Section 12 below provides the SACNASP registration details of the relevant specialists.
(f) Please be reminded that section 2(3) of NEMA requires developments to be socially, environmentally and economically sustainable, while section 2(4)(i) of NEMA requires the social, economic and environmental impacts of activities, including disadvantages and benefits, to be considered, assessed and evaluated.	Refer to the specialist summary under Section 12 and the impact assessments under Section 13 .
(g) Specialist findings and recommendations must be separated per project.	Refer to the specialist summary under Section 12 .
(h) The following Specialist Assessments will form part of the EIAR: <ul style="list-style-type: none"> ▪ Terrestrial Ecological Impact Assessment; ▪ Aquatic Impact Assessment and Delineation; ▪ Avifaunal Impact Assessment; ▪ Heritage Impact Assessment; ▪ Agricultural Impact Assessment; ▪ Social Impact Assessment; ▪ Visual Impact Assessment; and ▪ Desktop Palaeontological Impact Assessment. 	A Transport Impact Assessment was also undertaken. Specialist studies are summarized under Section 12 and the reports can be found under Appendix E .
(v) General	
(a) Recommendations of conditions to be included in the EA, must be done per project.	Refer to Section 16.3 below.
(b) Details of the future plans for the site and infrastructure after decommissioning in 20-30 years and the possibility of upgrading the proposed infrastructure to more advanced technologies must be indicated.	The Applicant provided the following response: <i>Ideally, the power purchase agreement (PPA) with Eskom and Implementation and Direct Agreement with the Department of Energy will be renegotiated at the end of the project lifespan (20 – 25years) in which case the facility won't be decommissioned. In the unlikely event that this isn't possible, various components of the proposed SEF which are decommissioned will be reused, recycled or disposed of in accordance with the relevant regulatory requirements. Some components may also be traded or sold as there is an active second-hand market for scrap metal. The decommissioning phase of the project is also expected to create skilled and unskilled employment opportunities.</i>
(c) The EAP must provide landowner consent for all farm portions affected by the proposed project, whether the project component is linear or not, i.e. all farm portions where the access road, solar panels and associated infrastructure is to be located.	Regulation 39(1) of the EIA Regulations requires the proponent, if not the owner or person in control of the land on which the activity is to be undertaken, to obtain written consent of the landowner or person in control of the land in order to undertake such activity on that land. In line with Regulation 39(2)(a), the need to obtain landowner consent does not apply to linear activities. Therefore, the Project proponent has obtained written consent from the landowner for the activities related to the Solar PV facility. Landowner consent for the access road and powerline route are not included with this application, as per the EIA Regulations.
(d) Please also ensure that the EIAR includes the period for which the Environmental Authorisation is required and the date on which the activity will be concluded as per Appendix 3 of the NEMA EIA Regulations, 2014, as amended	Refer to Section 16.3 below.

6.9 Other Applications in Project Area

DFFE created the SA Renewable Energy EIA Application (REEA) Database, which contains spatial data for renewable energy applications for Environmental Authorisation. It includes spatial and attribute information for both active (in process and with valid authorisations) and non-active (lapsed or replaced by amendments) applications.

A map is contained in **Figure 55** below, which shows that there are no other renewable energy applications within a 30 km radius of the PV Site.

7 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations accompany the EIA process:

- ❑ As the design of the project components is still in feasibility stage, and due to the dynamic nature of the planning environment, the dimensions and layout of the infrastructure may change during the detailed design phase.
- ❑ Regardless of the analytical and predictive method employed to determine the potential impacts associated with the Project, the impacts are only predicted on a probability basis. The accuracy of the predictions is largely dependent on the availability of environmental data and the degree of understanding of the environmental features and their related attributes.
- ❑ The following assumptions, gaps and limitation were noted as part of the Specialist Studies:
 - Aquatic Compliance Statement (van Rooyen, 2023) –
 - This report is based on the information and layout received from the proponent;
 - The findings, observations, conclusions and recommendations are based on the author's best professional and scientific knowledge; and
 - The assessment of wetlands presented in this report is limited to the proposed project footprint and does not include the extended 500 m radius regulated area of surrounding wetlands in terms of the NWA.
 - Terrestrial Biodiversity Compliance Statement (Human, 2023) –
 - It is assumed that all information received from the client is accurate;
 - All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;
 - The handheld GPS utilised for the fieldwork had a maximum accuracy of 5 m. As such, any features spatially logged and mapped as part of this report may be offset by approximately 5 m; and
 - Only a single season survey was conducted for the respective studies, this would constitute a wet season survey, however the data received is considered sufficient to derive a meaningful baseline.
 - Avifauna Impact Assessment (de Wet, 2023) –
 - The Project Area of Influence (PAOI) was based on the project footprint as provided by the client, as well as a 500 m corridor around the powerlines. Any alterations to the area and/or missing Geographic Information Systems (GIS) information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment;
 - Two site visits were conducted for the purpose of this regime 2 assessment. The first was conducted in summer, over 4 days from the 5th to the 8th of January 2023, and the second, also in summer, over 4 days from the 13th to the 16th of March 2023. These two site visits are considered sufficient from a seasonal perspective and no additional season assessment is required;

- Whilst every effort was made to cover as much of the PAOI as possible it is possible that some species that are present within the PAOI were not recorded during the field investigations due to their secretive behaviour; and
- The GPS used in the assessment has an accuracy of 5 m and consequently any spatial features delineated may be offset by up to 5 m.
- Heritage Impact Assessment (Kitto, 2023) –
 - This assessment assumes that all the information provided regarding the project footprint (Including the powerline) is correct and current.
 - The Project Area traverses various properties separated by fences, and access was sometimes restricted by locked gates.
 - The large area of the project footprint meant that it was not feasible to undertake a pedestrian survey of the whole area and the fieldwork therefore, comprised a combination of vehicle and pedestrian investigation. The extremely dense and long vegetation in several areas meant that archaeological and heritage visibility was low in those areas. Therefore, there is a possibility that some heritage resources were not identified, specifically, informal graves or burial sites and archaeological material that often occurs sub-surface.
- Palaeontological Desktop Assessment (Butler, 2023) –
 - The focal point of geological maps is the geology of the area and the sheet explanations of the Geological Maps were not meant to focus on palaeontological heritage. Many inaccessible regions of SA have never been reviewed by palaeontologists and data is generally based on aerial photographs alone. Locality and geological information of museums and universities databases have not been kept up to date or data collected in the past have not always been accurately documented.
 - Comparable Assemblage Zones in other areas is also used to provide information on the existence of fossils in an area which has not documented in the past. When using similar Assemblage Zones and geological formations for Desktop studies it is generally assumed that exposed fossil heritage is present within the footprint. A field-assessment will thus improve the accuracy of the desktop assessment.
- Visual Impact Assessment (Buys, 2023) –
 - Determining the value, quality and significance of a visual resource or the significance of the visual impact that any activity may have on it, in absolute terms, is not achievable. Visual perception is by nature a subjective experience, as it is influenced largely by personal opinions and world views. For instance, what one viewer may experience as an intrusion in the landscape, another may regard as positive. Such differences in perception are greatly influenced by culture, education, and socio-economic background. A degree of subjectivity is therefore bound to influence the rating of visual impacts. It is therefore impossible to conduct a visual assessment without relying to some extent on the opinion of an experienced consultant, which is inherently subjective. The subjective opinion of the visual consultant is however unlikely to materially influence the findings and recommendations of this study, as a wide body of scientific knowledge exists in the industry of Visual Impact Assessment, on which findings are based.

- A once-off field survey was sufficient to characterise the baseline visual characteristics of the site.
- The primary objective of this study was to assess the visual environment.
- The fieldwork relevant to this study was a once-off assessment that was conducted.
- A preliminary layout was available. Detailed dimensions, such as the vertical offset of proposed surface infrastructure above ground level, were however not available and were assigned based on experience from similar infrastructure in previous projects.
- All viewsheds were based on terrain level. As such these viewsheds do not incorporate distractive views in the form of vegetation or land use (infrastructure, buildings, etc.).
- This study did not include an illumination or social assessment.
- The assessment of impacts and recommendation of mitigation measures was informed by the site-specific aspects identified and based on the assessor's working knowledge and experience with similar activities.
- Social Impact Assessment (Tanhuke & Chidley, 2023) -
 - The information obtained during the public participation phase provides a comprehensive account for the community structure and community concerns for the Project.
 - The study was done with the information and the time frames available to the specialist at the time of executing the study. The specialist took an evidence-based approach in the compilation of this report and did not intentionally exclude information which is relevant to the assessment; and
 - No relocation of families will take place for this project.
- Agricultural Compliance Statement (Gouws, 2023) –
 - The observations are accepted as representative of the soil conditions. The author feels confident that this is the case.
 - There were sufficient observations made that no gaps in knowledge or data is expected.
- Transport Impact Assessment (iWink Consulting, 2023) -
 - This study is based on the project information provided by the client.
 - According to the Eskom Specifications for Power Transformers (Eskom Power Series, Volume 5: Theory, Design, Maintenance and Life Management of Power Transformers), the following dimensional limitations need to be kept when transporting the transformer – total maximum height 5 000 mm, total maximum width 4 300 mm and total maximum length 10 500 mm. It is envisaged that for this project the inverter, transformer, and switchgear will be transported to site in containers on a low bed truck and trailer. The transport of a mobile crane and the transformer are the only abnormal loads envisaged. The crane will be utilised for offloading equipment, such as the transformer.
 - Maximum vertical height clearances along the haulage route are 5.2 m for abnormal loads.
 - If any elements are manufactured within SA, these will be transported from their respective manufacturing centres, which would be either in the greater Cape Town area, Johannesburg, or possibly in Pinetown/Durban.

- All haulage trips will occur on either surfaced national and provincial roads or existing gravel roads.
- Material for the construction of internal access roads will be sourced locally as far as possible.
- The final access points are to be determined during the detailed design stage. Only recommended access points at conceptual level can be given at this stage.
- Planned or approved projects in the vicinity of the site to be considered as part of the cumulative impacts.
- An 18 to 24-months construction period is assumed with some of the construction period dedicated to site prep and civil works.

8 NEED AND DESIRABILITY

This section serves to expand on the motivation for the proposed Project that is provided in **Section 3** above. The format contained in the Guideline on Need and Desirability (DEA, 2017) was used in **Table 9** below.

Table 9: Need for and desirability of the proposed Project

Question No.	Response
<p>1. How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?</p> <p>1.1. How were the following ecological integrity considerations taken into account?:</p> <p>1.1.1. Threatened Ecosystems.</p> <p>1.1.2. Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.</p> <p>1.1.3. Critical Biodiversity Areas (“CBAs”) and Ecological Support Areas (“ESAs”).</p> <p>1.1.4. Conservation targets.</p> <p>1.1.5. Ecological drivers of the ecosystem.</p> <p>1.1.6. Environmental Management Framework.</p> <p>1.1.7. Spatial Development Framework.</p> <p>1.1.8. Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).</p>	<p>The following specialist studies will be undertaken to assess the impacts of the Project on the ecological integrity of the area:</p> <ul style="list-style-type: none"> ▪ Aquatic Assessment; ▪ Terrestrial Ecological Assessment; and ▪ Avifaunal Assessment. <p>The findings of the above studies are presented in the EIA Report.</p> <p>The Project will provide clean energy which is in line with several global and international responsibilities.</p> <p>Management objectives are included in the EIA Report and EMPr to safeguard the sensitive ecological features.</p> <p>An Agricultural Impact Assessment has been undertaken and the findings are presented in the EIA Report.</p> <p>The Applicant intends to bid for the current and future REIPPPP bid windows and/or other renewable energy markets within SA. The REIPPPP is a competitive tender process that was designed to facilitate private sector investment into grid-connected renewable energy generation in SA.</p>
<p>1.2. How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</p>	<p>Potential disturbances to ecosystems may include the following:</p> <ul style="list-style-type: none"> ▪ Clearance of large areas of indigenous vegetation associated with the construction footprint of the PV facility and associated infrastructure; ▪ Potential loss of sensitive environmental features; ▪ Pollution of water resources; ▪ Soil destabilisation and subsequent erosion; and ▪ Proliferation of alien and invasive species. <p>The following specialist studies were undertaken to assess the impacts of the Project on the ecological integrity of the area:</p> <ul style="list-style-type: none"> ▪ Aquatic Assessment; ▪ Terrestrial Ecological Assessment; and ▪ Avifaunal Assessment. <p>The findings of the above studies are presented in the EIA Report.</p> <p>Mitigation measures are included in the EIA Report and EMPr to minimise disturbances to ecosystems, according to the mitigation hierarchy.</p>
<p>1.3. How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where</p>	<p>The Project may cause surface water, groundwater, soil, air, noise and light pollution during the construction and operational phases.</p>

Question No.	Response
<i>impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</i>	<p>Environmental sensitivities were established through ground-truthing by specialists, these were overlaid on the scoping phase layout.</p> <p>The above impacts were assessed during the EIA Phase and mitigation measures are included in the EIA Report and EMPr to manage these impacts.</p>
<p>1.4. <i>What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?</i></p>	<p>The waste to be generated by the Project includes the following:</p> <ul style="list-style-type: none"> ▪ Construction – <ul style="list-style-type: none"> ○ Waste generated from site preparations (e.g. plant material), domestic waste, surplus and used building material, and hazardous waste (e.g. chemicals, oils, soil contaminated by spillages, diesel rags). Solid waste generated during the construction phase will be temporarily stored at suitable locations (e.g. at the construction camp) and will be removed at regular intervals and disposed of at approved waste disposal sites. All the waste disposed of will be recorded. ○ Wastewater will include sewage, and water used for washing purposes. ▪ Operation – <ul style="list-style-type: none"> ○ Refuse (domestic waste) generated during the operational phase will be removed on a weekly basis and will be disposed of at a permitted waste disposal facility. <p>Mitigation measures to manage all waste and wastewater generated during the construction and operational phases are included in the EMPr.</p>
<p>1.5. <i>How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</i></p>	<p>Potential disturbances to cultural heritage may include the following:</p> <ul style="list-style-type: none"> ▪ Possible direct impacts to graves, heritage resources and on below-ground archaeological deposits and fossils as a result of ground disturbance. ▪ Possible impacts to the cultural landscape as a result of the introduction of incompatible structures and infrastructure to the rural landscape <p>A Heritage Impact Assessment was undertaken and the findings are presented in the EIA Report.</p>
<p>1.6. <i>How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</i></p>	<p>During the construction phase electricity will be obtained from diesel generators and / or temporary supply via cables from the site power grid. No alternative energy sources were considered for the generation of electricity. The generation of electricity will be derived from a renewable energy source, namely, the sun.</p> <p>During the operational phase electricity will be sourced from this renewable energy-generation facility itself and/or from the existing electrical infrastructure on the property.</p>
<p>1.7. <i>How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure</i></p>	<p>The Solar PV Power Plant with BESS proposes to generate electricity from a renewable energy resource, namely the sun. In addition, some of this electricity will be stored in the BESS and will be discharged during evening peak hours when there is no sun. The total generation capacity of the Project will be 65MW renewable solar energy. The use of the resource will not jeopardise the integrity of the resource.</p> <p>Impacts to the receiving environment were assessed during the EIA Phase and are presented in the EIA Report.</p>

Question No.	Response
<p><i>responsible and equitable use of the resources? What measures were explored to enhance positive impacts?</i></p> <p>1.7.1. <i>Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life).</i></p> <p>1.7.2. <i>Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)</i></p> <p>1.7.3. <i>Do the proposed location, type and scale of development promote a reduced dependency on resources?</i></p>	<p>The proposed development is a renewable energy project and will be generating cleaner energy to assist SA in moving away from more 'dirty' forms of energy generation and to diversify the energy mix.</p>
<p>1.8. <i>How were a risk-averse and cautious approach applied in terms of ecological impacts?</i></p> <p>1.8.1. <i>What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?</i></p> <p>1.8.2. <i>What is the level of risk associated with the limits of current knowledge?</i></p> <p>1.8.3. <i>Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</i></p>	<p>The following specialist studies were undertaken to assess the impacts of the Project on the ecological integrity of the area:</p> <ul style="list-style-type: none"> ▪ Aquatic Assessment; ▪ Terrestrial Ecological Assessment; and ▪ Avifaunal Assessment. <p>The findings of the above studies are presented in the EIA Report.</p>
<p>1.9. <i>How will the ecological impacts resulting from this development impact on people's environmental right in terms following:</i></p> <p>1.9.1. <i>Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</i></p> <p>1.9.2. <i>Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?</i></p>	<p>Potential impacts to the social environment include the following:</p> <ul style="list-style-type: none"> ▪ Construction phase – <ul style="list-style-type: none"> ○ Influx of people seeking employment and associated impacts (e.g. foreign workforce, cultural conflicts, squatting, demographic changes); ○ Safety and security; ○ Use of local road network; ○ Nuisance from dust and noise; ○ Consideration of local labourers and suppliers in area – stimulation of local economy (positive impact); and ○ Transfer of skills (positive impact). ▪ Operational phase – <ul style="list-style-type: none"> ○ Direct and indirect economic opportunities as a result of the Project; and ○ Threats to human and animal health from electromagnetic field. <p>A Social Impact Assessment was undertaken, and the findings are presented in the EIA Report. Mitigation measures to manage impacts to the social environment are included in the EMP.</p>
<p>1.10. <i>Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how</i></p>	<p>The areas affected by the proposed Project footprint are rural in nature. The Project is located approximately 30km to the north-west of Rustenburg's CBD. There is evidence that the</p>

Question No.	Response
<i>the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?</i>	PV Site was previously used for agricultural purposes, which was assessed as part of the Agricultural Impact Assessment. The study found that since the project area was used for grazing,
1.11. <i>Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?</i>	Refer to the response to question no. 1 above.
1.12. <i>Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?</i>	There were no site alternatives considered. The layout was assessed by the respective specialists during the EIA Phase. Options under consideration are presented in Section 10 below. The BPEO was identified in Section 14 below, taking into consideration of the specialists' findings.
1.13. <i>Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?</i>	Other renewable energy applications that have been made within a 30km radius of the PV Site, according to DFFE's REEA Database, and the associated cumulative impacts, are discussed in Section 13.28 below.
2.1. <i>What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?:</i> 2.1.1. <i>The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,</i> 2.1.2. <i>Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),</i> 2.1.3. <i>Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and</i> 2.1.4. <i>Municipal Economic Development Strategy ("LED Strategy").</i>	The socio-economic environment is discussed in Section 11.8 below. The following is noted from a planning perspective: <ul style="list-style-type: none"> ▪ The Project will contribute towards both National and Provincial targets for renewable energy and Eskom's target for Independent Power Producer (IPPs), as well as assist in meeting the increasing electricity demands in SA and specifically in the grid network. ▪ The Project falls within an area used for grazing. An Agricultural Impact Assessment was undertaken during the EIA Phase and the findings are presented in Section 12.7 and 13.15. ▪ The PV Site and power line are located outside of the urban edge and should not impact on future urban expansion. ▪ According to the findings from the National Web Based Environmental Screening Tool, the PV Site has low sensitivity in terms of the relative civil aviation theme.
2.2. <i>Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?</i> 2.2.1. <i>Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?</i>	Refer to the response to question no. 1.9 above.
2.3. <i>How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?</i>	
2.4. <i>Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?</i>	
2.5. <i>In terms of location, describe how the placement of the proposed development will:</i> 2.5.1. <i>result in the creation of residential and employment opportunities in close proximity to or integrated with each other,</i>	2.5.1. The Project will result in increased economic activity, as well as increased opportunities for employment and for SMMEs. 2.5.2. Not deemed to be relevant, due to the nature of the development.

Question No.	Response
<p>2.5.2. reduce the need for transport of people and goods,</p> <p>2.5.3. result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),</p> <p>2.5.4. compliment other uses in the area,</p> <p>2.5.5. be in line with the planning for the area,</p> <p>2.5.6. for urban related development, make use of underutilised land available with the urban edge,</p> <p>2.5.7. optimise the use of existing resources and infrastructure,</p> <p>2.5.8. opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),</p> <p>2.5.9. discourage "urban sprawl" and contribute to compaction/densification,</p> <p>2.5.10. contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,</p> <p>2.5.11. encourage environmentally sustainable land development practices and processes,</p> <p>2.5.12. take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),</p> <p>2.5.13. the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),</p> <p>2.5.14. impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and</p> <p>2.5.15. in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?</p>	<p>2.5.3. Goods will be transported to site from Johannesburg and Richard's Bay predominantly according to the Transport Impact Study. People may need to be transported from the surrounding areas during construction, and less so during operation.</p> <p>2.5.4. The area is rural in nature with agriculture being the main land use practice, and generally grazing. Grazing of small livestock according to the Agricultural study will still be possible under the panels.</p> <p>2.5.5. Refer to the response to question no. 2.1 regarding planning.</p> <p>2.5.6. The PV Site and power line are located outside of the urban edge and should not impact on future urban expansion.</p> <p>2.5.7. The resources and services required for construction and operation are discussed in Section 9 below.</p> <p>2.5.8. The Project does not include the expansion of any bulk infrastructure.</p> <p>2.5.9. Not deemed to be relevant, due to the nature of the development.</p> <p>2.5.10. Not deemed to be relevant, due to the nature of the development.</p> <p>2.5.11. Provision is made in the EMPr to manage the impacts associated with the Project.</p> <p>2.5.12. Locational factors that favour the proposed site include the favourable solar irradiation levels, short distance to grid connection point, flat topography, suitable site access and availability of land.</p> <p>2.5.13. The socio-economic benefits associated with the Project will be further identified in the Section 12 below.</p> <p>2.5.14. Refer to the response to question no. 1.5 above.</p> <p>2.5.15. Refer to the response to question no. 2.1 above regarding planning.</p>
<p>2.6. How were a risk-averse and cautious approach applied in terms of socio-economic impacts?</p> <p>2.6.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?</p> <p>2.6.2. What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?</p> <p>2.6.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</p>	<p>The findings of the Social Impact Assessment are included in Section 12, and assumptions and limitations are included under Section 7.</p>
<p>2.7. How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:</p> <p>2.7.1. Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</p> <p>2.7.2. Positive impacts. What measures were taken to enhance positive impacts?</p>	<p>Refer to the responses to questions no. 1.9 and 2.1 above.</p> <p>The assessment of potential social impacts is contained in Section 13.26.</p>
<p>2.8. Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem</p>	<p>Refer to the responses to questions no. 1.7 and 1.10 above.</p>

Question No.	Response
<i>services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?</i>	
2.9. <i>What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?</i>	The BPEO has been identified, taking into consideration the specialists' findings (refer to Section 14).
2.10. <i>What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?</i>	
2.11. <i>What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?</i>	The areas affected by the proposed Project footprint are rural in nature. The PV Site is vacant, used for grazing. Consent has been provided by the landowner for the proposed development in terms of the Option to Lease Agreement.
2.12. <i>What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?</i>	The findings of the Social Impact Assessment are included in the EIA Report. Mitigation measures to manage these impacts are included in the EMPr. Also refer to the response to question no. 1.9 above.
2.13. <i>What measures were taken to:</i> 2.13.1. <i>ensure the participation of all interested and affected parties,</i> 2.13.2. <i>provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,</i> 2.13.3. <i>ensure participation by vulnerable and disadvantaged persons,</i> 2.13.4. <i>promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,</i> 2.13.5. <i>ensure openness and transparency, and access to information in terms of the process,</i> 2.13.6. <i>ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge, and</i> 2.13.7. <i>ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted?</i>	Section 15 below provides an overview of the public participation process, which includes the following: <ul style="list-style-type: none"> ▪ Public Participation during the Announcement and Scoping Phases; ▪ Maintenance of the database of I&APs; ▪ Period to review the draft EIA Report; ▪ Notification of review of the draft EIA Report; ▪ Means of accessing the draft EIA Report; and ▪ Commenting on the draft EIA Report. Comments received from authorities and I&APs during the process are included in the CRR and will be submitted with the final EIA Report.
2.14. <i>Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g.. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?</i>	The findings of the Social Impact Assessment are included in the EIA Report. Also refer to the responses to questions no. 1.9 and 2.5 above.
2.15. <i>What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or</i>	Health and safety related risks associated with the Project during the construction and operational phases are assessed in the EIA Report. These risks are addressed through

Question No.	Response
<i>the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?</i>	mitigation measures that are included in the EMPr. Additional management requirements will be included in the Project's Occupational Health and Safety system.
<p>2.16. Describe how the development will impact on job creation in terms of, amongst other aspects:</p> <p>2.16.1. the number of temporary versus permanent jobs that will be created,</p> <p>2.16.2. whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),</p> <p>2.16.3. the distance from where labourers will have to travel,</p> <p>2.16.4. the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and</p> <p>2.16.5. the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).</p>	The Project will have a beneficial impact on local employment during the construction and operational phases. The exact number of employment opportunities was not available at the time of writing the report. Labour will be sourced locally first and thereafter from surrounding areas, where necessary.
<p>2.17. What measures were taken to ensure:</p> <p>2.17.1. that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and</p> <p>2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?</p>	<p>SA's commitment to renewable energy is reflected in its ratification of the Paris Agreement and the country's long-term energy planning iterations. Solar power represents a large component of the needed diversification of SA's electricity system.</p> <p>According to the Department of Energy (2017), energy is by nature an intergovernmental issue, cutting across energy security, economic prosperity, employment and environment, among others. In recognising these benefits, clean energy has been incorporated into the broader policy framework.</p> <p>The White Paper on Renewable Energy of 2003 is one of SA's policy documents that laid the foundation for the promotion of renewable energy technologies such as solar, hydro, biomass and wind (http://www.energy.gov.za/files/renewables_frame.html). Through this policy document, a ten year target of how renewable energy technologies could diversify the country's energy mix and secure cleaner energy was set.</p> <p>The Applicant intends to bid for the current and future REIPPPP bid windows and/or other renewable energy markets within SA. The REIPPPP is a competitive tender process that was designed to facilitate private sector investment into grid-connected renewable energy generation in SA.</p>
<p>2.18. What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?</p>	<p>The Solar PV Plant proposes to generate electricity from a renewable resource, namely the sun. The total generation capacity of the Project will be up to 65MW renewable solar energy. Some of the electricity generated from the renewable energy source will be stored in the BESS which may generate electricity during peak evening hours when the sun goes down. During the distribution of electricity, as the energy source is renewable, there will be no Greenhouse Gas Emissions (GHG), such as Carbon Dioxide, that will be released into the atmosphere, thus providing a clean environment for the local community and public in general.</p> <p>Impacts to the receiving environment were assessed through various specialist studies that are included in the EIA Report. See Section 13.</p>
<p>2.19. Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?</p>	The intention is for the mitigation measures that were included in the EIA Report and EMPr to be realistic and for the residual risks to be managed to an acceptable level.

Question No.	Response
<p>2.20. <i>What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?</i></p>	<p>The solar PV facility will have an estimated lifespan of 25 years. It is at this time not possible to accurately predict the exact nature of the surrounding environment in 25 years' time or whether the area would have developed to the point where the solar PV facility will be upgraded to continue providing electricity or decommissioned. Decommissioning of the PV facility will require Environmental Authorisation in terms of NEMA. However, it is also not possible to predict the legal framework in 25 years' time. For the purposes of this EIA, it is assumed that the facility will eventually be decommissioned, and the site rehabilitated.</p>
<p>2.21. <i>Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?</i></p>	<p>The BPEO was identified, taking into consideration the specialists' findings (see Section 14).</p>
<p>2.22. <i>Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?</i></p>	<p>Other renewable energy applications that have been made within a 30km radius of the PV Site, according to DFFE's REEA Database, and the associated cumulative impacts, are discussed in Section 13.28 below.</p>

9 PROJECT DESCRIPTION

9.1 Solar Technology

Solar energy facilities operate by converting solar energy into a useful form (i.e. electricity). The use of solar energy for electricity generation is a non-consumptive use of a natural resource and consumes no fuel for continuing operation. Solar power produces an insignificant quantity of greenhouse gases over its lifecycle as compared to conventional coal-fired power stations. The operational phase of a solar facility does not produce carbon dioxide, sulphur dioxide, mercury, particulates, or any other type of air pollution, as fossil fuel power generation technologies do.

9.2 PV Technology Overview

PV technology produces direct current (DC) which is then converted to alternating current (AC) via power electronic inverters. The main technology categories are crystalline modules (mono or poly), thin film, and concentrated photovoltaics (CPV). **Figure 9** below provides an overview of a typical Solar PV Power Plant.

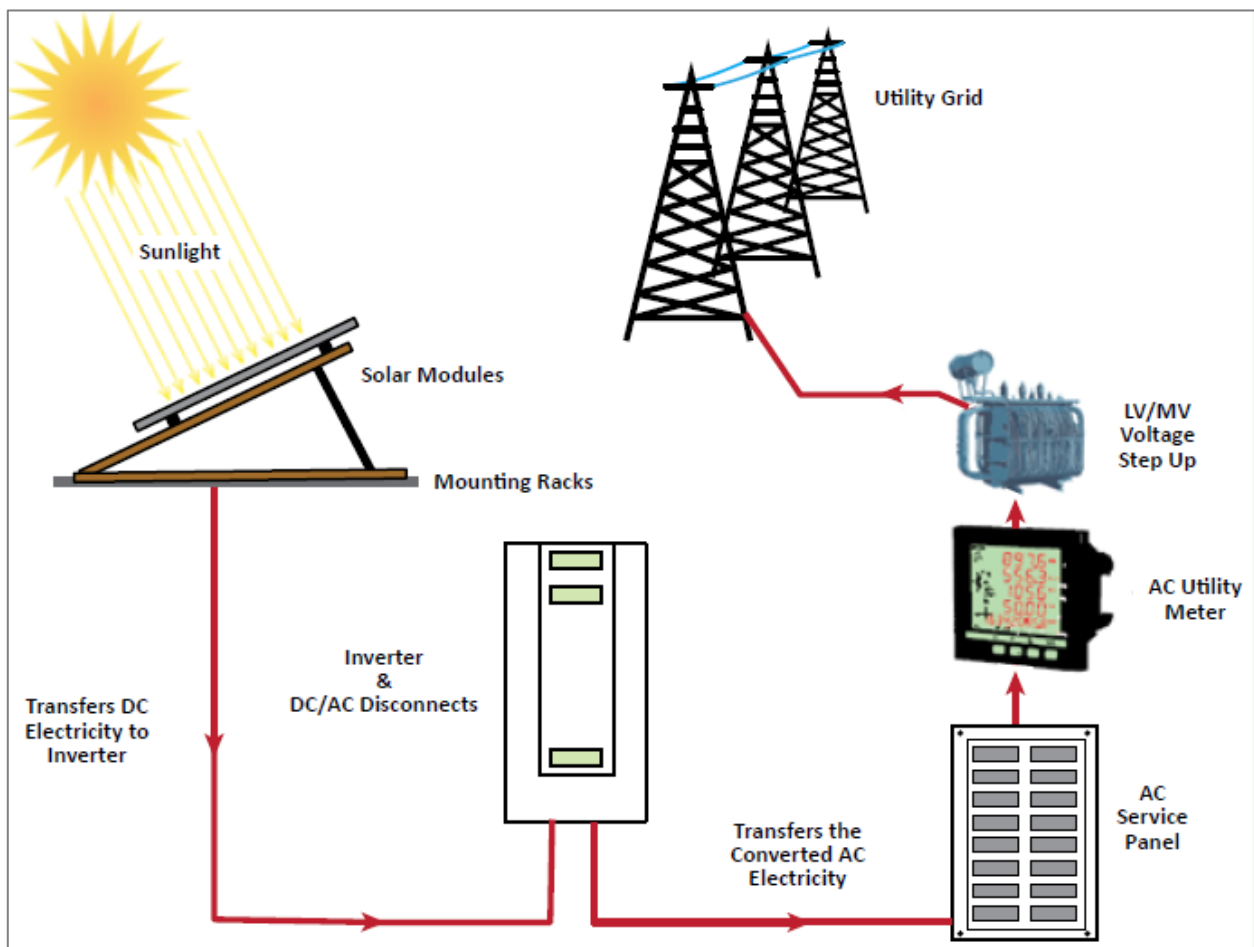


Figure 9: Overview of Solar PV Power Plant (IFC, 2015)

9.3 Project Overview

9.3.1 Overview of Technical Details

The technical details of the proposed Solar PV Plant are captured in **Table 10** below.

Table 10: Technical details of the proposed PV Plant

No.	Component	Description / Dimensions	
		Layout Alternative 1	Layout Alternative 2
13.	Height of PV panels	Up to 5.5 m	Up to 5.5 m
14.	Area of PV Array	Up to approximately 117 ha	Monofacial or Bifacial PV panels, mounted on either fixed-tilt, single-axis tracking, and/or double-axis tracking systems Area: Up to 115 ha
15.	Area occupied by substations	Up to 1 ha	It is estimated that the maximum size of the facility substation will not exceed 1 ha Each facility will require inverter-stations, transformers, switchgear and internal electrical reticulation (underground cabling)
16.	Capacity of on-site substation	High voltage (up to 132 kV)	The facility substation will collect the power from the facility and transform it from medium voltage (up to 33 kV) to high voltage (88 or 132 kV)
17.	BESS	Area up to ± 4 ha	Area up to ± 4 ha
18.	Area occupied by both permanent and construction laydown areas	Temporary: Up to 5 ha Permanent: Up to 1 ha (located within the area demarcated for temporary construction laydown)	Temporary construction laydown area up to 5 ha Permanent laydown area up to 1 ha (to be located within the area demarcated for the temporary construction laydown)
19.	Area occupied by buildings	Up to 1 ha	Up to 1 ha
20.	Length of internal roads	Up to 10 km	Up to 10 km
21.	Width of internal roads	The internal roads will be up to 6 m wide. The access roads will be up to 8 m wide.	The internal roads will be up to 6 m wide. The access roads will be up to 8 m wide.
22.	Proximity to grid connection	Approximately 750 m to the Eskom Rhino Substation	Approximately 410 m to connect to existing powerline
23.	Height of fencing	Up to 3.5 m	Up to 3.5 m
24.	Type of fencing	Type will vary around the site, welded mesh, palisade and electric fencing	Type will vary around the site, welded mesh, palisade and electric fencing

9.3.2 Project Layout

The alternative layouts are shown in **Figure 3** and **Figure 4** above. The desirability of the earmarked site for the development of the proposed Solar PV Plant is due to the following key characteristics:

- ❑ **Solar Irradiation:** The feasibility of a solar facility is dependent on the direct solar irradiation levels (refer to **Section 4.1** above).
- ❑ **Topography:** The suitability of the surface area is an important characteristic for the construction and operation of solar facilities. Most of the site has a low gradient slope and is suitable for this development.

- Grid connection:** The Project will transfer the electricity via up to 132 kV powerlines from the Eskom collector switching station, located adjacent to the facility substation, to the existing grid network.
- Extent of site:** The overall extent of the site is sufficient for the installation of the PV facility.
- Site access:** The site is accessed by tar and gravel roads, which are linked to the R556 that runs to the east of the Project Area.

The following factors were considered in determining the layouts (amongst others):

- Requirements of the PV Plant;
- Understanding of sensitive features on the site (e.g., watercourses); and
- Existing servitudes and infrastructure.

9.3.3 Components of the Proposed Solar PV Project

The development consists of the following systems, sub-systems or components (amongst others):

- PV modules and mounting structures which will consist of either Monofacial or Bifacial PV panels, mounted on either fixed-tilt, single-axis tracking, and/or double-axis tracking systems.
- Inverters and transformers.
- Battery Energy Storage System (BESS) area up to 4 ha.
- Operation and Maintenance buildings including a gate house and security building, control centre, offices, warehouses and workshops for storage and maintenance.
- Facility grid connection infrastructure, including –
 - 33 kV cabling between the project components and the facility substation;
 - An up to 132 kV facility substation; and
 - Up to 132 kV powerline between the back to back Eskom collector station/facility substation and the exiting Eskom grid network.
- Temporary construction laydown area up to 5 ha;
- Permanent laydown area up to 1 ha (to be located within the area demarcated for the temporary construction laydown);
- Internal roads up to 6 m wide, to allow access to the Solar PV modules for operations and maintenance activities; and
- Main access road up to 8 m wide.

The components of the proposed Solar PV Facility are discussed below. Reference Source: Solar Power Plant - Types, Components, Layout and Operation (<https://www.electricaltechnology.org/>).

9.3.3.1 Solar PV Panels/Modules

A PV panel is the most important component of a solar power plant. It is made up of small solar cells. This is a device that is used to convert solar photon energy into electrical energy.

Generally, silicon is used as a semiconductor material in solar cells. The typical rating of silicon solar cells is 0.5 V and 6 Amp. And it is equivalent to 3 W power. The number of cells is connected in series or parallel and makes a module. The number of modules forms a solar panel.

According to the capacity of power plants, a number of plates are mounted and a group of panels is also known as a PV array.

9.3.3.2 Single Axis Trackers

The following information was sourced from Solar Basics: Single-Axis Tracking (<https://www.powerflex.com/>).

A solar tracking system adjusts the position of a solar panel along an axis. This is done to ensure a small angle of incidence or the angle that sunlight hits a solar panel. Since the energy output of a solar system increases as the angle of incidence decreases, keeping this angle as small as possible is ideal. Active trackers rely on powered machineries such as gears and motors to move solar panels, whereas passive trackers achieve motion via compressed fluid that shifts sides when heated by the sun, changing the tilt of the panel along with it. Some trackers keep panels aligned with the sun by moving them in the opposite direction of the earth's rotation, and others determine an optimal panel angle based on latitude and longitude data obtained through GPS.

In addition to varying methods of motion, solar trackers differ in terms of the number of axes on which they move. Single axis tracking systems tilt on one axis, tracking the sun as it moves from east to west during the day.

An example of PV modules mounted on a single axis tracker is shown in **Figure 10** below.



Figure 10: Example of PV Module mounted on Single Axis Tracker
(source: Single-ACES – Atlantic Clean Energy Supply – Official Site [<https://atlanticces.com/>])

The trackers are mounted on steel posts installed in the ground. Concrete bases are sometimes also used. The site would need to be cleared of all trees to prevent shading of the PV modules. The ground between the trackers is sometimes left grassed.

9.3.3.3 Inverters

The following information was sourced from “A Guide to Solar Inverters: how they work and how to choose them” (<https://solarmagazine.com/>).

A solar inverter is really a converter. Inverters are installed to convert the DC electrical power into AC electrical power, which is used in the grid. The frequency of the AC electricity is synchronised to the grid, which in South Africa is 50 Hz, but varies slightly. The purpose of the inverters is to maximise and control the conversion of power from the DC modules to low voltage AC (i.e., less than 1000 V).

String inverters have multiple inputs for connecting the strings from the trackers. String inverters are normally installed on steel structures under the shade of the PV modules.

9.3.3.4 Low Voltage AC Cabling

AC cables are installed from the inverters to the distribution box located adjacent to the medium voltage transformers. These cables are installed underground in trenches.

9.3.3.5 Medium Voltage Step-Up Transformers

The purpose of medium voltage transformers is to step-up the low voltage to medium voltage. In order to distribute the combined electrical power from a block of tracker rows the voltage is required to be increased. Transformers will typically be in the order of 2.5 MVA capacity and similar in appearance to the type as shown in **Figure 11** below.



Figure 11: Example of Medium Voltage Transformer
(source: <https://www.ulaginoli.com/>)

Transformers will typically be filled with oil for cooling the transformer windings. The cooling oil is circulated through radiator fins mounted on the side of the transformer. The oil remains in the transformer. Oil spills from transformers need to be contained by providing drip trays and special care taken to clean up the spill should it occur.

9.3.3.6 Medium Voltage AC Cabling

Medium voltage AC cabling from the transformers to the high voltage substation is buried in trenches underground. The cables are protected from accidental damage by placing brightly coloured orange danger tape in the trench and sometimes concrete slabs. Cable routes are indicated with concrete cables markers on the ground at bend points, road crossings etc.

9.3.3.7 High Voltage Substations

The medium voltage cables are connected to a medium voltage switchgear room located in a substation yard. High voltage transformers step the medium voltage up to high voltage.



Figure 12: Example of High Voltage Substation

(source: <https://www.protogenenergy.com/>)

A typical HV Substation will look like the substation shown in **Figure 12** above, with large ground mounted transformers and outdoor high voltage switchgear with overhead conductors and steel lattice structures. The yard is fenced off and only authorised personnel are allowed inside the high voltage yard (see example shown in **Figure 13** below).



Figure 13: Example of High Voltage Transformers
(source: <https://www.electricityforum.com/>)

9.3.3.8 Guardhouses, Operation, Maintenance and Visitor Centre Buildings

Guardhouses, Operation, Maintenance and Visitor Centre Buildings are required for the facility. Buildings will be single story.

The purpose of the buildings is to provide space for staff working on site for the operation and maintenance of the facilities, including storage space for spare parts, tools, etc. Computers will be installed for monitoring the electricity generation and reporting on the condition of the plant. Toilets, kitchens, water, wastewater, and electricity will be required for staff and visitors.

Sustainable building principals will be used including use of rainwater harvesting, energy efficient lighting, insulation, etc.

9.3.3.9 Roads

Existing roads are located on the site. These will serve as the entrance roads to the site. The existing access from main roads may need to be upgraded. The internal roads will vary from 4m to 6m wide and will be gravel, with the exception of paving close to the buildings for parking and access into the buildings. The entrance road will be up to 8 m wide.

The basic layout consists of rows of single axis trackers, similar to that shown in **Figure 14** below.



Figure 14: Example of Roads Between Trackers and Medium Voltage Substations
(source: <https://ecoinventos.com/>)

9.3.3.10 Fencing, Security and Lighting

Fencing is required to secure the site. Due to the voltage of the DC wiring (up to 1500 V) and high value of the plant the site must be secured. Details of the fencing is still to be finalised and may include electric fencing.

CCTV cameras and security lighting may be installed as part of the security for the plant.

9.3.3.11 Stormwater Infrastructure

The topography of the site is relatively flat, which simplifies the management of stormwater runoff as high velocities in surface drainage channels and pipes underground drainage systems need not be dealt with. Furthermore, surface stormwater drainage channels can be employed to advantage (easier to maintain than an underground pipe system).

9.4 Battery Energy Storage System

9.4.1 Types of Electrical Energy Storage Systems

Electrical Energy storage systems consist of Mechanical, Chemical, Electrical, Thermal and Electrochemical systems. **Figure 15** below summarizes the various Electrical Energy Storage systems. Electrochemical technology was selected as the preferred solution to meet the requirements of the Project.

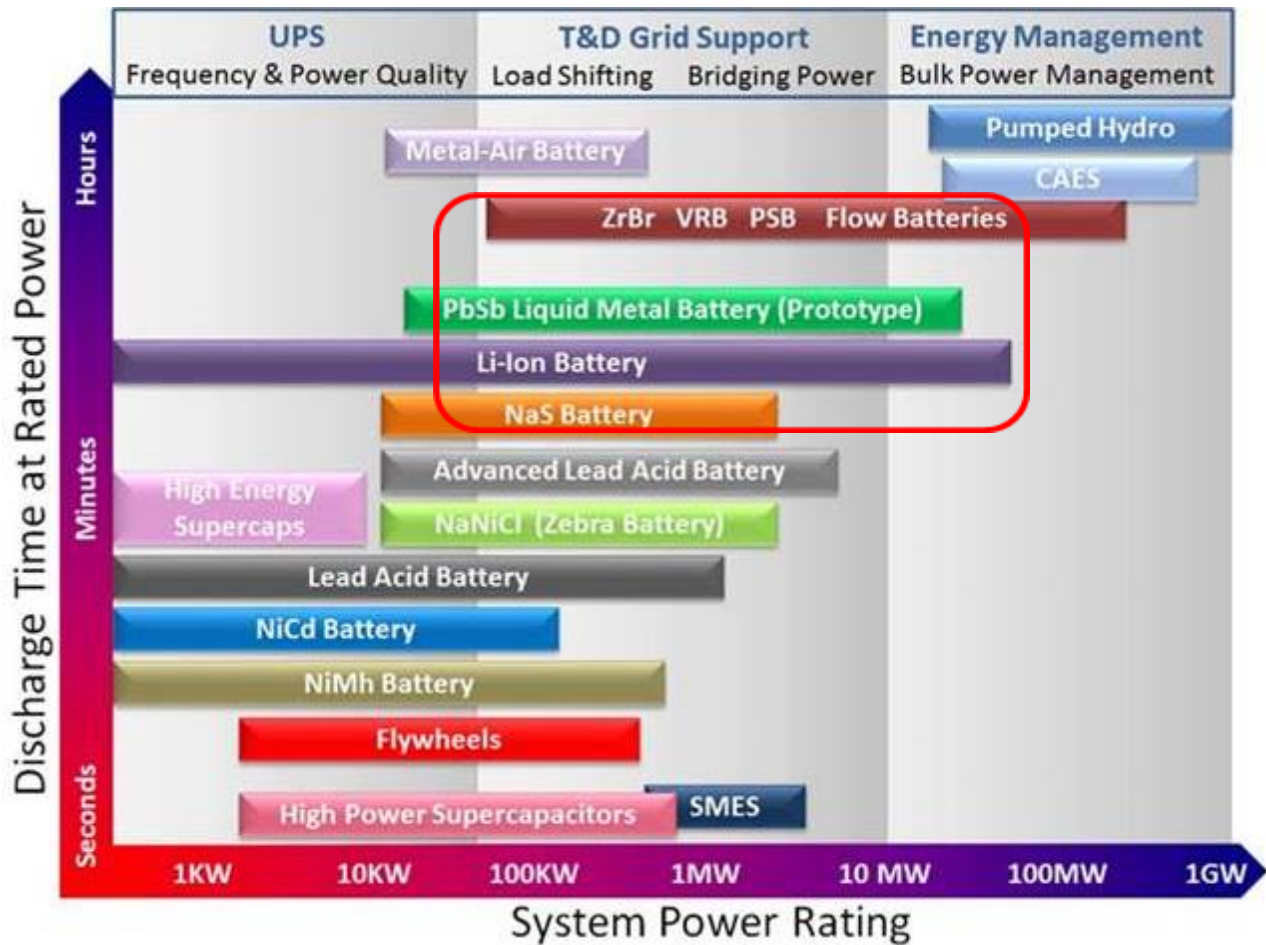


Figure 15: Grid Energy Storage Technologies and Applications
 (Adapted from Climate Policy Initiative for the Energy Transitions Committee)

As per <https://www.smart-energy.com/>, “Batteries, the oldest, most common and widely accessible form of storage, are an electrochemical technology comprised of one or more cells with a positive terminal named a cathode and negative terminal or anode. Batteries encompass a range of chemistries. The best known and in widespread use in portable electronic devices and vehicles are lithium-ion and lead acid. Others solid-state battery types are nickel-cadmium and sodium-sulphur, while zinc-air is emerging. Another category is flow batteries with liquid electrolyte solutions, including vanadium redox and iron-chromium and zinc-bromine chemistries”.

9.4.2 The Project’s BESS Infrastructure

The total footprint of the BESS is up to a maximum of 4 ha. The technology will be the commercially proven solid-state battery systems, which include Lithium Ion technology.

As per <https://www.smart-energy.com/>, “This type of technology is widely used in mobile phones and electric vehicles. It is also predominantly used in large utility scale projects”. The batteries generally arrive on site from the factory fully-assembled and pre-tested in containerised/modular enclosures.

The number of containers required will depend on the specific manufacturer. The approximate dimensions of each container will be up to a maximum of 12 m long, 3 m wide and 3 m high. Level and fenced off platforms would be created for the battery storage areas of approximately 3 000 m². The location of the battery energy storage facility will be adjacent to the solar power plant's on-site substation.

An example of similar utility scale BESS is shown in **Figure 16** below.



Figure 16: Example of BESS installation
(<https://biiworld.com/>)

The containers are environmentally friendly during their life-cycle. However, the Lithium in the technology is considered hazardous / dangerous goods. Used batteries will be removed by the suppliers. Batteries containing chemistries that when charged are a fire risk, and at the end of their life need to be recycled. With regard to the fire risk, the battery storage area will have a non-flammable buffer area to prevent the spread of fire. The BESS will have electrical and fire protection measures in the form of battery temperature monitoring, circuit breakers, fire detection and fire suppression as per fire and electrical regulations.

9.5 Grid Connection

The electricity generated by the proposed Solar PV Plant will be transferred to the national Eskom grid via an up to 132 kV powerline from the back to back Eskom collector station/facility substation, as shown in **Figure 3** (Alternative Layout 1) and **Figure 4** (Alternative Layout 2).

Examples of a 132 kV transmission line as well as a high voltage transmission line connecting to a substation are shown in **Figure 17** and **Figure 18** below, respectively.



Figure 17: Example of a 132 kV transmission line



Figure 18: Example of High Voltage Transmission Line Connecting to Substation

9.6 Implementation Programme

Key milestones during the Project's implementation programme include the following:

- Preferred Bidder Status: Q4 2023;
- Financial Close: Q2 2023;
- Notice to proceed (commencement of construction): Q4 2023; and
- Commercial Operation Date (COD): Q1 2025.

9.7 Project Life-Cycle

The project life-cycle for a typical Solar PV Plant includes the following primary activities (high level outline only):

- Feasibility phase - This phase includes confirming the feasibility of the Project by evaluating and addressing the following (amongst others) –
 - Solar resource assessment;
 - Site selection;
 - Project land allocation;
 - Project yield assessment;
 - Permitting and licensing;
 - Legal agreements;
 - Socio economic development;
 - Industrialisation and localisation;
 - Project cost determination;
 - Project financing; and
 - Risk analysis.
- Design phase - This phase includes the following (amongst others) –
 - Confirming key design features such as the type of PV module to be used, tilting angle, mounting and tracking systems, inverters, and module arrangement;
 - Confirming specifications for the components of the Solar PV Plant and BESS;
 - Preparing detailed designs (layout, civil, electrical);
 - Preparing construction plans;
 - Preparing the Project schedule; and
 - Preparing the commissioning plans.
- Construction phase – During the implementation of the Project, the following construction activities will be undertaken –
 - Pegging the footprint of the development;
 - Establishing access roads;
 - Preparing the site (fencing, clearing, levelling and grading, etc.);
 - Establishing the site office;

- Establishing laydown areas and storage facilities;
 - Transporting equipment to site;
 - Undertaking civil, mechanical and electrical work; and
 - Reinstating and rehabilitating working areas outside of permanent development footprint.
- Operational phase - Once the solar park is up and running the facility will be largely self-sufficient. Operational activities associated with the maintenance and control of the Solar PV Plant will include the following (amongst others) –
- Testing and commissioning the facility's components;
 - Cleaning of PV modules;
 - Controlling vegetation;
 - Managing stormwater and waste;
 - Conducting preventative and corrective maintenance; and
 - Monitoring of the facility's performance.
- Decommissioning –
- PV panels are guaranteed to produce at least 80% of their rated power for 20 to 30 years. In practice, PV panels will perform satisfactorily well beyond this timeframe. At the end of the 20-30 year lifespan, two scenarios exist for the PV panels:
 - The old, redundant panels can be disposed of (at a registered disposal facility designated for this purpose); or
 - The panels can be recycled, by either using their components to fix or make new panels, or be donated for use elsewhere (e.g., for the electrification of rural schools and clinics).
 - It is unlikely that the PV Park will be decommissioned after 30 years. Instead, the facility will continually be reconditioned as the PV panels are recycled and replaced with more advanced technology, as it becomes available.
 - In the event that the facility must be decommissioned, the decommissioning phase will include measures for complying with the prevailing regulatory requirements, rehabilitation and managing environmental impacts in order to render the affected area suitable for a future desirable use.

9.8 Resources and Services required for Construction and Operation

This section briefly outlines the resources that will be required to execute the Project. Note that provision is made in the EMPr to manage impacts associated with aspects listed below, as relevant.

9.8.1 Raw Materials

Construction

Material required for construction purposes, including fencing and construction material (e.g., cement, sand, aggregate, etc.), will be sourced from suitable suppliers. The PV modules and other components of the facility will also be sourced from accredited suppliers.

Operation

During the operational phase, few raw materials will be required. Material such as consumable spares will be used for the operation of the facility.

9.8.2 Water**Construction**

Four options will be considered, in order of priority:

1. Supply from the KLM – the Applicant will approach the KLM to enquire whether they can provide all or part of the total water requirements of the Project. Specific arrangements will be agreed with the KLM in a Service Level Agreement (SLA), following the appointment of preferred bidder during the financial close period.
2. Supply from a Private Contractor, which may include extraction from any bulk water supply lines nearby to the site.
3. An existing borehole on site, subject to NWA requirements.
4. A new borehole on site, subject to NWA requirements.

Operation

Water use requirements for a Solar PV Plant during the operational phase depend on the technology and climate conditions at the site. In general, solar power technologies use relatively low volumes of water for cleaning solar collection and reflection surfaces like PV panels, as well as for domestic consumption by the staff.

Water will be supplied by one of the four options mentioned above for the construction phase.

9.8.3 Sanitation**Construction**

Chemical toilets will be utilised during construction and removed/ emptied by an appointed contractor for treatment at a licensed facility off site.

Operation

No effluent will be produced during operation of the facility, except for normal sewage from site and operations staff. This will be collected and treated as per normal standards using a septic or conservancy tank. In cases where the KLM does not permit the use of septic tanks, sewage will be stored in conservancy tank and collected (honey-sucker) by a service provider (the KLM/ Contractor) and treated at an approved facility off site.

9.8.4 Waste**Construction**

During the construction phase, solid waste will mainly be in the form of construction material, 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. Any other waste and excess material will be removed once construction is complete and disposed of at a registered waste facility.

According to the KLM's IDP for 2021/2022, there are no licenced landfills in the municipality. The Waterval Landfill, which is located in the Rustenburg Local Municipality, is a permitted waste disposal facility that receives general waste (including domestic, business, garden and building waste) and industrial waste (<https://www.rustenburg.gov.za/services/waste-management/>).

Wastewater, which refers to any water adversely affected in quality through construction-related activities and human influence, will include the following:

- Sewage;
- Water used for washing purposes (e.g., equipment, staff); and
- Drainage over contaminated areas (e.g., workshop, equipment storage areas).

Suitable measures will be implemented to manage all wastewater generated during the construction period.

Operation

Refuse generated during the operational phase will be removed on a weekly basis and will be disposed of at licenced waste disposal sites.

9.8.5 Roads

Construction

Temporary access roads will be created during the construction phase. The areas affected by temporary roads will be reinstated, as they will not be used permanently in the operational phase.

Operation

The site is accessed by tar and gravel roads, which are linked to the R556 that runs to the east of the Project Area.

The proposed access road towards the site is located off the R556, which is gravel surfaced in the vicinity of the access location. Construction vehicles will travel from the R565 onto the R556 to the proposed access to enter the site (see **Figure 19** below). The proposed access was assessed in line with access spacing requirements, required sight lines and road safety considerations as part of the Transport Impact Assessment.



Figure 19: Aerial view of external roads towards the project site (iWink Consulting, 2023)

9.8.6 Stormwater

Construction

Best environmental practices will be implemented during construction to manage stormwater. These measures are included in the EMPr.

Operation

The stormwater run-off along the main access road will be controlled by side swales and dispersed in a controlled manner at regular intervals. Stormwater run-off from the buildings will be disposed of through soakaways. A formal piped stormwater system is not envisaged for the wider site. Water will be managed on the surface and dispersed into natural drainage routes.

9.8.7 Electricity

Construction

The EPC Contractor will be responsible for the supply of electricity during construction. The electricity supply will be obtained from diesel generators and / or temporary supply via cables from the site power grid.

Operation

The electricity will be supplied by the plant during daylight hours (off-peak times – 07:00 to 17:00). The BESS will supply electricity during night hours (peak times – 05:00 to 07:00 and 17:00 to 19:00). During other times electricity will be supplied from the power grid.

9.8.8 Laydown Areas

Construction

A laydown area will be required during the construction phase. The proposed temporary laydown area of approximately 5 ha will be located next to the building and substation (refer to alternative layouts in **Figure 3** and **Figure 4** above).

Operation

A 1 ha permanent laydown area will be utilised during the operational phase.

9.8.9 Construction Workers

Construction

The appointed Contractor will mostly make use of skilled labour for the construction of the facility and its associated infrastructure. In those instances where casual labour is required, the Applicant will request that such persons are sourced from local communities, as far as possible.

10 ALTERNATIVES

10.1 Introduction

Alternatives are the different ways in which the Project can be executed to ultimately achieve its objectives. Examples could include carrying out a different type of action, choosing an alternative location or adopting a different technology or design for a project.

The sub-sections to follow discuss the project alternatives considered during the EIA process. A comparative analysis of feasible alternatives from environmental (including specialist input) and technical perspectives is provided in **Section 14** below.

10.2 Site Alternatives

No site alternatives are proposed for this Project. Favourable location factors for the PV Site include suitable solar irradiation levels, short distance to grid connection point, flat topography, suitable site access and availability of land.

10.3 Layout / Design Alternatives

The extent of the site allows for the identification of layout/design alternatives to manage impacts to environmental sensitivity. Layout Alternative 1 constitutes the initial layout contemplated during the Scoping Phase. During the course of the EIA process, the layout was revised to avoid a small artificial dam in the north-western corner of the site. The new layout is known as Layout Alternative 2. The alternative layouts are further discussed in **Section 14** below.

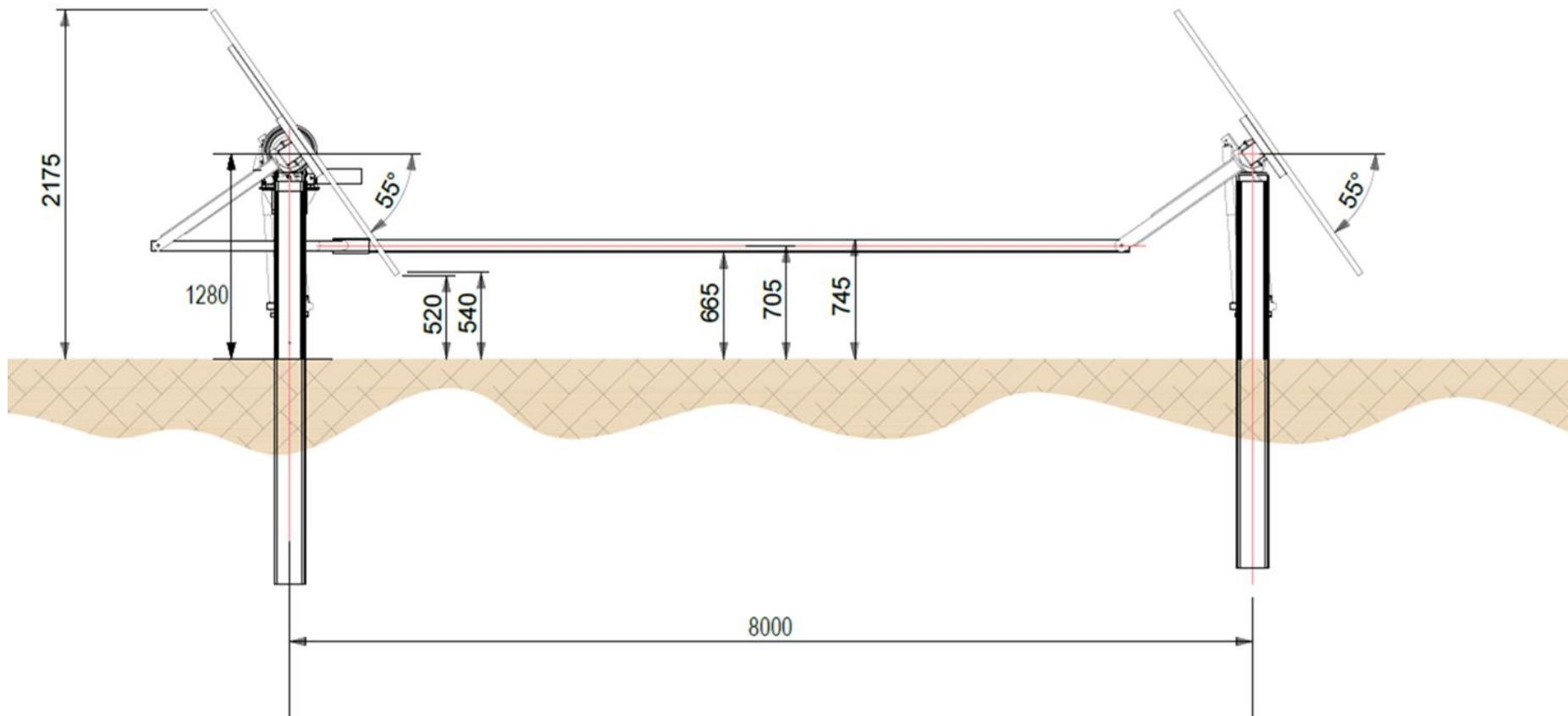
10.4 Technology Alternatives

10.4.1 *PV Technology*

Solar PV technology consists of either monofacial or bifacial solar panels mounted on either a fixed-tilt, single-axis tracking, and/or double-axis tracking system. A side view of an example of a tracker mounting structure is provided in **Figure 20** below.

A bifacial solar panel receives irradiation on both sides of the panel, which increases the yield, while monofacial solar panels that only receive power on one of its sides (see **Figure 21** below).

The choice of PV technology will be selected during the final design phase, and as such, is not presented as alternatives in this EIA. It should be noted that the choice of panel technology will not affect any of the impacts or the outcome of the EIA.



NTS

Figure 20: Side view of proposed tracker mounting structure



Figure 21: Monofacial (top) and bifacial (bottom) solar panels

(<https://www.bluestemenergysolutions.com/bifacial-versus-monofacial-solar-panels-an-analysis/>)

10.4.2 BESS Technology

The BESS can be broken into solid state and flow battery systems (refer to **Section 9.4** above).

A single battery technology, namely solid state, is anticipated to be implemented for the Project.

10.5 No-Go Option

As standard practice and to satisfy regulatory requirements, the option of not proceeding with the Project is included in the assessment of the alternatives.

The “no-go option” is evaluated in **Section 13.27** below to understand the implications of the project not proceeding.

11 PROFILE OF THE RECEIVING ENVIRONMENT

11.1 Introduction

This section provides a general description of the status quo of the receiving environment in the Project Area. This serves to provide the context within which the EIA was conducted. The study area includes the entire footprint of the Project, including the proposed Solar PV Plant and the power line (100m wide corridor assessed). This section allows for an appreciation of sensitive environmental features and possible receptors of the effects of the proposed Project. The potential impacts to the receiving environment are discussed in **Section 13** below.

Where necessary, the regional context of the environmental features is also explained, with an ensuing focus on the local surrounding environment. The reader is referred to **Section 12** below for more elaborate descriptions of the specialist studies and their findings for specific environmental features.

11.2 Land Use and Land Cover

The Project Area is located approximately 30 km north-west of Rustenburg's CBD. The areas affected by the proposed Project footprint are rural in nature. The land cover is shown in **Figure 23**.

According to Gouws (2023), the entire site is used for animal grazing and browsing. There is approximately 15ha that is planted to fodder crops like sweet sorghum and haygrazer. A large portion is irrigated from boreholes (see Photos 1 and 2). The grazing lands has many shrubs and trees that is used by browsing animals. Some of the land is becoming encroached by Sekelbos. There are also portions that are bare because of overgrazing.



Figure 22: Bushveld – browsing and grazing (left) and cover crops planted for fodder (right) (Gouws, 2023)

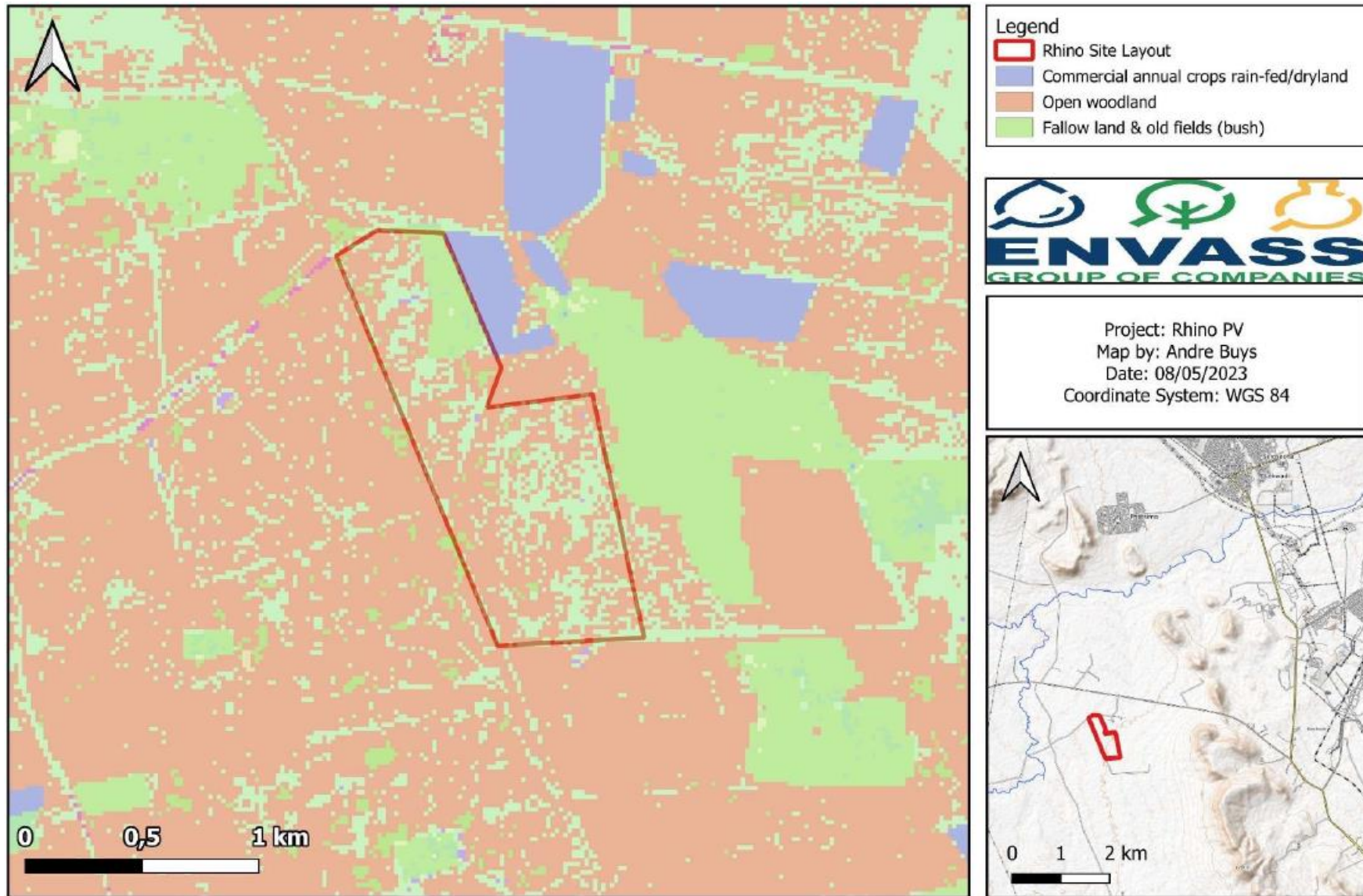


Figure 23: Land cover in Project Area (Buys, 2023)

11.3 Climate

Rustenburg's climate is a local steppe climate. The Köppen-Geiger climate classification is BSh.

The mean minimum and maximum temperatures over the year are shown in **Figure 24** below. The temperature averages 18.6 °C. November and December are the warmest month of the year. The maximum average temperature in November and December is 28.7 °C. The lowest average temperature in the year occur in July, when it is around 4.9 °C.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	23 °C (73.4) °F	22.8 °C (73.1) °F	21.3 °C (70.4) °F	18.3 °C (64.9) °F	15.1 °C (59.2) °F	12.2 °C (54) °F	12 °C (53.6) °F	15.5 °C (59.8) °F	19.4 °C (66.9) °F	21.7 °C (71.1) °F	22.3 °C (72.1) °F	22.8 °C (73) °F
Min. Temperature °C (°F)	17.8 °C (64) °F	17.6 °C (63.7) °F	16.1 °C (61) °F	12.8 °C (55) °F	8.6 °C (47.5) °F	5.6 °C (42) °F	4.9 °C (40.8) °F	8 °C (46.4) °F	11.8 °C (53.2) °F	14.6 °C (58.3) °F	15.9 °C (60.7) °F	17.4 °C (63.2) °F
Max. Temperature °C (°F)	28.3 °C (82.9) °F	28.1 °C (82.6) °F	26.8 °C (80.2) °F	24 °C (75.2) °F	21.8 °C (71.2) °F	19.2 °C (66.6) °F	19.3 °C (66.7) °F	22.9 °C (73.2) °F	26.9 °C (80.5) °F	28.7 °C (83.6) °F	28.7 °C (83.6) °F	28.3 °C (83) °F
Precipitation / Rainfall mm (in)	99 (3)	96 (3)	76 (2)	37 (1)	18 (0)	7 (0)	3 (0)	7 (0)	15 (0)	51 (2)	76 (2)	117 (4)
Humidity(%)	60%	57%	58%	58%	50%	48%	42%	35%	31%	38%	47%	58%
Rainy days (d)	11	9	8	5	2	1	1	1	2	5	8	11
avg. Sun hours (hours)	9.8	9.7	9.2	8.6	9.0	8.9	9.1	9.6	9.9	10.1	10.1	10.1

Figure 24: Average minimum and maximum temperatures in Rustenburg (Data: 1991 – 2021)
(Copyright © 2022 www. climate-data.org)

The rainfall for the year is 602 mm. The most precipitation occurs in December, with an approximate average of 119 mm as shown in Figure 25 below.

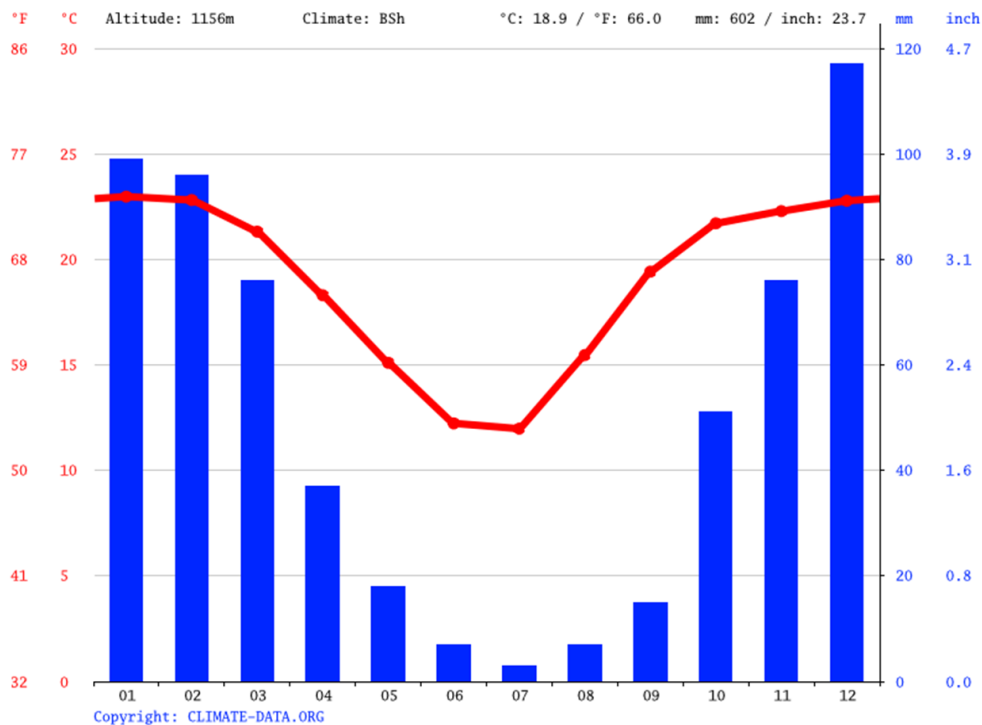


Figure 25: Average precipitation for the year
(Copyright © 2022 www. climate-data.org)

11.4 Geology and Soil

The Project Area is predominately underlain by quartzites, conglomerates and some shale horizons of the Magaliesburg, Daspoort and Silverton Formations, as shown in **Figure 26** below.

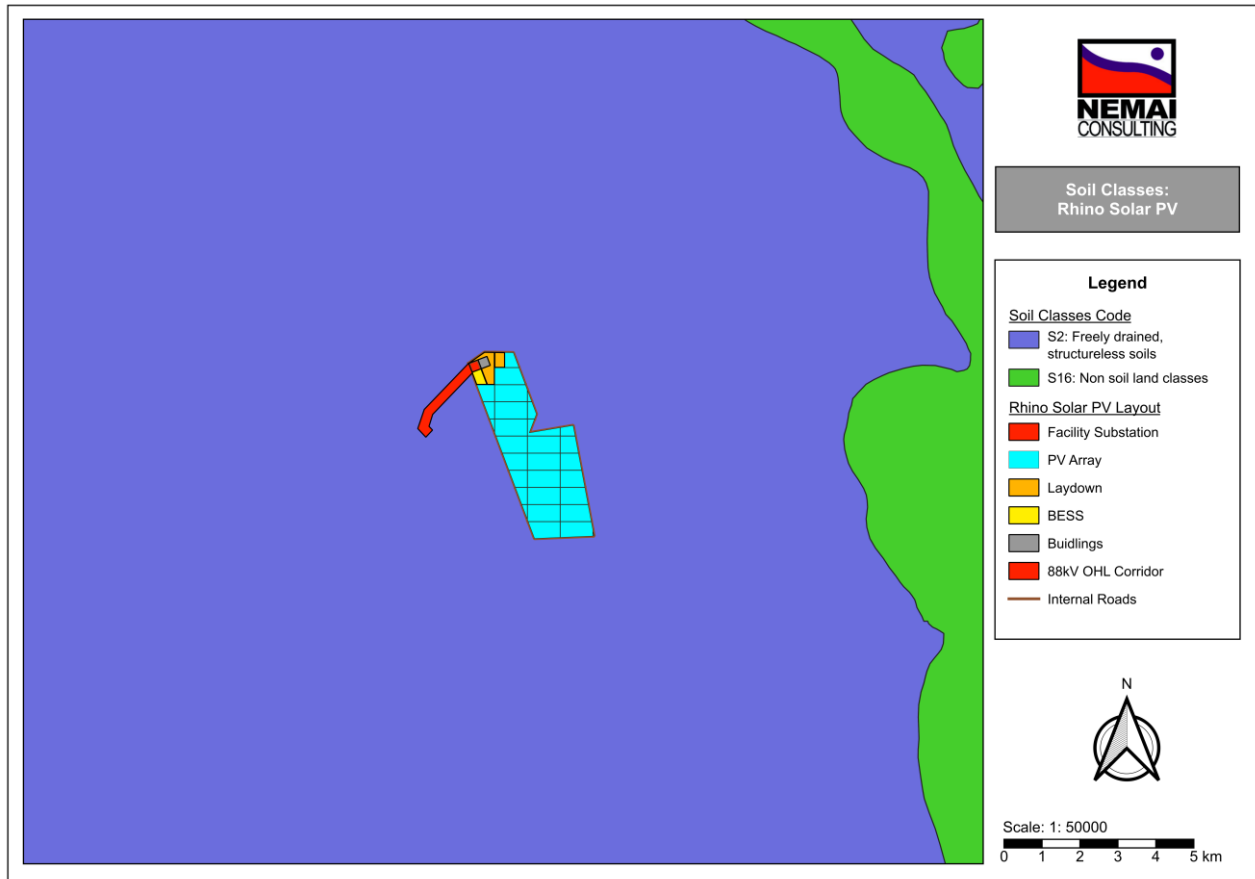


Figure 26: Soil classes

The following is noted in the Agricultural Assessment (Gouws, 2023) in terms of the properties of the soil encountered at the site:

- ❑ The PV site is located on shale in the western portion and sedimentary rock in the east. Shale gave rise to deep moderately structures reddish soils with a medium clay content. Soil types identified are Shortlands and Hutton with shallower Glenrosa in the western portion. Concretions of iron and manganese occurs at around 400mm, and rock outcrops, throughout this soil unit.
- ❑ Sandy soils developed on the sedimentary rock. The soils are moderately deep and is where the irrigated land is found.
- ❑ In general, because of the low variable rainfall, the land is not arable and only suitable for grazing. Irrigated land is automatically considered as high potential. Through micro placement, this land will not be developed but remain under cultivation.

11.5 Topography

In terms of the SOTER database (see **Figure 27** below), the landform encountered at most of the PV Site and powerline route is characterised as a valley at low level.

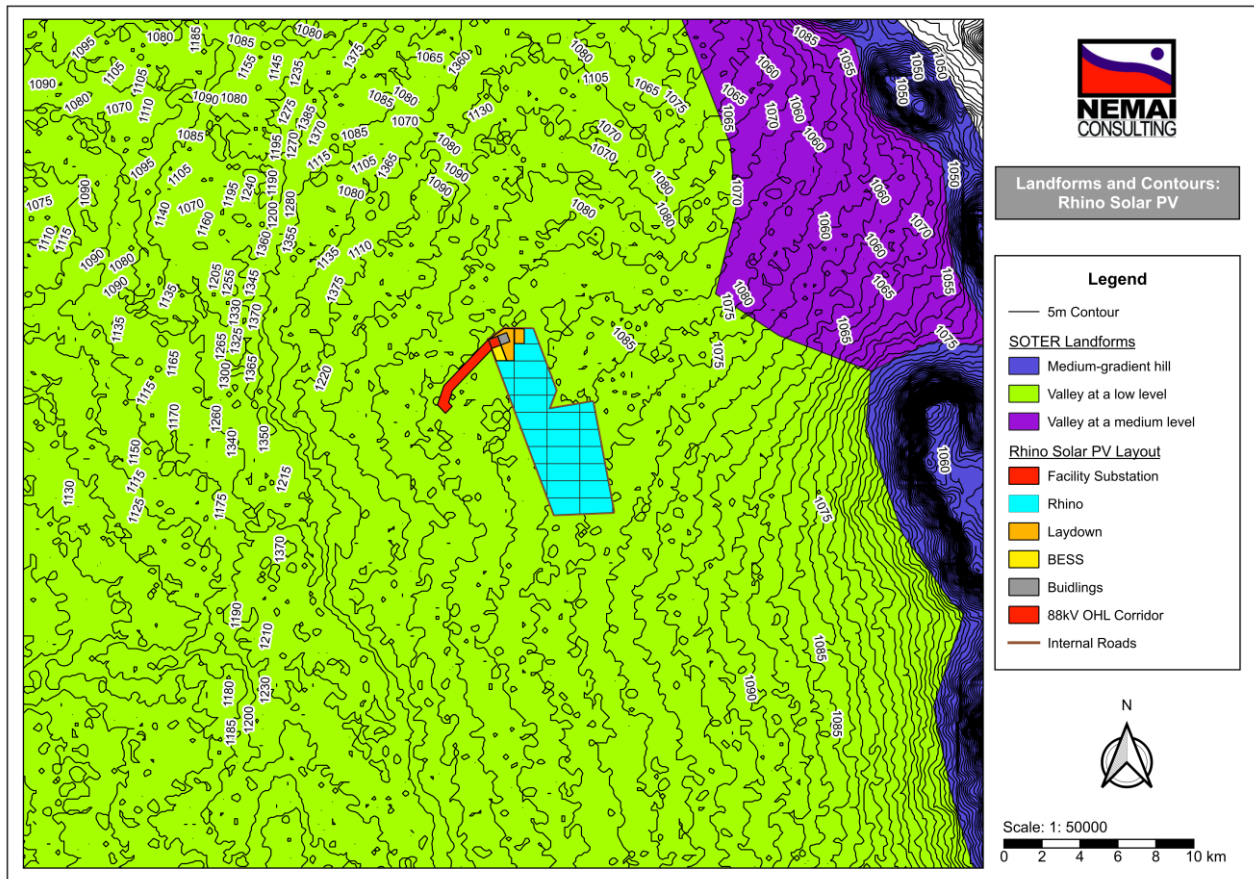


Figure 27: SOTER Landforms

From north to south the elevation on the site increases from 1087m to 1101m above sea level over a distance of approximately 2,8km (see **Figure 28**). From west to east the elevation drops from 1091m to 1100m above sea level over a distance of approximately 1,24km. The topography or terrain morphology of the region is broadly described as plains with low to moderate relief.

The findings of the Visual Impact Assessment that was undertaken for the Project are contained in **Section 12.10** below. According to Buys (2023), the topography is considered to have a moderate value.

The following sensitive receptors to visual impacts are noted (Buys, 2023):

- ❑ Resident receptors – these include employees of the agricultural activities, residents and the local farming communities that are present outside the proposed project area.
- ❑ Transient receptors – the Project Area may be visible from the R556 road from Lindleyspoort and Boschhoek, while the visibility may be reduced due to vegetation obstructing the view from the roads at certain points.



Figure 28: Elevation Profile (maximum elevation to south-east – point A) (Buys, 2023)

11.6 Surface Water

The information contained in the sub-sections to follow was extracted from the Aquatic Compliance Statement (van Rooyen, 2023). Refer to **Sections 12.4** below for a synopsis of the study. The specialist report is contained in **Appendix E1**.

The study area is located within the Limpopo Water Management Area (WMA) and within the A22D Quaternary Catchment. The site is located to the east of the Selons River. No watercourses are located in close proximity to the site (see **Figure 29** and **Figure 30** below). According to the North West Biodiversity Sector Plan (READ, 2015), the site does not encroach into any Aquatic Critical Biodiversity Area (CBA) or Ecological Support Area (ESA) (see **Figure 34** below). There are several agricultural dams located near the study area. The original layout (Layout Alternative 1) was revised to avoid a small artificial dam in the north-western corner of the site.

According to GCS (2023), the elevation of the site is 30m above the floodplain of the Selons River and is not at risk to river flood waters in the 100-year event.

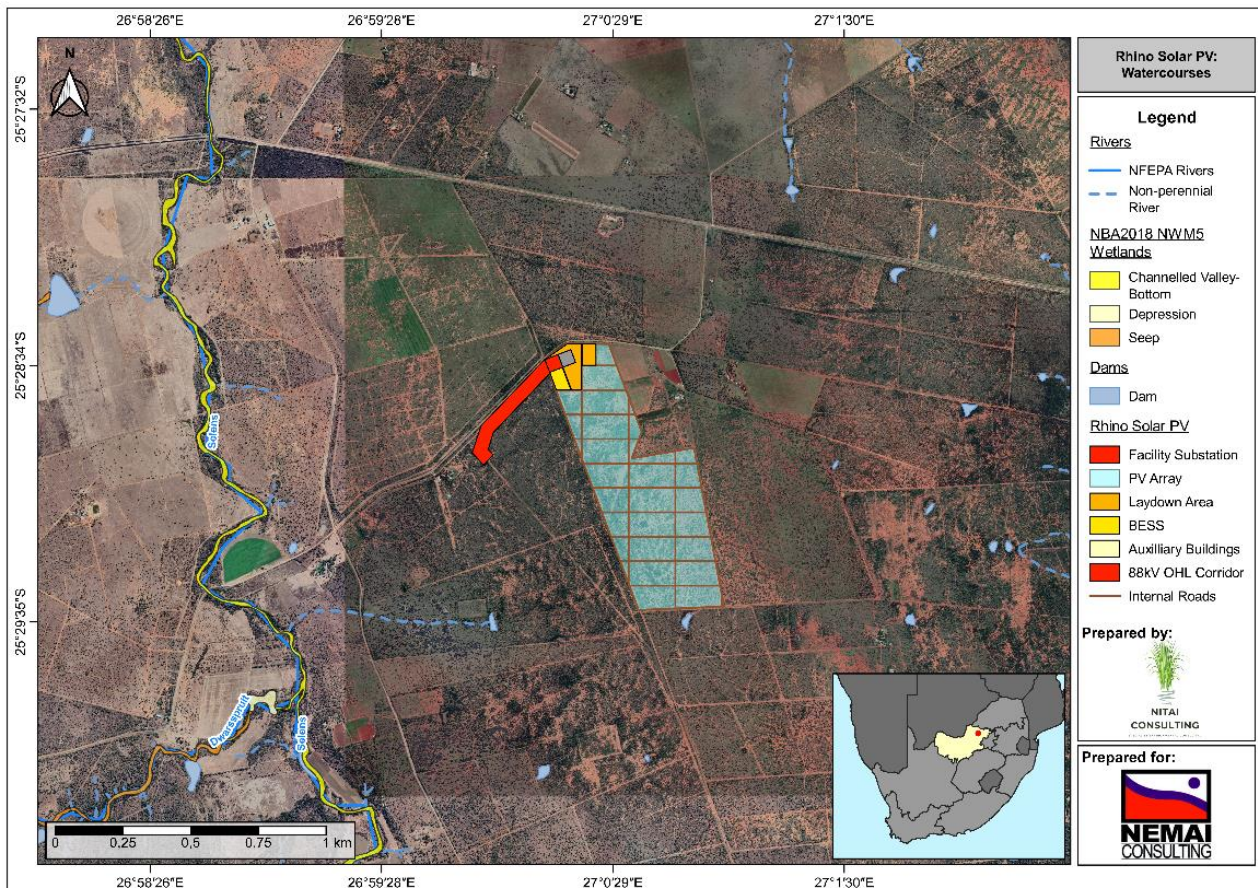


Figure 29: Watercourses in relation to Project Area for Layout Alternative 1 (van Rooyen, 2023)

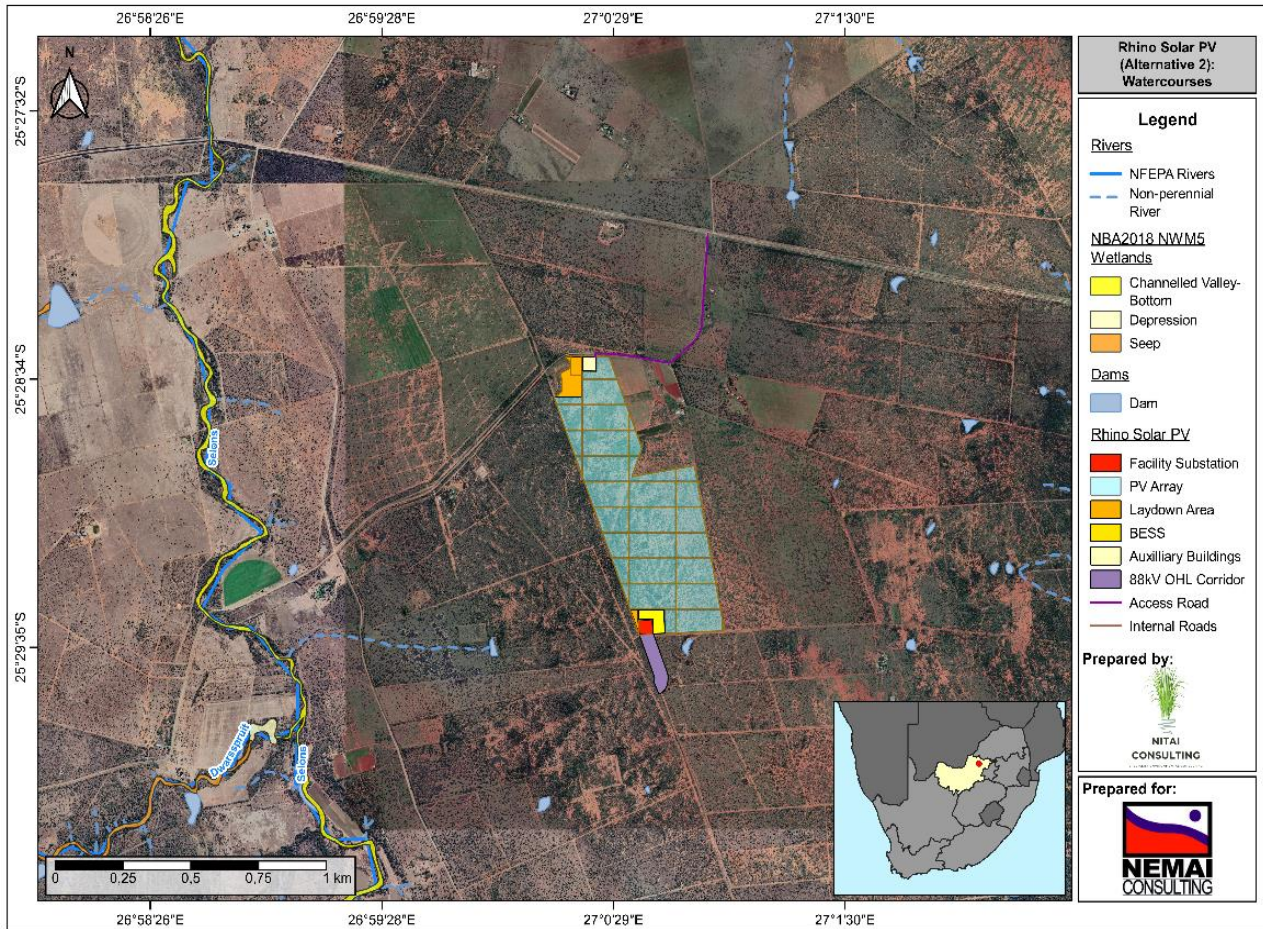


Figure 30: Watercourses in relation to Project Area for Layout Alternative 2 (van Rooyen, 2023)

11.7 Terrestrial Ecology

The information contained in the sub-sections to follow was extracted from the Terrestrial Biodiversity Compliance Statement (Human, 2023). Refer to **Sections 12.5** below for a synopsis of the study. The specialist report is contained in **Appendix E2**.

11.7.1 Protected Areas

According to the South Africa Protected Areas Database (SAPAD) (DFFE, 2022), the closest Protected Area to the site is the Pilanesberg National Park, which is located approximately 10km to the north-east (see **Figure 31**).

The site overlaps with priority focus areas for expansion according to the 2017 National Protected Areas Expansion Strategy (NPAES) dataset (see **Figure 32**).

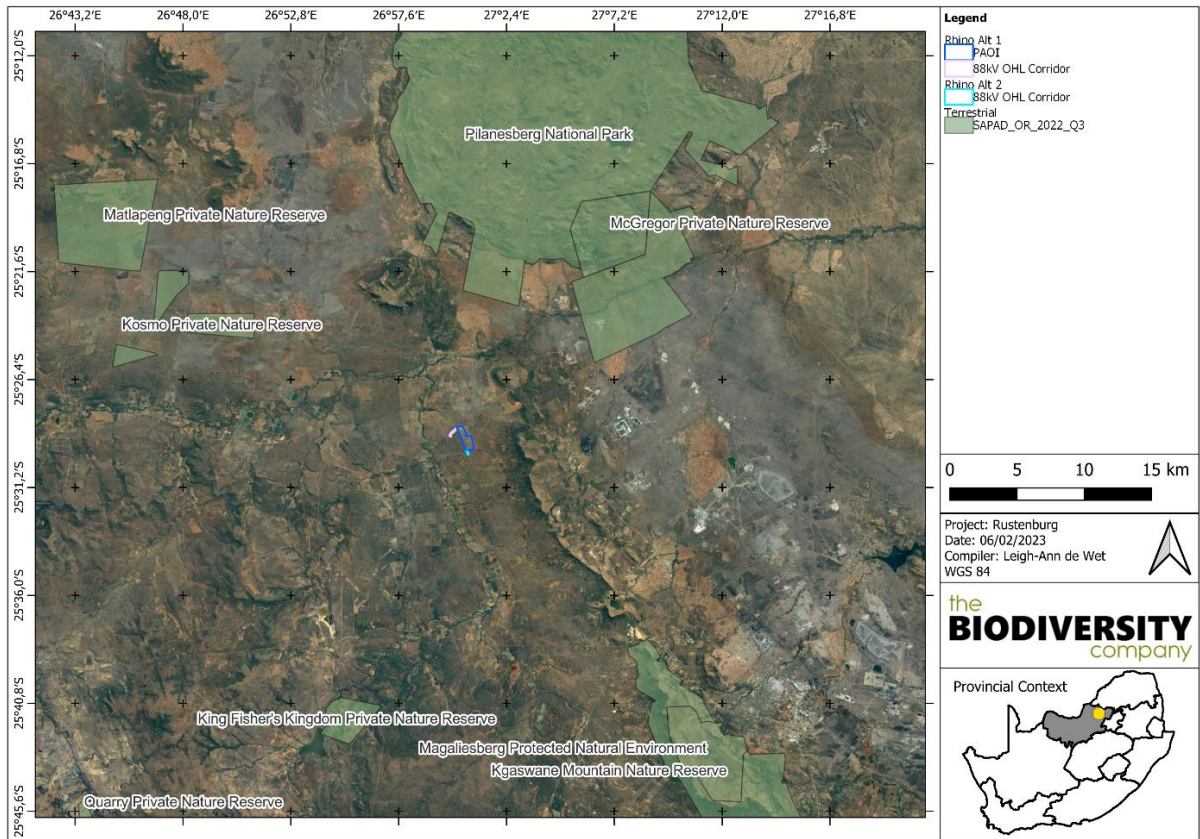


Figure 31: Project Area in relation to Protected Areas (de Wet, 2023)

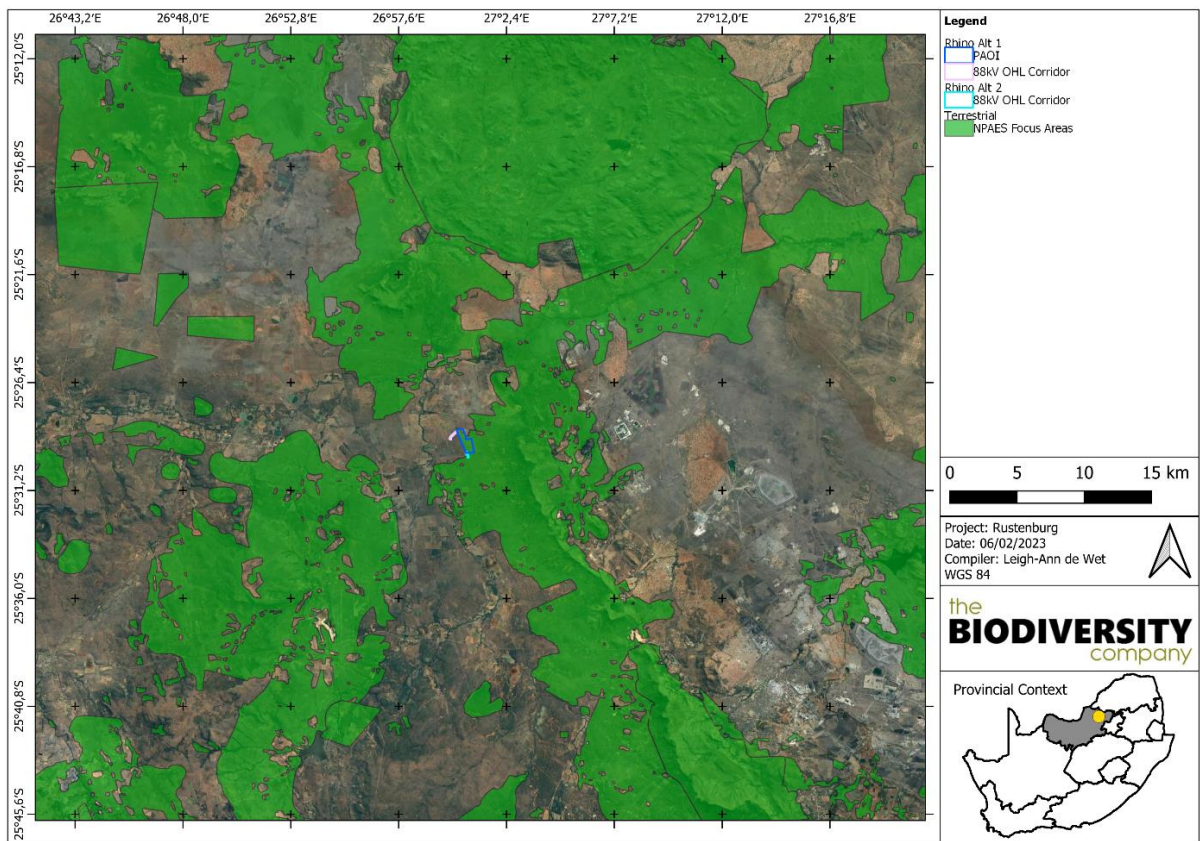


Figure 32: Project Area in relation to NPAES (de Wet, 2023)

11.7.2 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).

According to the spatial dataset, the proposed Project Area overlaps with a LC ecosystem (see **Figure 33** below).

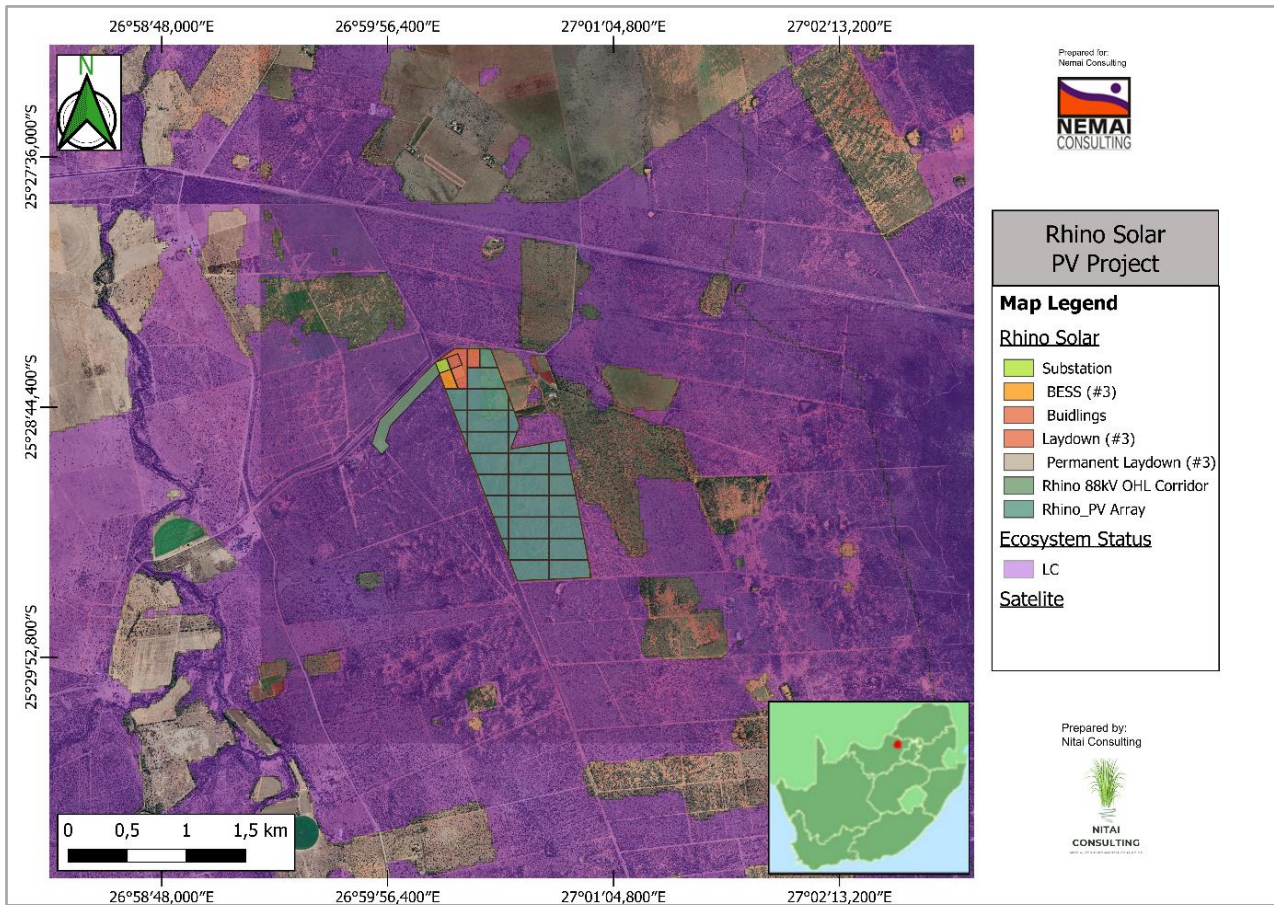


Figure 33: Ecosystem threat status associated with the Project Area (Human, 2023)

11.7.3 Critical Biodiversity Areas and Ecological Support Areas

The North West Biodiversity Sector Plan (READ, 2015) identifies biodiversity priority areas for the province, called CBAs and 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.

The site encroaches into areas designated as CBA2, as well as small areas of ESA1 and ESA2 (see **Figure 34**).

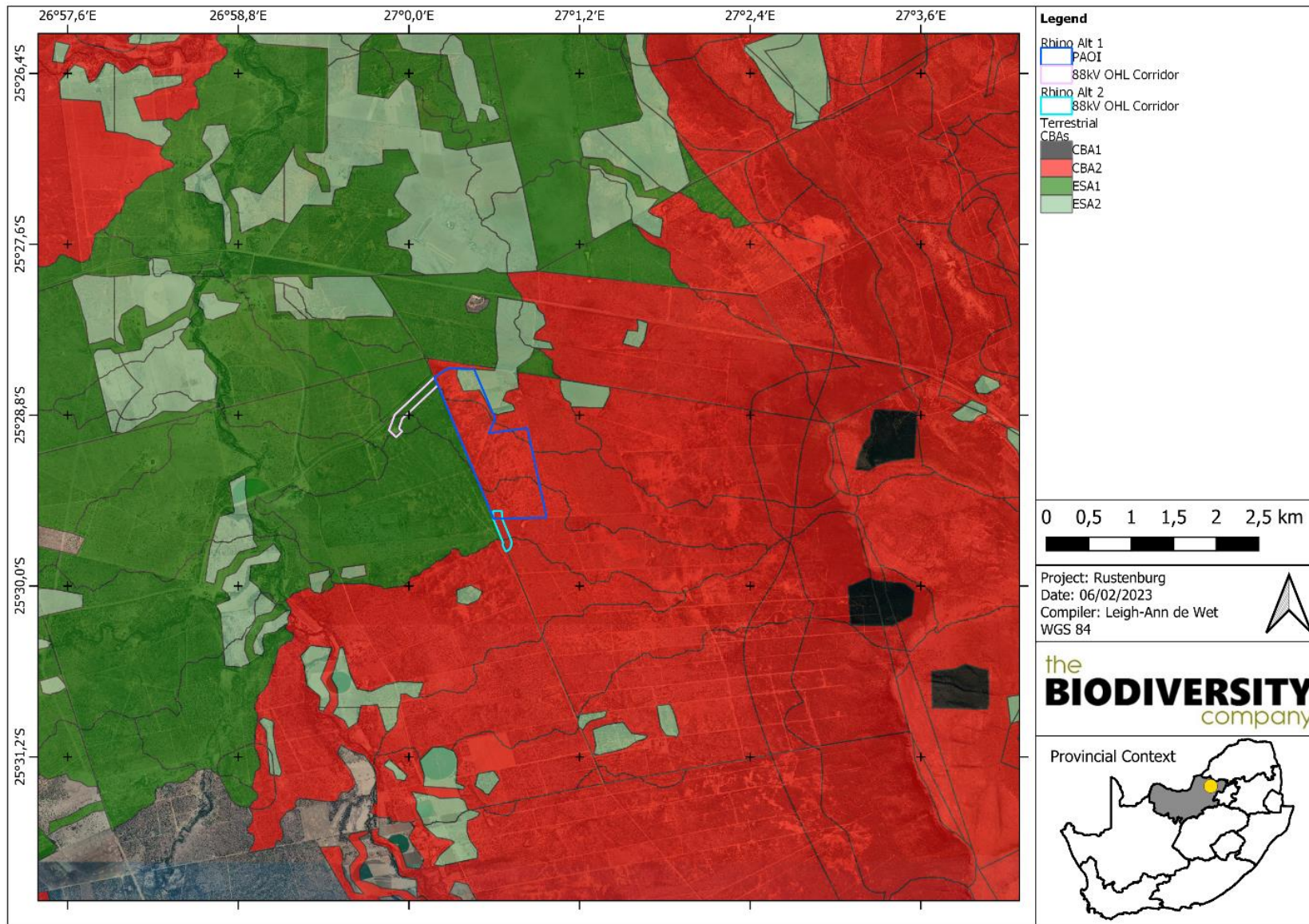


Figure 34: Project Area in relation to the North West Biodiversity Sector Plan (Layout Alternative 1) (de Wet, 2023)

11.7.4 *Flora*

The Project Area falls within the Savanna Biome and the Zeerust Thornveld vegetation bioregion (see **Figure 35**).

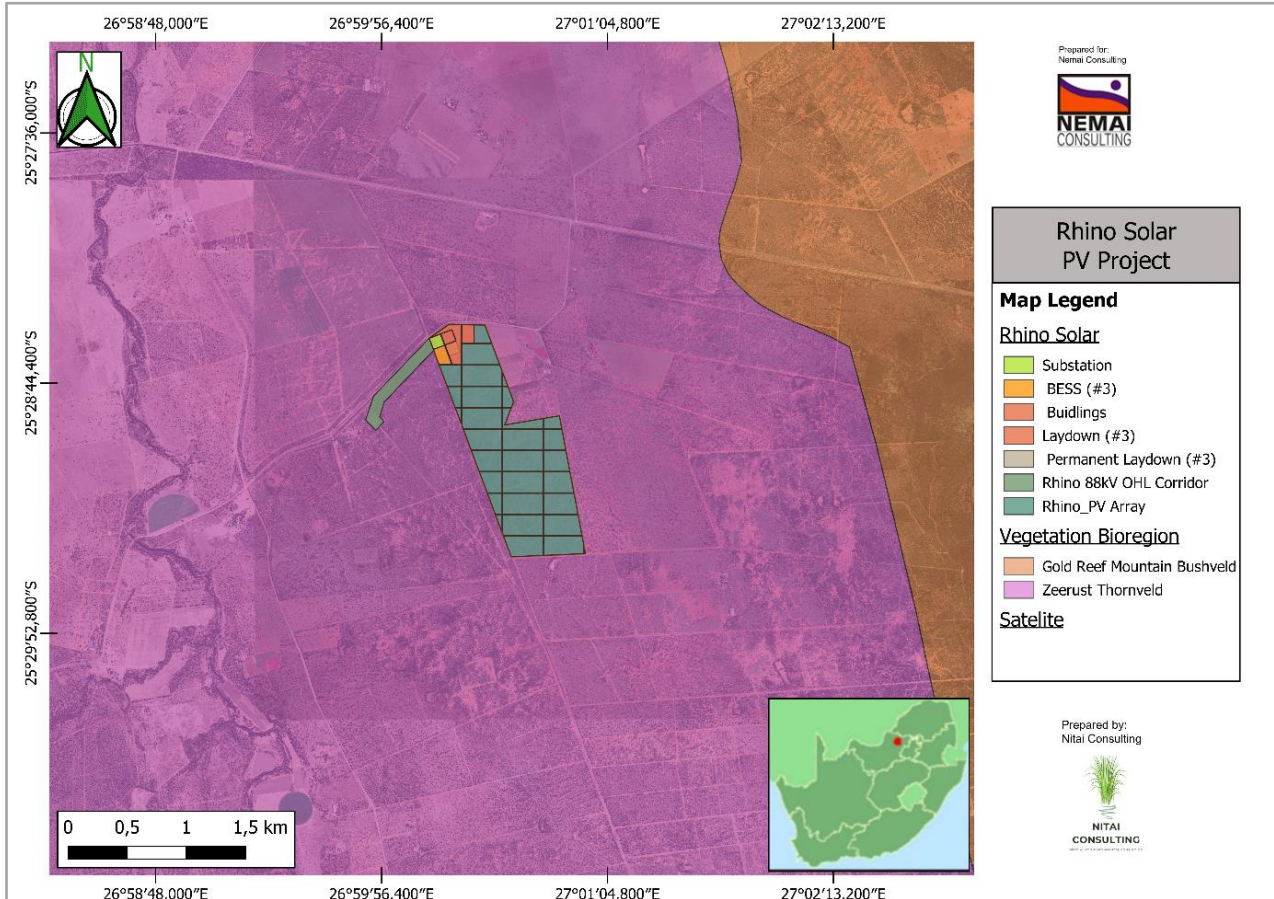


Figure 35: Vegetation region associated with the Project Area (Human, 2023)

Based on the Plants of Southern Africa (BODATSA-POSA, 2019) database, no species presence data is available for the study site. The screening tool identifies no potential SCC species and rated the area “Low”.

During the field survey the site was found to be in a heavily modified condition, mainly attributed to the agricultural practices and its associated impacts (see **Figure 36**). Grazing practices, old lands and piospheres have degraded the veld severely. These aspects further limit the functional capacity of the Project Area. Much of the development footprint is located within or along roads or transformed areas and their associated servitudes, which are considered as very low sensitivity. No protected trees or SCC flora species were observed.



Figure 36: General condition of the site (Human, 2023)

11.7.5 *Fauna*

The total number of animal species that have the potential to occur in or around the Project Area, and the corresponding number of SCC, are as follows:

- ❑ Mammals – 58 (6 SCC);
- ❑ Herpetofauna –
 - Amphibians – 14 (0 SCC); and
 - Reptiles – 29 (0 SCC).

These numbers include animals that only occur within nature reserves and private reserves. Of the 58 total mammals listed, none of the mammal SCC are likely to be found resident within the Project Area.

During the field survey, mammal activity was low due to the extent of disturbance in general and cattle grazing the area, as well as the poor habitat condition. No SCC were observed during the field survey.

11.7.6 *Avifauna*

A separate Avifaunal Impact Assessment (de Wet, 2023) was undertaken for the Project and the information to follow was extracted from this study. Refer to **Sections 12.6** and **13.14** below for a synopsis of the study and related impact assessment, respectively. The specialist report is contained in **Appendix E3**.

Important Bird & Biodiversity Areas (IBAs) are the sites of international significance for the conservation of the world's birds and other conservation significant species as identified by BirdLife International.

Figure 37 below shows that site does not encroach into any IBAs. There are two IBAs over 10 km from the site, which include the Pilanesberg National Park IBA and the Magaliesberg IBA.

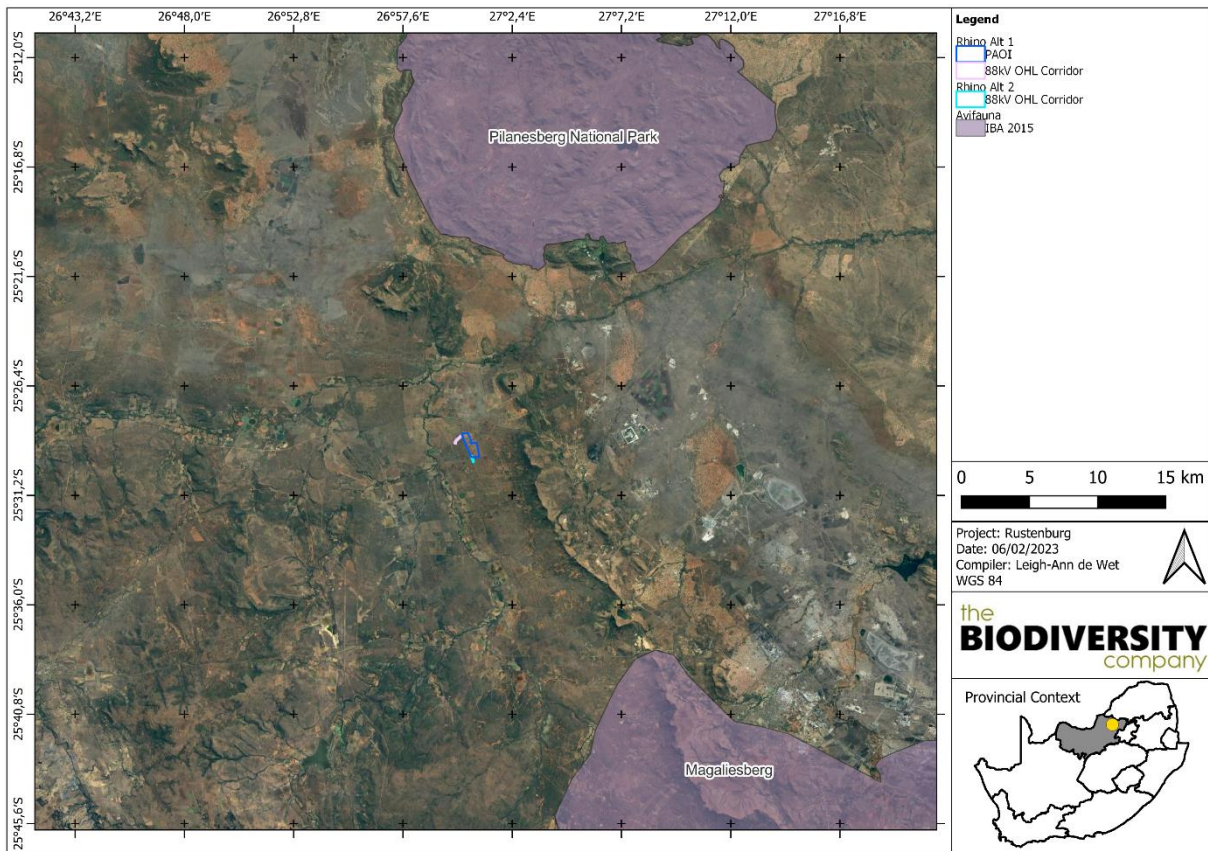


Figure 37: Project Area in relation to the nearest IBA (de Wet, 2023)

The South African Bird Atlas Project 2 (SABAP2) data lists 394 indigenous avifauna species that could be expected to occur within the Project Area of Influence (PAOI) defined by the Avifaunal Specialist and surrounding landscape. Twenty-nine (29) of these expected species are regarded as Species of Conservation Concern (SCC).

During the first assessment performed in the wet season (5th – 8th of January 2023) 119 species were recorded during the point counts. One of the species recorded were SCC i.e., *Sagittarius serpentarius* (Secretarybird). During the second assessment performed in the summer (13th to the 16th of March 2023) 110 species were recorded during the point counts. One of the species recorded during incidental sightings were SCC i.e., *Sagittarius serpentarius* (Secretarybird). Seventeen (17) risk species were recorded in the first survey, and sixteen (16) in the second survey. These are species at risk for collisions, electrocutions or sensitive to habitat loss.

Existing impacts to avifauna in the Project Area include the following:

- Existing energy infrastructure;
- Noise pollution;
- Minor and major gravel roads and associated vehicle traffic;

- Invasive Alien Plants;
- Livestock agriculture; and
- Fences and associated infrastructure.

11.8 Socio-Economic Environment

11.8.1 Municipal Profile

The Project Area is located in Ward 6 of KLM. Demographic information for the KLM (NW374) is presented in **Table 11** below.

Table 11: Demographic information for the KLM
(<https://municipalities.co.za/demographic/1187/kgetlengrivier-local-municipality>)

	Community Survey 2016	Census 2011
Population	59 562	51 049
Age Structure		
Population under 15	33.6%	28.5%
Population 15 to 64	61.0%	65.6%
Population over 65	5.4%	5.9%
Dependency Ratio		
Per 100 (15-64)	64.0	52.5
Sex Ratio		
Males per 100 females	115.4	112.6
Population Growth		
Per annum	3.51%	n/a
Labour Market		
Unemployment rate (official)	n/a	20.5%
Youth unemployment rate (official) 15-34	n/a	26.7%
Education (aged 20 +)		
No schooling	8.5%	15.8%
Matric	27.3%	22.7%
Higher education	7.0%	6.3%
Household Dynamics		
Households	18 787	14 673
Average household size	3.2	3.1
Female headed households	30.0%	29.3%
Formal dwellings	67.5%	72.0%
Housing owned	65.5%	39.6%
Household Services		
Flush toilet connected to sewerage	62.5%	51.9%
Weekly refuse removal	27.5%	44.5%
Piped water inside dwelling	27.7%	34.8%
Electricity for lighting	87.0%	78.0%

An extract from KLM's IDP for 2021/2022 pertaining to the main economic sectors in the municipality follows:

☐ Agriculture –

- Agriculture in the municipal area has a strong competitive advantage in terms of the climate, biodiversity and number of dams. But this advantage is impacted by problems associated with it such as drought, veld fires, and unsustainable farming practices. Although commercial agriculture provides the bulk of the employment opportunities, a large part of the population, particularly the youth, is unemployed.

☐ Tourism –

- Tourism has potential to stimulate economic growth, taking into account KRLM's close proximity to the Johannesburg, Pretoria and the surrounding areas. The national road (N4) linking Botswana and Gauteng creates opportunity to service the travellers which in turn would feed the hospitality sector within the area. According to the Tourism Growth and Development Strategy that was conducted by the Department of Finance and Economic Development, 2004, tourism in the area has a competitive advantage and has a potential to contribute significantly towards accelerating growth in the tourism industry. The study mentions the following attractions available in the area: private game farms, cultural activities of local people, and tourist facilities and opportunities (including caravanning, camping sites, chalets, water sports, fishing, bush camps, game viewing and lodges).

☐ Small scale mining and manufacturing –

- Mining activities relate to diamonds, slate and aggregate sand. As with many other municipalities, KLM also has no beneficiation except the sand that is used locally for building. This sector's future is dependent on additional discoveries of economically exploitable mineral resources, market demand and technology. Indications are that mining activities will in all probability remain a small role player in the of the area's economy, even though this sector provides a number of employment opportunities in the municipal area.

Further information regarding the social profile of the Project Area is provided in the Social Impact Assessment (Tanhuke & Chidley, 2023).

11.9 Agriculture

Key findings from the Agricultural Impact Assessment (Gouws, 2023) in terms of the current state of agriculture in the Project Area are as follows:

- ☐ Most of the land on the site has moderately deep soils with a high soil potential. However, the erratic and low rainfall and high summer temperatures reduces the land use capability to medium/low. This is reflected by the low carrying capacity for livestock as well as the low projected crop yield.
- ☐ The entire site is used for animal grazing and browsing (see **Figure 38** below). There is approximately 15ha that is planted to fodder.

- ❑ While the farm on which the site is located has some land that is irrigated, it was excluded from the project footprint and will not directly be affected (see **Figure 38** below).
- ❑ The grazing land has many shrubs and trees that is used by browsing animals. The farmer raises goats that supplies meat to his butchery and restaurant. He, therefore, does not rely only on the farming income, but also on the value addition made possible by selling the meat from his butchery. The fodder crops that are produced under irrigation is an essential part of his farming operation.
- ❑ There is no surface runoff on the property that can be used for irrigation. The farmer is totally reliant on groundwater.

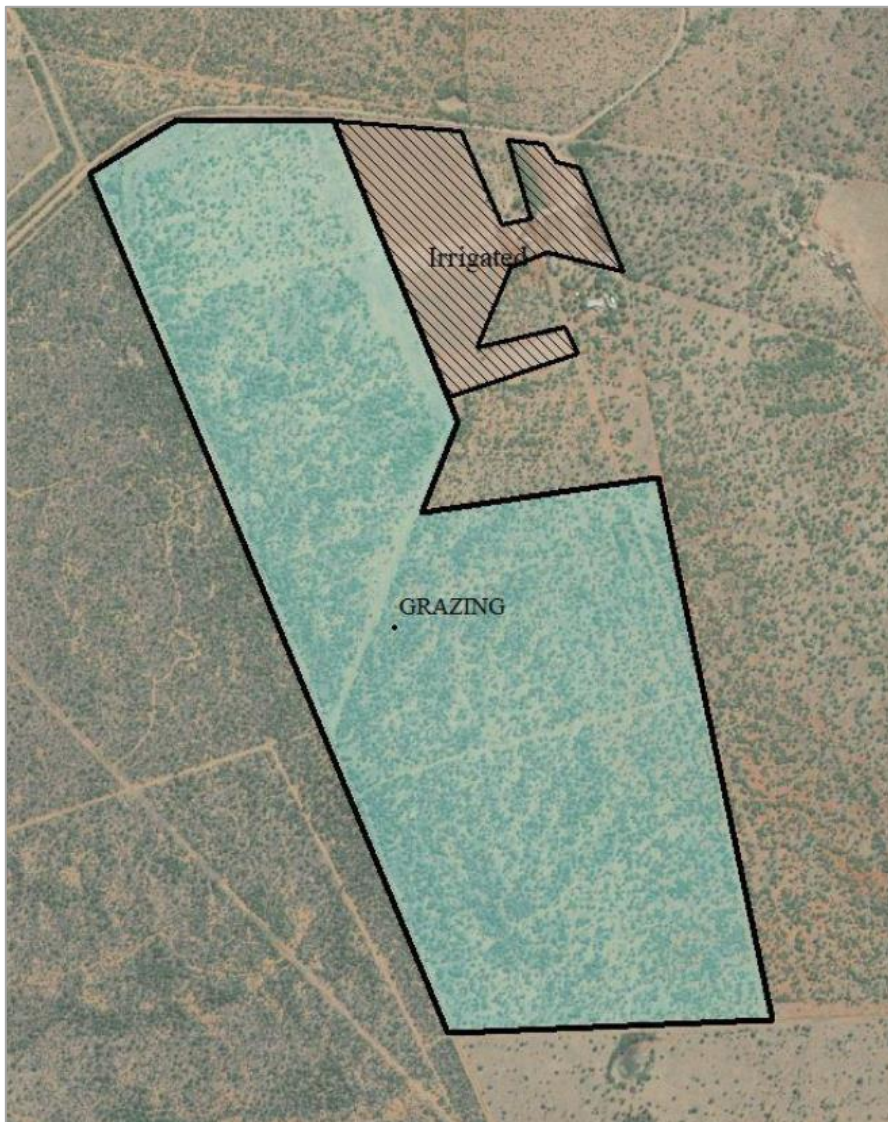


Figure 38: Present land uses on the site (note that the irrigated land is excluded from the development footprint) (Gouws, 2023)

A synopsis of the Agricultural Impact Assessment that was undertaken for the Project is provided in **Section 12.7** below.

11.10 Air quality

Potential sources of air pollution in the region include the following:

- Mining and activities in the region;
- Fugitive dust emissions from agricultural activities;
- Vehicle exhaust emissions from vehicles traveling on paved and unpaved roads;
- Biomass burning (veld fires);
- Domestic fuel burning;
- Industrial operations;
- Waste treatment and disposal; and
- Other fugitive dust sources such as wind erosion from exposed areas.

Receptors to air quality pollution include people residing in surrounding settlements and farm dwellings, ecological features (fauna and flora), livestock and crops.

11.11 Noise & Vibration

In terms of the local acoustical environment, the background noise levels are expected to be typical of rural areas. Noise in the greater area emanates primarily from anthropogenic sources in towns, farming operations (e.g., use of farming equipment), vehicles on the surrounding road network, human activities in surrounding settlements and trains passing on railway lines.

Sensitive receptors to noise and vibration include surrounding communities, sensitive faunal species, and livestock.

11.12 Cultural Heritage & Palaeontological Features

11.12.1 *Cultural Heritage*

The information to follow was obtained from the Heritage Impact Assessment (Kitto, 2023) (contained in **Appendix E5**). Refer to **Sections 12.8** and **13.16** below for a synopsis of the study and a related impact assessment, respectively.

The Heritage Impact Assessment provides an overview of the archaeological and historical overview of the general region, covering the Stone Age, Iron Age, Historic/Colonial Period, and the recent/ modern history.

An assessment of available historical topographical maps was undertaken to establish a historic layering for the study area. As can be seen in **Figure 39** (Layout Alternative 1) and **Figure 40** (Layout Alternative 2) below, which show the 1:50 000 map sheet 2527AC Heystekrand Edition 1 1963, no heritage features occur within the proposed development footprint. The only heritage

features depicted in the vicinity of the Project Area are two groups of structures and one homestead, which are located outside the proposed development footprint, east of the northern section.

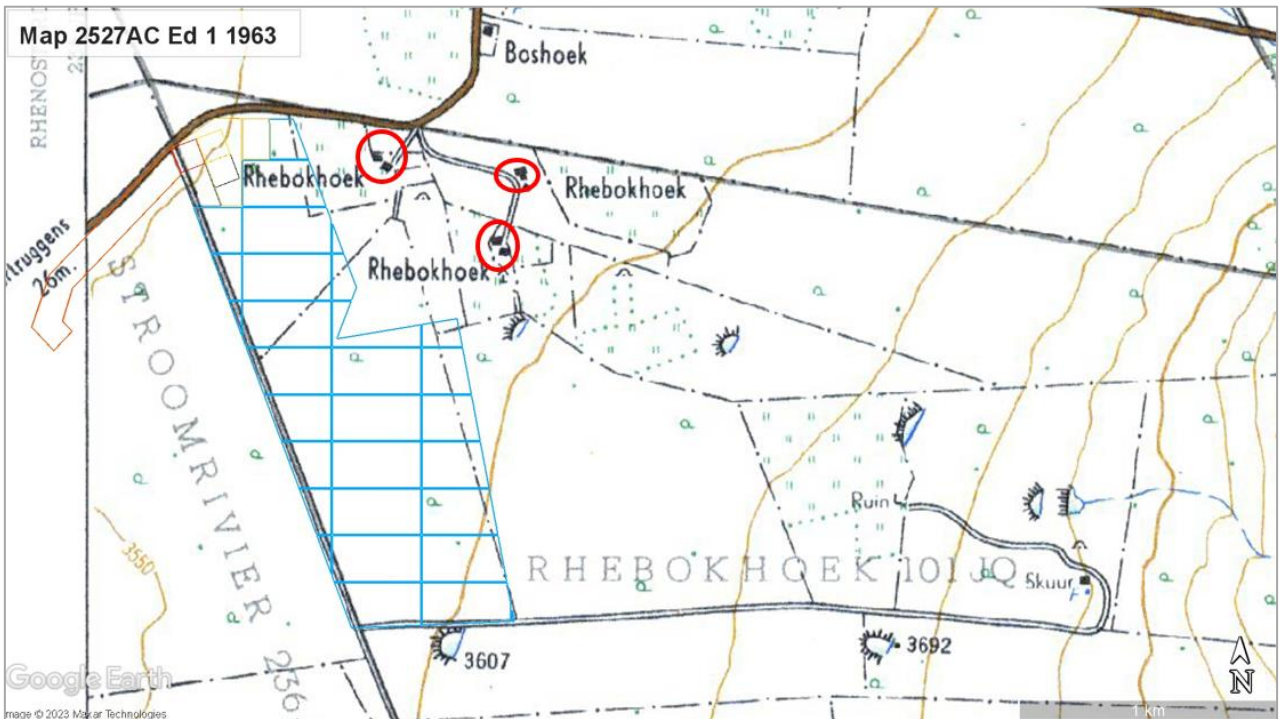


Figure 39: Heritage features in relation to Project Area (Layout Alternative 1) based on topographic map 2527AC Ed 1 1963 (Kitto, 2023)

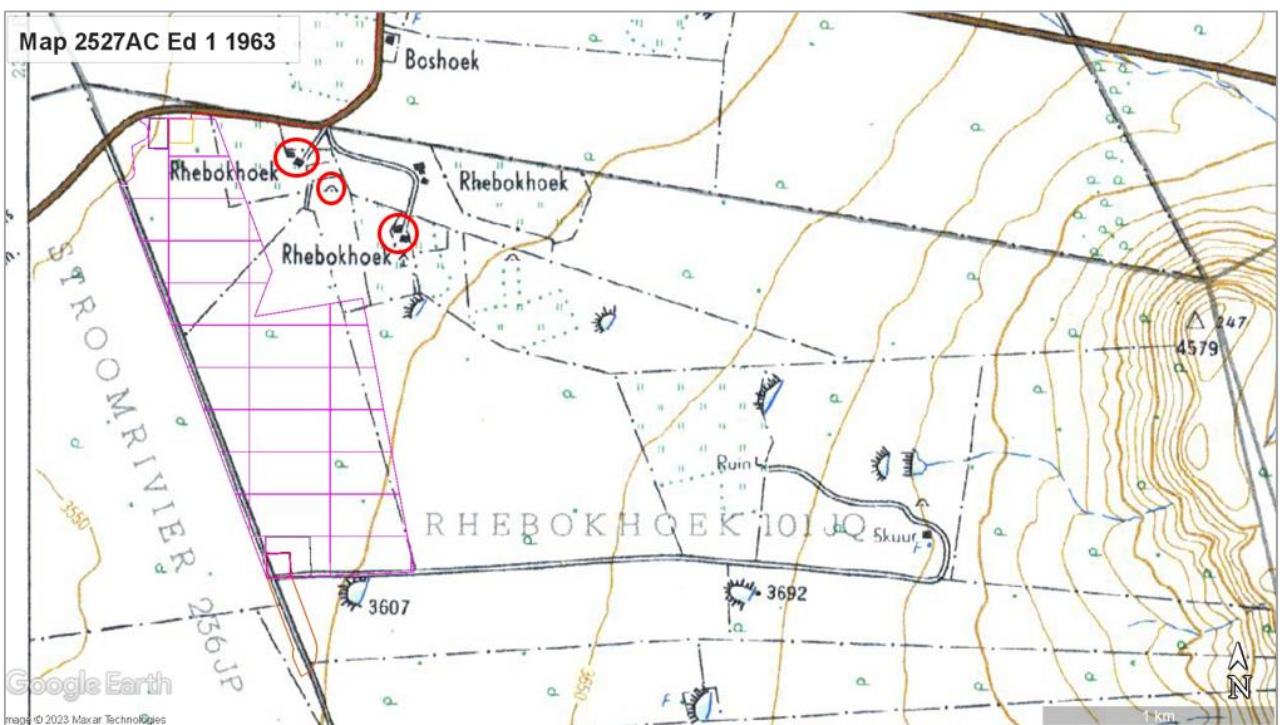


Figure 40: Heritage features in relation to Project Area (Layout Alternative 2) based on topographic map 2527AC Ed 1 1963 (Kitto, 2023)

11.12.2 Palaeontological Features

The information to follow was obtained from Palaeontological Desktop Assessment (Butler, 2023) (contained in **Appendix E6**). Refer to **Sections 12.9** and **13.17** below for a synopsis of the study and a related impact assessment, respectively.

The study area is underlain by undifferentiated Quaternary surface deposits as well as the Silverton Formation (Pretoria Group, Transvaal Supergroup). The PalaeoMap of the South African Heritage Resources Information System (SAHRIS) indicates that the Palaeontological Sensitivity of Quaternary deposits is Moderate while that of the Silverton Formation is High. The Palaeontological Sensitivity for the proposed development is High based on the Screening Tool.

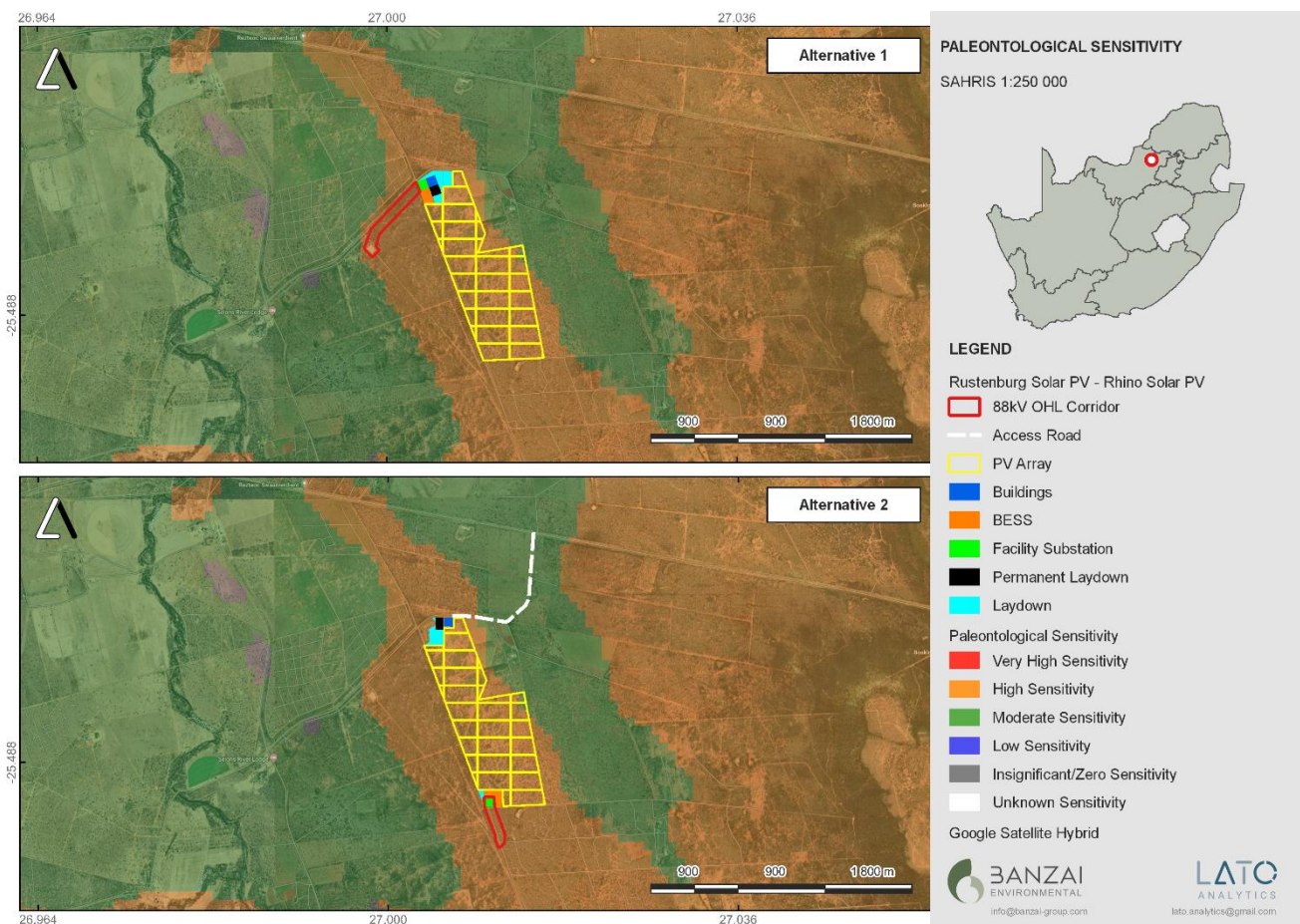


Figure 41: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences) indicating the proposed site (Butler, 2023) (Orange/Yellow = High; Green = Moderate)

11.13 Planning

The following is noted from a planning perspective:

- The proposed PV Site and power line are located outside of the urban edge and should not impact on future urban expansion.
- In the event that the Solar PV Plant must be decommissioned, the decommissioning phase will include measures for complying with the prevailing regulatory requirements, rehabilitation and

managing environmental impacts in order to render the affected area suitable for a future desirable use (anticipated to revert back to grazing).

- According to DFFE's REEA Database (refer to **Section 13.28.2**), there are no approved renewable energy applications that have been made within a 30km radius of the PV Site.

11.14 Existing Structures and Infrastructure

The site is vacant. Farming structures occur to the immediate north-east of the site.

11.15 Transportation

The transportation network surrounding the Project Area is shown in **Figure 42** below.

The site is accessed by tar and gravel roads, which are linked to the road between Lindleyspoort and Boschhoek (R556), which runs to the north of the site.

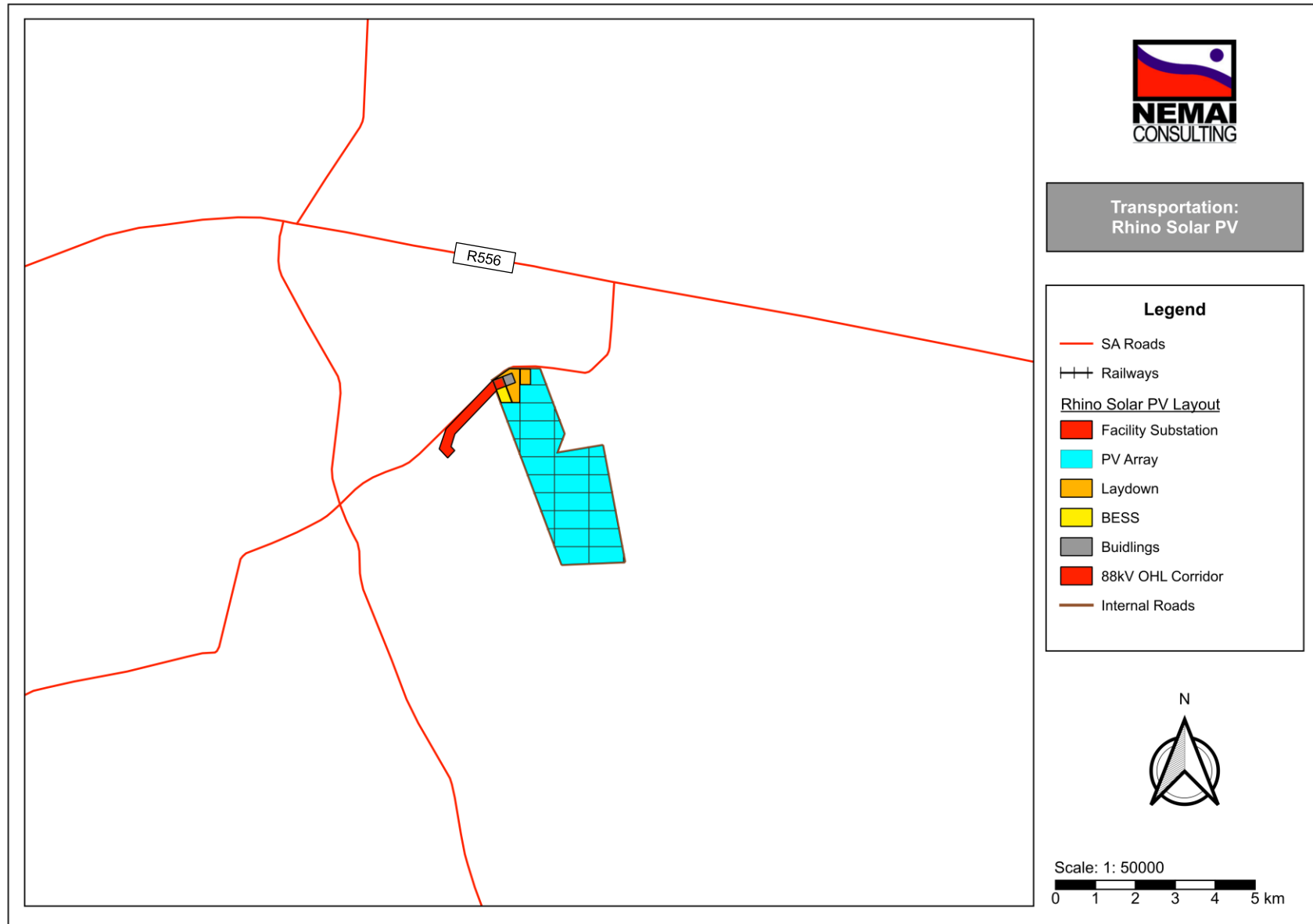


Figure 42: Transportation network in relation to Project Area (Layout Alternative 1)

12 SUMMARY OF SPECIALIST STUDIES

12.1 Specialist Studies undertaken as part of the EIA

A crucial element of the Plan of Study for the EIA prepared during the Scoping phase was to provide the Terms of Reference for the requisite specialist studies triggered during Scoping. According to Münster (2005), a 'trigger' is "*a particular characteristic of either the receiving environment or the proposed project which indicates that there is likely to be an issue and/or potentially significant impact associated with that proposed development that may require specialist input*".

The requisite specialist studies 'triggered' by the findings of the Scoping process, aimed at addressing the key issues and compliance with legal obligations, include the following:



1. Aquatic Compliance Statement;
2. Terrestrial Biodiversity Compliance Statement;
3. Avifauna Impact Assessment;
4. Agricultural Compliance Statement;
5. Heritage Impact Assessment;
6. Palaeontological Desktop Assessment;
7. Visual Impact Assessment;
8. Social Impact Assessment; and
9. Transport Impact Assessment.


12.2 Excluded Specialist Studies identified during Environmental Screening

As mentioned in **Section 6.3** above, a Screening Report for the proposed Project was compiled by means of the Screening Tool, which was appended to the Application Form. **Table 12** below lists the specialist studies that were identified in the Screening Report, but which were not deemed to be necessary.

Table 12: Specialist studies identified in the Screening Report that are deemed unnecessary

Specialist Study identified in Screening Report	Reason for not undertaking the Specialist Study
Civil Aviation Assessment	<p>The map that was created by the Screening Tool showed low civil aviation sensitivity in terms of the Project Area, as there are no major or other types of civil aviation aerodromes in proximity to the site.</p> <p>The South African Civil Aviation Authority (SACAA) is mandated with controlling, promoting, regulating, supporting, developing, enforcing, and continuously improving levels of safety and security throughout the civil aviation industry. The SACAA was included in the Project notification. They will further be afforded the opportunity to review the draft EIA Report and to provide comments.</p> <p>The low sensitivity of the site in terms of the RFI theme is confirmed.</p>

Specialist Study identified in Screening Report	Reason for not undertaking the Specialist Study
	<p style="text-align: center;">MAP OF RELATIVE CIVIL AVIATION (SOLAR PV) THEME SENSITIVITY</p>  <p style="text-align: center;">Civil Aviation Theme Sensitivity – Screening Tool</p>
<p>Defence Assessment</p>	<p>The map that was created by the Screening Tool showed that the Project Area has low sensitivity in terms of the relative defence theme.</p> <p style="text-align: center;">MAP OF RELATIVE DEFENCE THEME SENSITIVITY</p>  <p style="text-align: center;">Defence Theme Sensitivity – Screening Tool</p> <p>Upon interrogation of the surrounding environment, through the site visit, desktop review and satellite imagery, no evidence was found of any military or defence operations or installations. It was thus not deemed necessary to undertake this study. The low sensitivity of the site in terms of the defence theme is confirmed.</p>

Specialist Study identified in Screening Report	Reason for not undertaking the Specialist Study
<p>Radio Frequency Interference (RFI) Assessment</p>	<p>The map that was created by the Environmental Screening Tool showed that the Project Area has low sensitivity in terms of the relative RFI theme. It was thus not deemed necessary to undertake this study.</p> <p style="text-align: center;">MAP OF RELATIVE RFI THEME SENSITIVITY</p>  <p style="text-align: center;">RFI Theme Sensitivity – Screening Tool</p> <p>Furthermore, research (e.g., United States Federal Aviation Administration, 2010) suggests that RFI from PV installations poses a low risk. PV systems equipment such as step-up transformers and electrical cables are not sources of electromagnetic interference because of their low frequency of operation and PV panels themselves do not emit EMI. The only component of a PV array that may be capable of emitting EMI is the inverter. Inverters, however, produce extremely low frequency EMI similar to electrical appliances and at a distance of 46 m from the inverters the EM field is at or below background levels. Standard engineering mitigations will be implemented to address RFI at the PV site, as necessary.</p> <p>The low sensitivity of the site in terms of the RFI theme is confirmed.</p>

12.3 Incorporating the Findings from Specialist Studies

The *Guideline for the review of specialist input in EIA processes* (Keatimilwe & Ashton, 2005) was used for including the findings of the specialist studies into the EIA Report. Key considerations included the following:

- Ensuring that the specialists have adequately addressed I&APs’ issues and specific requirements prescribed by environmental authorities;
- Ensuring that the specialists’ input is relevant, appropriate and unambiguous; and
- Verifying that information regarding the receiving ecological, social and economic environment has been accurately reflected and considered.

The information obtained from the respective specialist studies was incorporated into the EIA Report in the following manner:

- ❑ The assumptions and limitations identified in each study were included in **Section 7** above;
- ❑ The information was used to complete the description of the receiving environment (**Section 11**) in a more detailed and site-specific manner;
- ❑ A summary of each specialist study is contained in the sub-sections to follow (**Sections 12.4 – 12.12** below), focusing on the approach to each study, key findings and conclusions drawn;
- ❑ The specialists' impacts assessments, and the identified mitigation measures, were included in the overall project impact assessment contained in **Section 13** below;
- ❑ The evaluations performed by the specialists on the alternatives were included in **Section 14** below to identify the most favourable option;
- ❑ Specialist input was obtained to address comments made by I&APs that related to specific environmental features pertaining to each specialist discipline; and
- ❑ Salient recommendations made by the specialists were taken forward to the final EIA Conclusions in **Section 16** below.

Refer to **Appendix E** for declarations from the respective specialists.

12.4 Aquatic Compliance Statement

A summary of the Aquatic Compliance Statement (van Rooyen, 2023) follows. The specialist report is contained in **Appendix E1**.

12.4.1 *Details of the Specialist*

The details of the specialists that undertook the Wetland Delineation and Risk Assessment follow.

Organisation:	Nitai Consulting
Name:	Divan van Rooyen/Antoinette Bootsma
Qualifications:	PhD Environmental Science
No. of years' experience:	1 year/18years
Affiliation (if applicable):	SACNASP (Candidate Natural Scientist – Environmental Science (Registration No. 151272)); IAIA (Membership No. 7063); South African Aquatic Scientists (SASAqS – Membership No. SASAQS0101/ SACNASP Registration No. 400222-09.

12.4.2 *Objectives of the Study*

The objectives of this study included identifying watercourses in the Project Area and verifying the aquatic biodiversity sensitivity in terms of Screening Tool. The study aimed to comply with the relevant Protocol for Aquatic Biodiversity.

12.4.3 Methodology

Site sensitivity was determined by conducting a Desktop Study through using the latest Satellite Imagery as well as various layers of spatial data. Thereafter, a site visit was conducted on 19 January 2023 and 31 January 2023 which included the following:

- Identifying all areas of interest identified during the Desktop Study;
- Identifying and classifying all watercourses; and,
- Ground-truthing aquatic biodiversity sensitivity.

12.4.4 Key Findings of the Study

12.4.4.1 Verification of Site Sensitivity – Screening Tool

According to the Screening Tool, the sensitivity of the Aquatic Biodiversity Theme in the Project Area is Low (see **Figure 43**).



Figure 43: Sensitivity of Aquatic Biodiversity Theme - Screening Tool (van Rooyen, 2023)

The site does not contain any sensitive freshwater features (drainage lines, streams, rivers and wetlands). No plants indicative of a moisture gradient were recorded on the site. Two small rainwater-fed dams were identified in the Project Area. **Figure 44** below shows the environment within the proposed Project footprint.

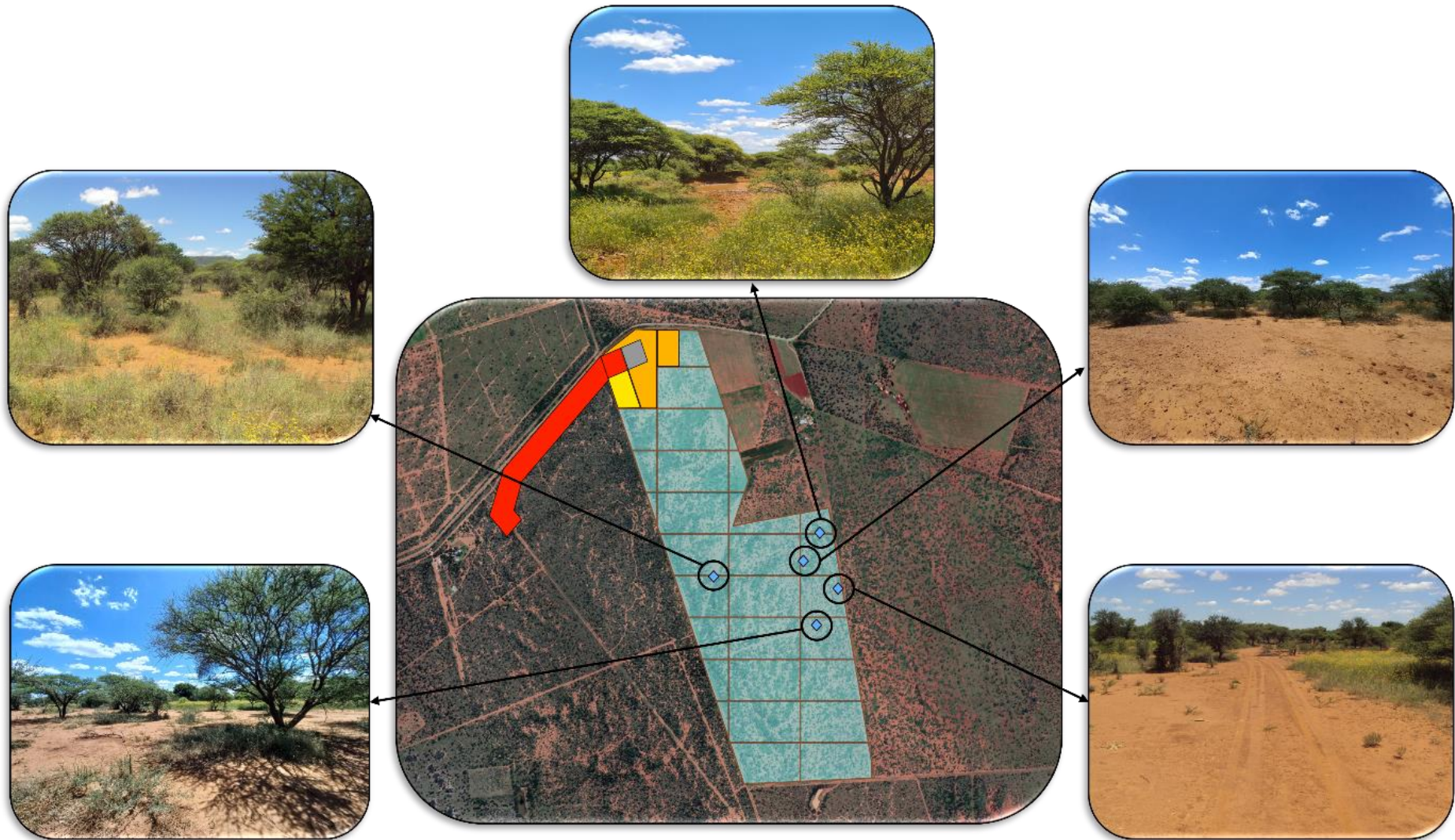


Figure 44: Photographs indicating the general environment within the proposed Project footprint (van Rooyen, 2023)

12.4.5 Conclusions

According to spatial data, no freshwater features are found within the Project Area. This was verified by the absence of wetland vegetation indicators as well as the absence of wetland soil indicators during the fieldwork. The study area comprises Hutton soils. The vegetation recorded throughout the site is not associated with wetlands and rather with terrestrial vegetation. Therefore, it is concluded that no wetland or riparian habitat exists on the site and that no watercourses will be affected.

The specialist concurred with the Screening Tool that the sensitivity of the Aquatic Biodiversity Theme in the Project Area is Low.

The specialist recommended that the development may proceed. Preference is given to the Layout Alternative 2 due to the small agricultural rainwater-fed dam.

12.5 Terrestrial Biodiversity Compliance Statement

A summary of the Terrestrial Biodiversity Compliance Statement (Human, 2023) follows. The specialist report is contained in **Appendix E2**.

12.5.1 Details of the Specialist

The details of the specialists that compiled the Terrestrial Biodiversity Compliance Statement follow.

Organisation:	Nitai Consulting
Name:	H.E. Human
Qualifications:	M-Tech Degree Nature Conservation
No. of years' experience:	13
Affiliation (if applicable):	SACNASP Professional Natural Scientist (Registration No.: (147031)

12.5.2 Objectives of the Study

The study aimed to comply with the relevant Protocols for Terrestrial Biodiversity, Terrestrial Plant Species and Terrestrial Animal Species.

12.5.3 Methodology

The assessment included the following tasks (amongst others):

- Existing data layers were incorporated into GIS software to establish how the proposed Project might interact with any ecologically important features.

- ❑ A botanical assessment was undertaken, which encompassed an assessment of all the vegetation units and habitat types within the Project Area. This focused on an ecological assessment of habitat types as well as identification of any Red Data species within known distribution of the Project Area. The fieldwork methodology included timed meanders, sensitivity analysis based on structural and species diversity, identification of protected floral species, and identification of floral red-data or red-listed species (SCC).
- ❑ A faunal assessment was undertaken, which included the following:
 - The faunal desktop assessment encompassed –
 - Compilation of expected species lists;
 - Identification of any Red Data or SCC potentially occurring in the area; and
 - Emphasis was placed on the probability of occurrence of species of provincial, national and international conservation importance.
 - The field survey component of the assessment utilised a variety of sampling techniques including, but not limited to, the following -
 - Visual observations;
 - Active hand-searches, used for species that shelter in or under particular micro-habitats;
 - Identification of tracks and signs; and
 - Utilisation of local knowledge.
 - Various field guides and texts were consulted for identification purposes in the field during the survey.

The wet season fieldwork (completed during January 2023) was conducted to ground-truth the floral, faunal, and habitat features of the Project Area.

12.5.4 *Key Findings of the Study*

A description of the terrestrial ecological features in the Project Area is contained in **Section 11.7** above. Key findings from the study follow.

12.5.4.1 Habitat Survey and Site Ecological Importance

The main habitat types (see **Figure 45**) identified across the Project Area were initially identified and pre-delineated largely based on aerial satellite imagery. These habitat types were then refined based on the field coverage and data collected during the survey.

The habitat has been modified from its natural state, and it represents habitat that has been historically impacted and has not recovered. This habitat is largely limited to areas that have been impacted through effects from agricultural grazing practices and associated impacts, roads, and land use, as well as mismanagement and inadequate rehabilitation procedures. These habitats are not entirely transformed, but exist in a constant degraded state, as they cannot recover to a more natural state, due to the ongoing disturbances and impacts received.

Transformed habitat was present in the form of the existing road, existing infrastructure, or any other areas devoid of vegetation, artificially. Due to the transformed nature of this habitat, it is regarded as having a very low sensitivity.

Bush thickened habitat was found on extensive areas of the property with areas denuded of vegetation. There is surface crust formation and evidence of water runoff due to extremely low herbaceous vegetation cover. Due to the disturbance of this area and ongoing incorrect grazing management this area is considered as having a very low sensitivity.

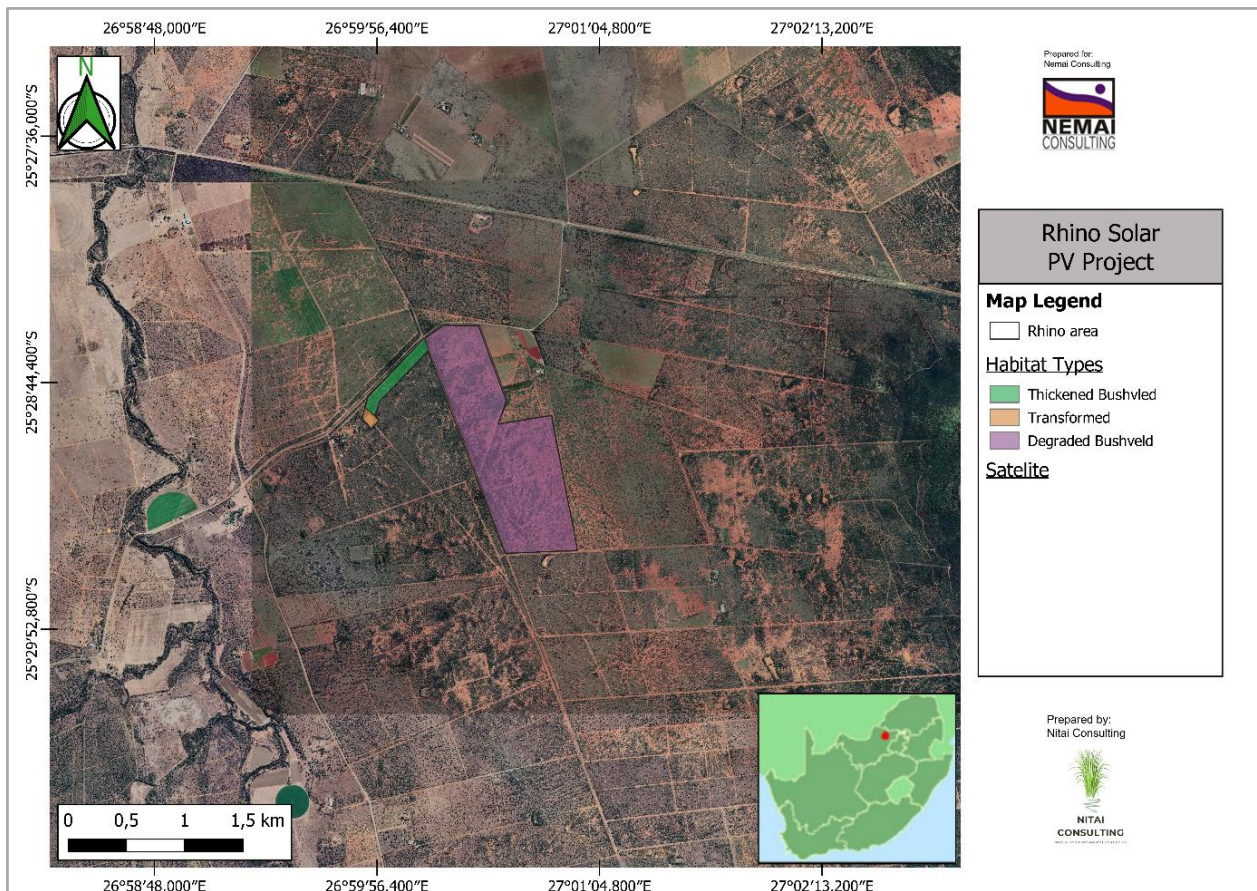


Figure 45: Habitat types found in the Project Area (Human, 2023)

The three delineated habitat types were allocated a sensitivity category, or Site Ecological importance (SEI), and presented in **Table 13** below. The sensitivity of each of the habitat types delineated within the Project Area are mapped in **Figure 46**.

Table 13: Summary of SEI assessment of habitat types delineated within Project Area (Human, 2023)

Habitat Type	Conservation Importance	Functional Integrity	Biodiversity importance	Receptor resilience	SEI
Degraded Savanna	Low	Medium	Low	Medium	Low
Transformed	Low	Medium	Low	Medium	Low
Thickened Savanna	Low	Medium	Low	Medium	Low

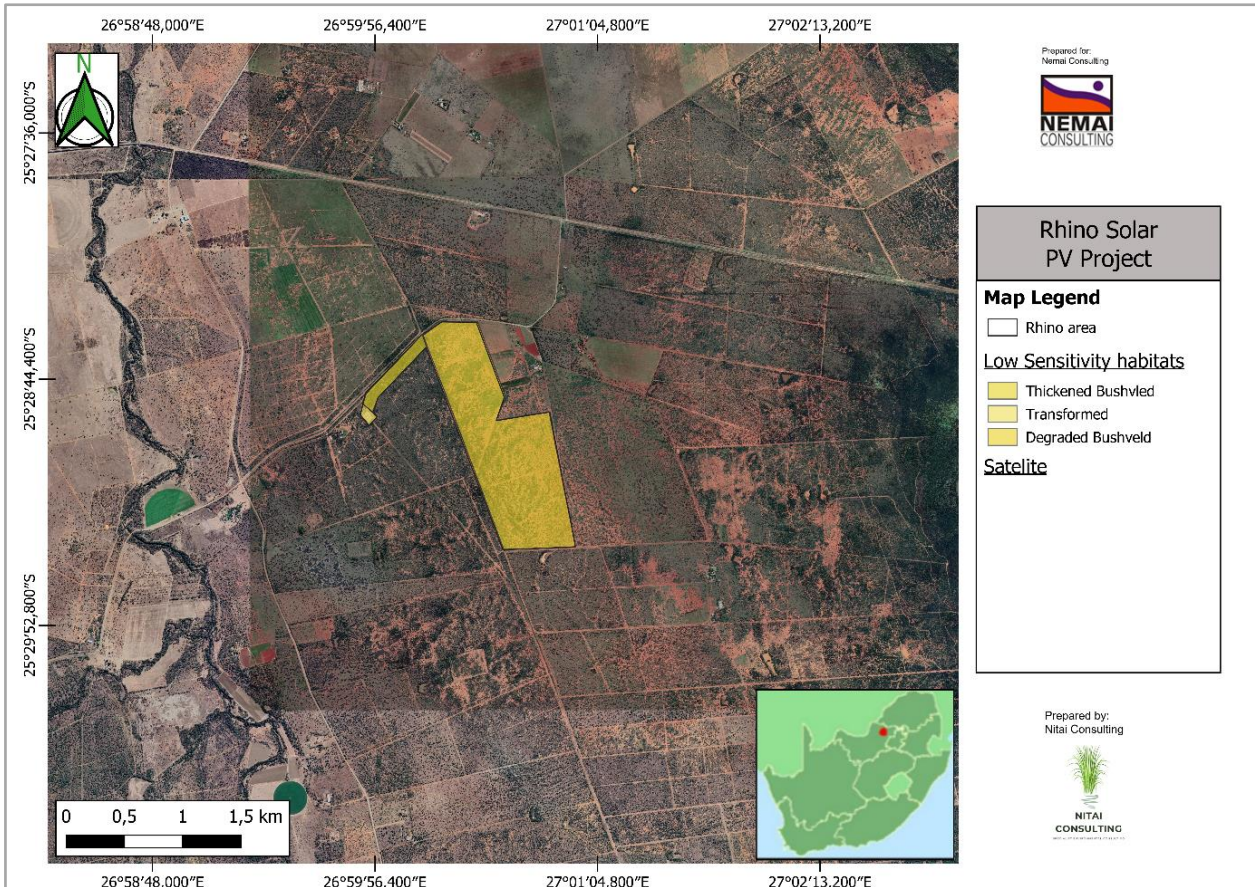


Figure 46: Biodiversity SEI delineation relevant to Project Area (Human, 2023)

12.5.4.1 Verification of Site Sensitivity – Screening Tool

The sensitivity in terms of the Terrestrial Biodiversity Theme identified by the Screening Tool is shown to be ‘Very High’ (see **Figure 47**). Following the completion of the terrestrial desktop assessment and fieldwork, the sensitivity is disputed. As discussed, the Project Area is largely modified and as such is assigned a sensitivity rating of ‘Low’.

The Screening Report further classified the sensitivity in terms of the Animal Species Theme as mostly ‘Medium’, apart from a small section of the power line route near the existing substation for Layout Alternative 1 which is ‘High’. In addition, the Screening Report indicates that the sensitivity in terms of Plant Species Themes is ‘Low’. Following the field survey, the sensitivity in terms of the Animal and Plant Species Themes were verified to be ‘Low’. This is related to the limited suitable habitat available to support the regular occurrence of any faunal SCC within the Project Area.

12.6 Avifauna Impact Assessment

A summary of the Avifauna Impact Assessment (de Wet, 2023) follows. The specialist report is contained in **Appendix E3**.

12.6.1 *Details of the Specialist*

The details of the specialists that undertook the Avifauna Impact Assessment follow.

Organisation:	The Biodiversity Company &	
Name:	L. de Wet	A. Husted
Qualifications:	MSc Botany	MSc Aquatic Health
Affiliation (if applicable):	SACNASP Professional Natural Scientist (Registration No.: 400233/12)	SACNASP Professional Natural Scientist (Registration No.: 400213/11)

12.6.2 *Objectives of the Study*

The study aimed to comply with the Protocol for Terrestrial Animal Species. In addition, based on the size of the PV facility and the associated risk, a Regime 2 assessment was undertaken in terms of the Birds and Solar Energy Best Practice Guidelines (BirdLife South Africa, 2017).

The scope of the study included the following:

- Desktop assessment to identify the relevant ecologically important geographical features within the Project Area of Influence (PAOI) and surrounding landscape;
- Desktop assessment to compile an expected species list and possible avifauna SCC that potentially occur within the PAOI;
- Description of the baseline avifauna species and Functional Feeding Guild (FFG) composition assemblage within the PAOI;
- Delineate site sensitivity or sensitivities i.e., the Site Ecological Importance (SEI) within the context of the avifauna species assemblage of the PAOI;
- Identify the manner that the proposed development impacts the avifauna community and evaluate the level of risk of these potential impacts; and
- Provide mitigation measures to prevent or reduce the possible impacts.

12.6.3 *Methodology*

The assessment included the following tasks (amongst others):

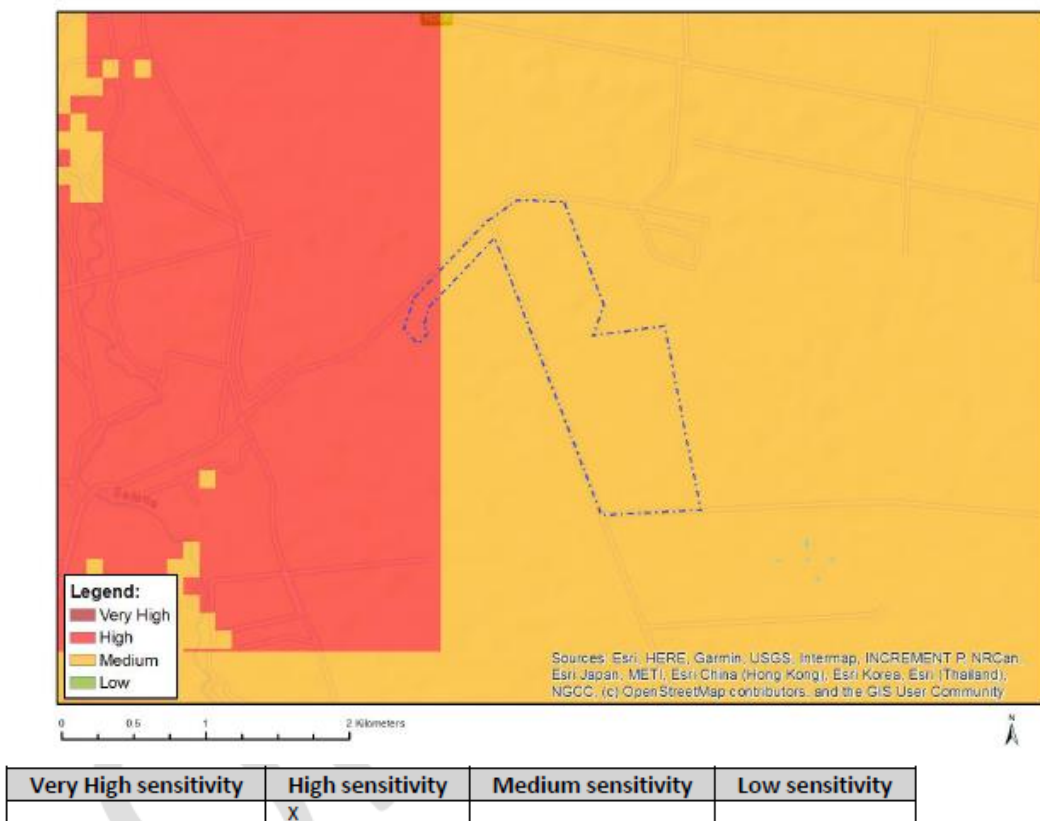
- Various sources were reviewed as part of the desktop assessment and for compiling the expected species list; and
- Two field surveys were undertaken during the 5th to the 8th of January 2023 (wet season) (Survey 1) and the 13th to the 16th of March 2023 (wet season) (Survey 2). Sampling consisted of Standardised Point Counts as well as random diurnal incidental surveys.

12.6.4 Key Findings of the Study

12.6.4.1 Verification of Site Sensitivity – Screening Tool

The Animal Species Theme sensitivity, as indicated in the Screening Report, is ‘High’ for the PAOI (**Figure 48**). The high sensitivity for a portion of the Project Area, from an avifaunal perspective, was due to the likely presence of *Torgos tracheliotos* (Lappet-faced Vulture) and a ‘Medium’ sensitivity for the remainder of the site due to the probable presence of *Aquilas rapax* (Tawny Eagle).

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



Sensitivity Features:

Sensitivity	Feature(s)
High	Aves-Torgos tracheliotos
Medium	Aves-Aquila rapax
Medium	Sensitive species 5
Medium	Mammalia-Crocidura maquassiensis
Medium	Mammalia-Lycaon pictus

Figure 48: Sensitivity of Relative Animal Species Theme - Screening Tool (de Wet, 2023)

12.6.4.2 Fine-Scale Habitat Use

Fine-scale habitats within the landscape are important in supporting a diverse avifauna community as they provide differing nesting, foraging and reproductive opportunities. The primary habitat type delineated within the PAOI consists of Thorny Bushveld (**Figure 49**).

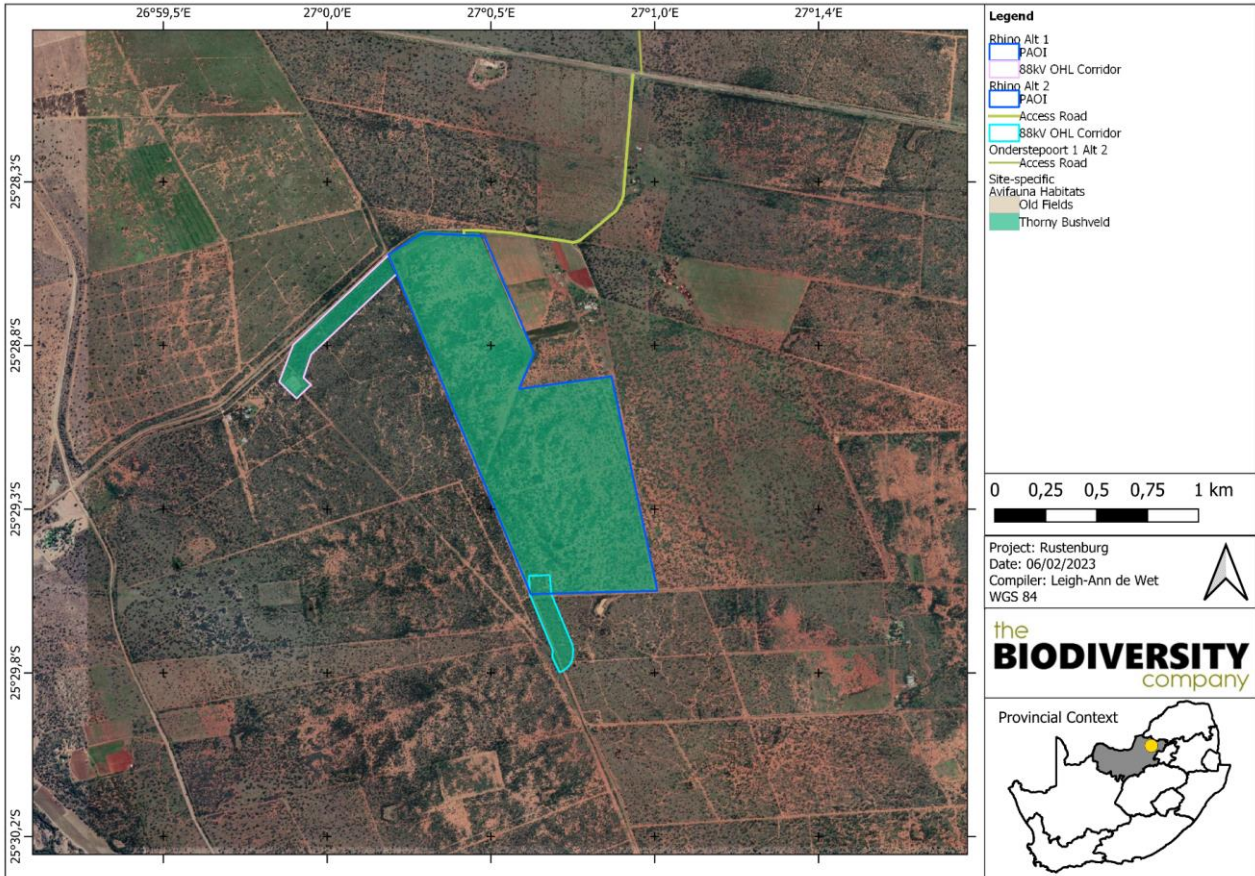


Figure 49: Habitat types delineated within the proposed Project Area PAOI (de Wet, 2023)

12.6.4.3 Site Ecological Importance

The SEI of the PAOI within an avifauna context was based on both the field results and desktop information. The SEI of the habitat type delineated in the Project Area is shown in **Figure 50**. Due to a high diversity of species in the thorny bushveld, this habitat was assigned a medium SEI.

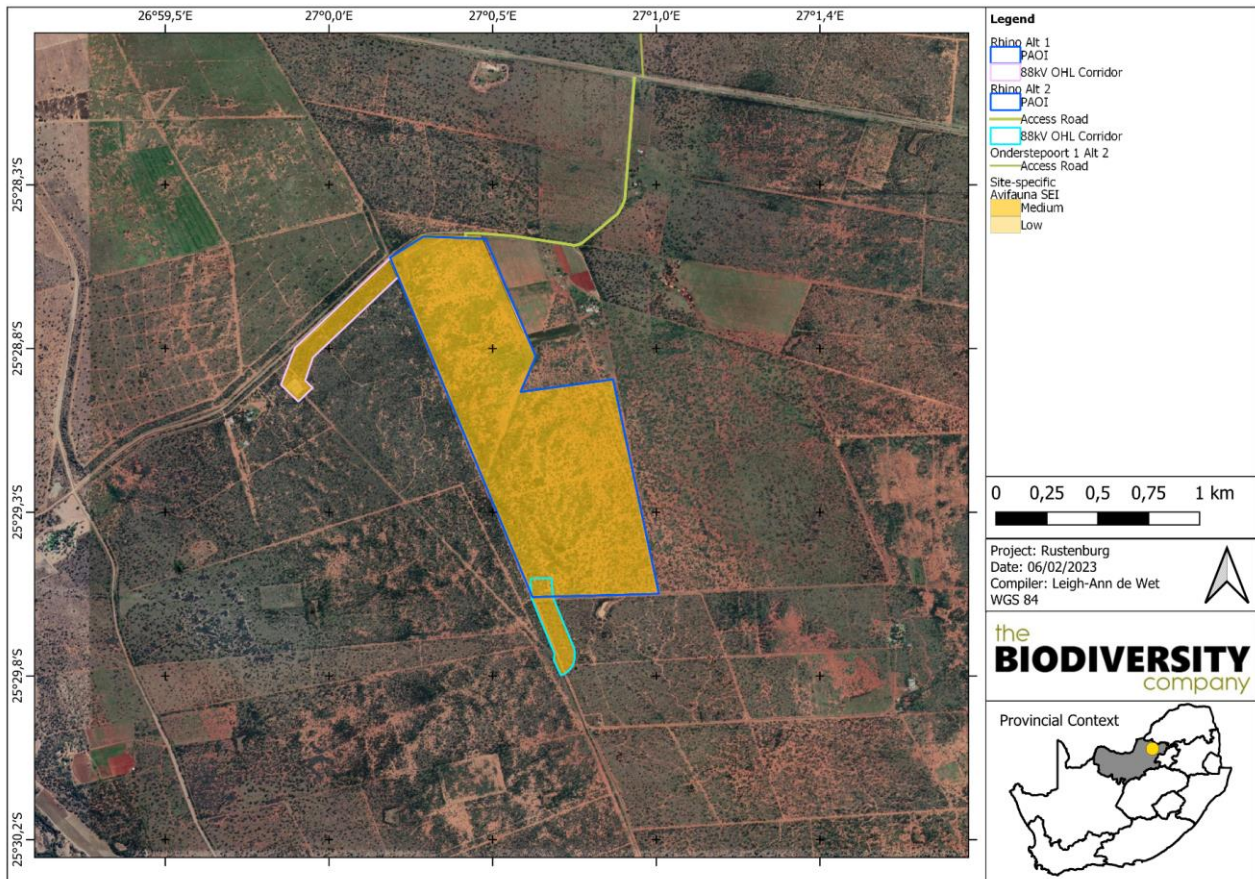


Figure 50: Site Ecological Importance of the proposed Project Area PAOI from an avifaunal perspective (de Wet, 2023)

12.6.5 Impact Assessment

Refer to **Section 13.14** below for the results from the impact assessment from this study.

12.6.6 Conclusions

During the first assessment performed in the wet season (5th – 8th of January 2023) 119 species were recorded during the point counts. One of the species recorded were SCC i.e., *Sagittarius serpentarius* (Secretarybird). During the second assessment performed in the summer (13th to the 16th of March 2023) 110 species were recorded during the point counts. One of the species recorded during incidental sightings were SCC i.e., *Sagittarius serpentarius* (Secretarybird). Seventeen (17) risk species were recorded in the first survey, and sixteen (16) in the second survey. These are species at risk for collisions, electrocutions or sensitive to habitat loss.

The SEI of the Rhino PAOI of both alternatives were found to be medium, with current impacts identified as roads and fences and associated infrastructure as well as cattle grazing and agriculture. Impacts were identified as being Moderately High to Moderate in the Construction Phase, most of which could be reduced to Moderate to Low, and even Absent with the application of mitigation measures. Impacts in the operational phase are expected to be Moderately High to

Moderate and can be reduced to Moderate to Low with mitigation measures. Decommissioning phase impacts are expected to be Moderately High to Moderate and can be reduced to Low with mitigation measures. Cumulative impacts are Moderate for the project in isolation but Moderately High for the project in consideration of the entire cluster.

Management measures include ensuring the construction footprint is kept small and industry-standard mitigations are put into place for solar panels, fencing and electrical infrastructure among other measures.

The main expected impacts of the proposed PV and associated infrastructure will include:

- Habitat loss and fragmentation;
- Electrocutations; and
- Collisions.

The identified mitigation measures can be implemented to reduce the significance of the risk to an acceptable residual risk level. Considering the above-mentioned information, it is the opinion of the Avifaunal Specialist that the Project may be favourably considered, on condition that all the mitigation and recommendations provided in this report and other specialist reports are implemented. The impacts for both alternatives are identical.

12.7 Agricultural Compliance Statement

A summary of the Agricultural Compliance Statement (Gouws, 2023) (contained in **Appendix E4**) follows.

12.7.1 *Details of the Specialist*

The details of the specialist that undertook the Agricultural Impact Assessment follow.

Organisation:	Index
Name:	Dr A. Gouws
Qualifications:	PhD Integrated Land Use Modelling
Affiliation (if applicable):	<ul style="list-style-type: none"> ▪ Council of Natural Sciences.No:400036/93, Category: Agricultural sciences. ▪ Member of the Soil Science Society of South Africa

12.7.2 *Objectives of the Study*

The study aimed to comply with the Protocol for the Agriculture Theme.

The objectives of the study include the following:

- Determine the agricultural potential in the Project's footprint;
- Determine impacts of the Project from an agricultural perspective;
- Suggest suitable mitigation measures to address the identified impacts; and

- Adhere to the Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Section 24(5) (a) and (h) and 44 of NEMA (“the Protocols”) promulgated in GN No. 320 of 20 March 2020.

12.7.3 Methodology

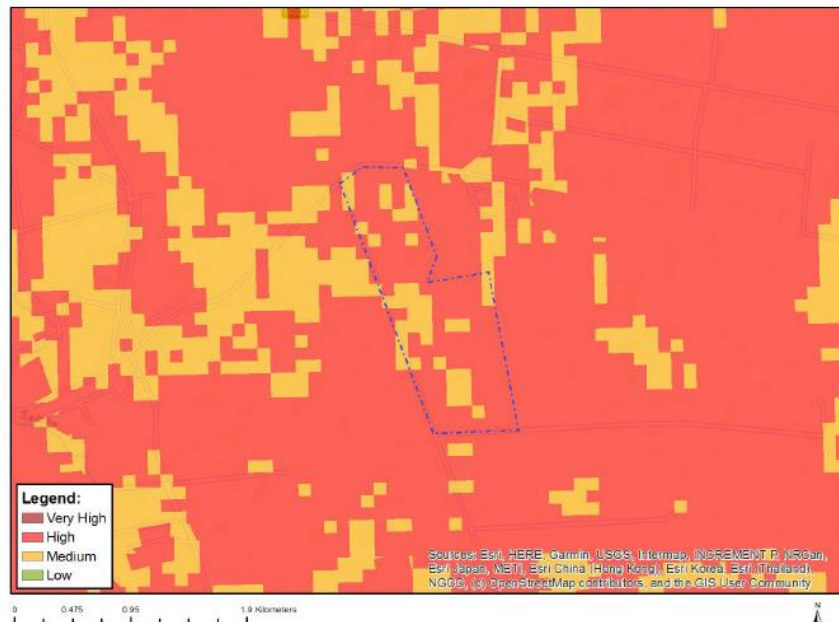
The sensitivity verification entailed a review of existing information on soils and topography on a desktop level to determine areas with high sensitivity. The desktop verification was done through use of satellite imagery. Thereafter, a site survey was undertaken on 4 April 2023. The report compared the current crop land and the environmental sensitivity as identified by the Screening Tool with the present situation.

12.7.4 Key Findings of the Study

12.7.4.1 Verification of Site Sensitivity – Screening Tool

The Screening tool indicates the following (see **Figure 51**):

- Field crop boundary - no cultivated land;
- Land sensitivity - moderately high (Category 6 to 10); and
- Site sensitivity is high in general, with small portions of medium sensitivity scattered throughout the site.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity	Feature(s)
High	Land capability;09. Moderate-High/10. Moderate-High
High	Annual Crop Cultivation / Planted Pastures Rotation;Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate
High	Annual Crop Cultivation / Planted Pastures Rotation;Land capability;09. Moderate-High/10. Moderate-High
Medium	Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate

Figure 51: Sensitivity of Agriculture Theme - Screening Tool (Gouws, 2023)

The outcome of the site sensitivity verification found the following:

- Field crop boundary - the survey agrees with the Screening Tool that there is no cultivated land.
- Land capability -
 - The sensitivity indicated in the Screening Tool is disputed. While much of the land has moderately deep soils with a high soil potential, the erratic and low rainfall and high summer temperatures reduce the land use capability to medium/low. This is reflected by the low carrying capacity for livestock as well as the low projected crop yield.
 - Using the same guidelines as in AGIS (Department of Agriculture, Land reform and Rural Development [DALRRD]), the land has low/moderate arable potential. This is because of the climatic conditions and its impact on potential crop yield. According to the criteria in AGIS the land is not arable and more suitable for livestock grazing.
- Viability of the land for commercial crop production -
 - The crop yield is too low for commercial crop production if maize is used as indicator crop.
 - Animal production - the property is too small to be viable and can only contribute towards the household income.

12.7.5 *Conclusions*

There will be no permanent loss of high potential land and only limited loss of agricultural production from the livestock. This applies to both the original and alternative layouts.

It is the specialist's opinion that there is no reason to prevent the Project from being implemented from an agricultural perspective.

12.8 Heritage Impact Assessment

A summary of the Heritage Impact Assessment (Kitto, 2023) (contained in **Appendix E5**) follows.

12.8.1 *Details of the Specialist*

The details of the specialist that undertook the Phase 1 Cultural Heritage Impact Assessment follow.

Organisation:	Nitai Consulting
Name:	Jennifer Kitto
Qualifications:	BA Archaeology and Social Anthropology; BA (Hons) Social Anthropology
No. of years' experience:	24
Affiliation (if applicable):	Association of Southern African Professional Archaeologists (ASAPA) - Technical member No.444

12.8.2 Objectives of the Study

The objectives of this study included the following:

- Undertake a Heritage Impact Assessment in accordance with the NHRA;
- Identify and map all heritage resources in the area affected, as defined in Section 2 of the NHRA, including archaeological sites on or near (within 100m of) the proposed development;
- Assess the significance of such resources in terms of the heritage assessment criteria as set out in the regulations;
- Assess the impacts of the Project on such heritage resources;
- Prepare a heritage sensitivity map (GIS-based), based on the findings of the study;
- Identify heritage resources to be monitored; and
- Comply with specific requirements and guidelines of NWHRA and SAHRA.

12.8.3 Methodology

The methodology employed during this study consisted of the following:

- An archaeological and historical literature survey was undertaken;
- A survey of Heritage Impact Assessments for projects in the region by various heritage consultants was conducted;
- Various databases were consulted; and
- An assessment of available historical topographical maps was undertaken to establish a historic layering for the study area.

12.8.4 Key Findings of the Study

12.8.4.1 Archaeological and Cultural Heritage Sensitivity - Screening Tool

The Screening Tool was accessed for information on the cultural-heritage sensitivity of the general region. This tool indicated that the Archaeological and Cultural Heritage Sensitivity of the Project Area is Low for both Layout Alternative 1 and Alternative 2 (see **Figure 52** and **Figure 53**).

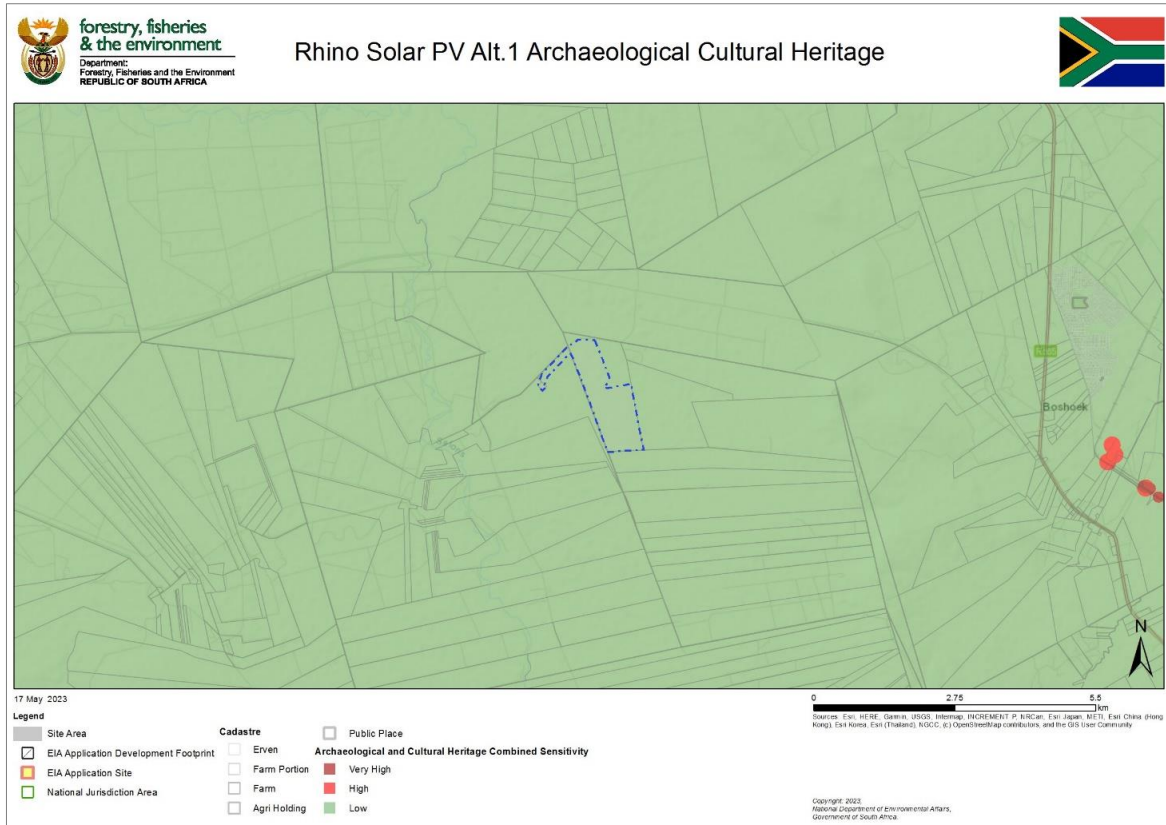


Figure 52: Screening Tool Archaeological Cultural Heritage Theme sensitivity map (Layout Alternative 1) (Kitto, 2023)

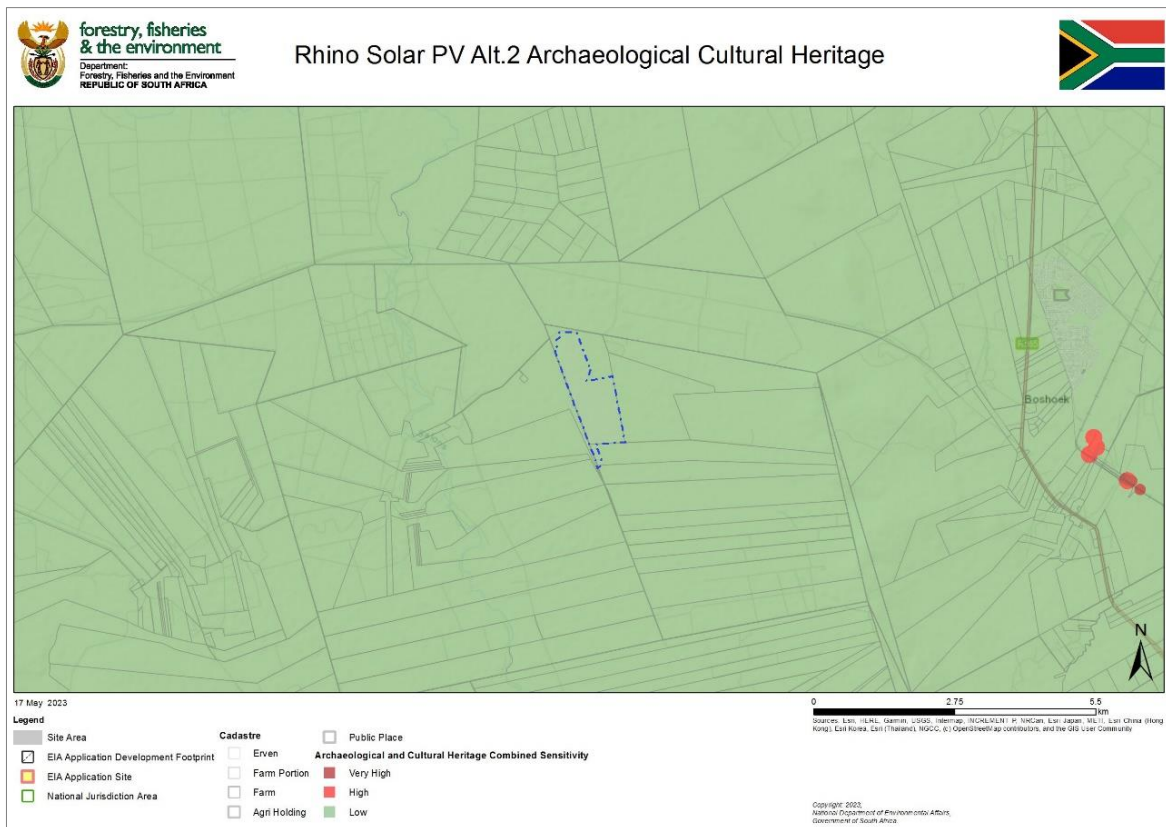


Figure 53: Screening Tool Archaeological Cultural Heritage Theme sensitivity map (Layout Alternative 2) (Kitto, 2023)

12.8.4.2 Findings of the Historical Desktop Study

The general overview from the historical desktop study showed that various archaeological and historical resources can be expected to occur in the Project Area. However, the examination of the earliest edition (1963) of the 1:50 000 topographical maps produced by overlying the maps with satellite Imagery (Google Earth) has shown that no heritage features are depicted within the development footprint, for either of the two alternative layouts.

12.8.4.3 Site Survey Results

The site survey did not identify any heritage resources occurring within or close to the Project Area.

The specialist thus concurs with the sensitivity identified in the Screening Tool.

12.8.5 Impact Assessment

Refer to **Section 13.16** below for the results from the impact assessment from this study.

12.8.6 Conclusions

The risk that the proposed Project poses to archaeological or heritage resources is considered to be low as no such features were identified within and adjacent to the project footprint (for either the Alternative 1 or Alternative 2 layouts). However, there is a low possibility that some archaeological material or unidentified graves could be uncovered sub-surface.

No fatal flaws were identified during this study, therefore, it is the considered opinion of The Heritage Specialist that the construction of the proposed Rhino Solar PV Project can proceed. There are no objections from a heritage perspective if the recommendations and mitigation measures are implemented. From a heritage perspective there is no difference between either of the two project layout alternatives and therefore there is no preference.

12.9 Palaeontological Desktop Assessment

A summary of the Palaeontological Desktop Assessment (Butler, 2023) (contained in **Appendix E6**) follows.

12.9.1 Details of the Specialist

The details of the specialist that undertook the Palaeontological Desktop Assessment follow.

Organisation:	Banzai Environmental
Name:	E. Butler

Qualifications:	MSc Zoology (specializing in Palaeontology)
Affiliation (if applicable):	Member of the Palaeontological Society of South Africa (PSSA)

12.9.2 Objectives of the Study

The general objectives of a Palaeontological Impact Assessment include the following:

- To identify the palaeontological importance of the rock formations in the footprint;
- To evaluate the palaeontological magnitude of the formations;
- To clarify the impact on fossil heritage; and
- To suggest how the developer might protect and lessen possible damage to fossil heritage.

12.9.3 Methodology

The following sources were reviewed as part of this study:

- Geological map 1:100 000, Geology of the Republic of South Africa (Visser 1984);
- Spatial data of the proposed development from the EAP;
- 1:250 000 Bloemfontein 2926 Geological map (1966) (Council of Geoscience, Pretoria);
- Updated geology produced by the Council of Geosciences, Pretoria; and
- Palaeontological Impact Assessment undertaken in the Bloemfontein area.

A site-specific field survey of the development footprint was conducted on 13 May 2023.

12.9.4 Key Findings of the Study

The study area is underlain by undifferentiated Quaternary surface deposits as well as the Silverton Formation (Pretoria Group, Transvaal Supergroup). The PalaeoMap of SAHRIS indicates that the Palaeontological Sensitivity of Quaternary deposits is Moderate while that of the Silverton Formation is High. The Palaeontological Sensitivity generated by the Screening Tool indicates that the Sensitivity of the proposed development is High. Updated Geology (Council of Geosciences) indicates that the proposed development is underlain by the alluvium, colluvium, eluvium and gravel as well as the Silverton Formation (Pretoria Group, Transvaal Supergroup). Two Layout alternatives have been proposed for the project. Layout Alternative One is the original layout and Alternative Two has been revised after specialist input. As the geology of the two layouts are the same there are no preference between the alternatives from a Palaeontological Perspective.

Based on the desktop research it is concluded that fossil heritage of scientific and conservational interest in the development footprint is rare. This is in contrast with the High Sensitivity allocated to the development area by the SAHRIS Palaeosensitivity Map and Screening Tool. A medium Palaeontological Significance has been allocated for the construction phase of the PV development pre-mitigation and a low significance post mitigation. The construction phase will be the only development phase impacting Palaeontological Heritage and no significant impacts are expected to impact the Operational and Decommissioning phases. As the No-Go Alternative considers the

option of 'do nothing' and maintaining the status quo, it will have a Neutral impact on the Palaeontological Heritage of the development. The Cumulative impact of the development is considered to be Low and falls within the acceptable limits for the project.

12.9.5 Impact Assessment

Refer to **Section 13.17** below for the results from the impact assessment from this study.

12.9.6 Conclusions

It is considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.

12.10 Visual Impact Assessment

A summary of the Visual Impact Assessment (Buys, 2023) (contained in **Appendix E8**) follows.

12.10.1 Details of the Specialist

The details of the specialist that undertook the Visual Impact Assessment follow.

Organisation:	Environmental Assurance (Pty) Ltd	
Name:	Andre Buys	Richard Viljoen
Qualifications:	MSc Environmental Science	MSc Environmental Science
Affiliation (if applicable):	SACNASP (Pr. Sci. Nat.) 119183	-

12.10.2 Objectives of the Study

The purpose of the Visual Impact Assessment included the following:

- Describing the existing visual characteristics of the proposed site and its environment;
- Determining areas from which the proposed development will be visible.
- Visual Impact Assessment in order to assess the significance of the visual impacts determined to be caused by the proposed development; and
- Recommendation of possible mitigation measures.

12.10.3 Methodology

An initial desktop site assessment was conducted to determine suitable locations regarding the assessment. The result of the desktop study is the identification of areas or activities, which could possibly contribute to the deterioration of the visual characteristics of the area.

Site baseline characterisation (and subsequent fieldwork) occurred on the 24th of April 2023 for the visual assessment. The site baseline characterisation was conducted to undertake the visual assessment of the current characteristics of the receiving environment. The field survey included photographic evidence at the various viewpoints, which were used as a basis for determining the potential visual ability and visual impacts of the proposed development. Various viewpoints were identified based on the sensitivity and visual impact of the area.

The assessment was conducted following the methodology:

- Site visit and orientation.
- Describing the landscape character or visual baseline.
- review of available aerial photography and topographical maps.
- Determining the area/s where the project will be visible from.
- Determining the visual resource value of the landscape.
- Determine the visual absorption capacity of the receiving visual landscape.
- Determining the receptor sensitivity to the proposed project.
- Determine the magnitude of the impact, by considering the visibility, visual intrusion and visual exposure.
- Assessing the impact significance .
- Recommending mitigation measures to reduce the potential visual impacts of the project.

12.10.4 Key Findings of the Study

12.10.4.1 Visual Absorption Capacity

The majority of vegetation cover is dominated by grasses, shrubs and scattered trees, while the topographical characteristics (flat to gentle), which can conceivably result in a low Visual Absorption Capacity (VAC). The visual resource value of the study area has been determined to be moderate and the VAC of the study area has been rated as low. Therefore, a high (1.2) weighting factor in terms of VAC is applied during the impact assessment.

12.10.4.2 Visual Receptor Sensitivity and Incidences

The following ratings were applied to the identified visual receptor groups:

- Resident Receptors: Resident receptors comprise a high number of people (incidence factor) living around the proposed project area -
 - People living and working in the surrounding areas will rate a moderate value (sensitivity factor) to the project; and

- ❑ Transient Receptors: People travelling through and near the proposed site will be moderate as the proposed site is located adjacent to the R556, approximately 2km (being the main roads to access these areas), constituting a moderate number of people (incidence factor). It is expected that travellers will attach a moderate degree of value to the current setting and visual character of the proposed site (sensitivity factor) due to the activities already established in the area. Hence, this receptor group has also been given a moderate sensitivity rating.

Based on the receptor sensitivity assessment, a moderate weighting factor (1.0) in terms of this aspect is applied during the impact magnitude determination.

12.10.4.3 Theoretical Visibility

Theoretical visibility was determined by conducting a Viewshed analysis and using GIS software with three-dimensional topographical modelling capabilities:

- ❑ The Digital Elevation Model (DEM) for the Viewshed analysis was acquired; and
- ❑ A 10 km area surrounding the site was used due the topography of the area.

The viewshed that was modelled is shown in **Figure 54**.

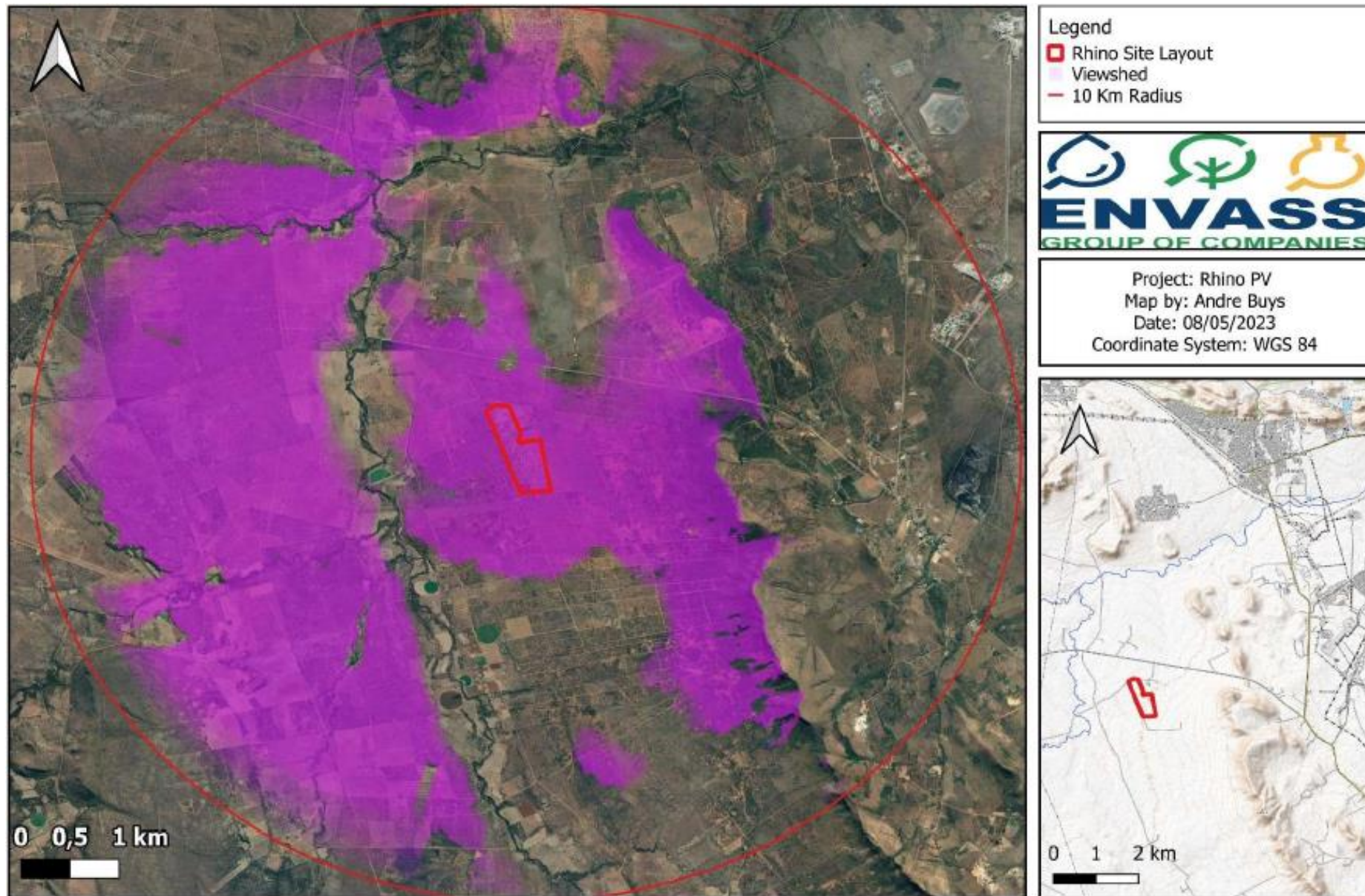


Figure 54: Viewshed analysis for the proposed Project (Buys, 2023)

12.10.4.4 Visual Intrusion

Visual intrusion deals with how well the project components fit into the ecological and cultural aesthetic of the landscape. An object will have a greater negative impact on scenes considered to have a high visual quality than on scenes of low quality.

Given that the study area has a low VAC (due to vegetation and the flat to gentle landscape) and moderate visual resource value, the proposed project will have a moderate (without mitigation measures) visual intrusion on surrounding sensitive receptors. Ensuring that vegetation is retained on the periphery of these areas, and wherever possible, lights be directed downwards as to avoid illuminating the sky and limit the reflection from the solar panels, the visual impact on the surrounding environment will be moderate depending on the proximity to the sensitive receptors.

The altered visual environment during the construction and operational phases will lead to moderate (without mitigation measures) levels of visual intrusion, with moderate levels of compatibility with the surrounding land uses as well as moderate visual contrast. The level of visual intrusion because of the proposed project, with specific mention of vegetation clearing, removal of topsoil and solar PV infrastructure, is considered to be moderate (without mitigation measures) during the construction and operational phases, in line with the low VAC. The perceived visual impacts associated with the construction and operational phases are moderately (without mitigation measures) intrusive to the receiving environment.

12.10.4.5 Visual Exposure

For the purposes of this assessment, close-range views (equating to a high level of visual exposure) are views over a distance of 500 m or less, medium-range views (equating to a moderate level of visual exposure) are views of 500 m to 2 km, and long-range views are over distances greater than 2 km (low levels of visual exposure). Limited sensitive receptors are located within 2 km of the site and are limited to people working in the area, residents and the number of farms surrounding the site.

For the purposes of this assessment, visual exposure in terms of all identified impacts has therefore been rated as low as the majority of the high sensitivity, sensitive receptors, are located more than 5 km from the project site.

12.10.4.6 Results

Results of the Visual Impact Assessment indicated that from a visual perspective, the proposed project and related activities are the main project components that are expected to result in a visual impact. Receptors located within 2km of the proposed site will have the moderate (without mitigation) visual impact. Within a 5 km radius of the proposed project, residential areas and farming communities will have a low (without mitigation) visual

impact. Beyond the 5 km study area, there are some areas where the development is discernible. However, the visual impacts are generally of moderate to low magnitude and impact. Local low and high-level vegetation will provide limited screening; however, the proposed solar PV facility and associated infrastructure can conceivably be visible to the sensitive receptors located near the proposed project boundary. The visual impacts associated with the Project and associated infrastructure will occur once construction has been completed and will be long term in nature.

Based on the results of the impact assessment, the majority of the potential visual impacts were considered to be moderate before mitigation and with the successful implementation this can be reduced to low. With regards to the proposed activities, due to the terrain of the proposed boundary, vegetation, VAC, and current land uses, the proposed activities are expected to result in a moderate visual impact on the receiving environment. The proposed activities will have a long-term temporal visual impact, due to the very nature of the Project and associated infrastructure. The activity will have a localised visual impact over a long-term duration. The activity will be able to continue with the implementation of appropriate mitigation strategies during the construction, operational and decommissioning phases.

Both the alternative options have been assessed, and a similar finding and recommendation is reasonable for both Alternatives.

12.10.5 Impact Assessment

Refer to **Section 13.18** below for the results from the impact assessment from this study.

12.10.6 Conclusions

The project site and surrounding area can be characterized by residential, commercial, tourism, and agricultural activities. The proposed site ranges from approximately 1087 to 1101 metres above mean sea level (mamsl). predominantly flat, with slight hills and mountains located towards the north and north-east. The landscape is characterized a mix of natural grassland, open woodland, commercial annual crops (rain-fed / dry land) and Fallow land (old fields (bush), typically of the Central bushveld region. The surrounding areas comprises with a mix of residential activities, agricultural, tourism and commercial activities. The vegetation in the area consists mainly of grasses, shrubs, and scattered trees.

Several potential risks to the receiving aesthetic and visual environment as a result of the proposed activities have been identified, relating to impacts on the visual character and sense of place, visual intrusion and visual exposure and visibility. The significance of these impacts may be reduced should appropriate and effective mitigation measures be implemented. The proposed Project and associated infrastructure can conceivably have a moderate impact on the visual environment, while secondary impacts, such as dust emission, solar glint and glare and lighting at night, will also

manifest as visual disturbances from project initiation. The study area comprises of residential activities, agricultural and commercial activities which have had a visual impact on the natural environment. Therefore, the proposed project has been predicted to have a moderate impact before mitigation on the visual environment. After appropriate and effective mitigation measures the impact is rated as moderate to low. Both the alternative options have been assessed, and a similar finding and recommendation is reasonable for both Alternatives.

The proposed activities should therefore have a moderate to low visual impact on the receiving environment and is thus not fatally flawed from a visual impact perspective. Considering the project, it is the specialist's opinion that the proposed activities be allowed, provided that the findings within this report are considered along with the recommendations made towards the management of the proposed activity.

12.11 Social Impact Assessment

A summary of the Social Impact Assessment (Tanhuke & Chidley, 2023) (contained in **Appendix E7**) follows.

12.11.1 *Details of the Specialist*

The details of the specialist that undertook the Social Impact Assessment follow.

Organisation:	Nemai Consulting	
Name:	C. Chidley	C. Tanhuke
Qualifications:	BA (Economics); BSc Eng (Civil); MBA	BA Environmental Management (Geography)

12.11.2 *Objectives of the Study*

The key objectives of the Social Impact Assessment included the following:

- Describe the social baseline conditions that may be affected by the Project;
- Determine the specific local social impacts of the Project;
- Identify the potential social issues associated with the Project;
- Suggest suitable mitigation measures to address the identified impacts; and
- Make recommendations on preferred options from a social perspective.

12.11.3 *Methodology*

The Social Impact Assessment sets out the social baseline of the study area; predicts social impacts and makes recommendations for mitigating negative social impacts.

The baseline study is based on both primary and secondary data. Primary data was collected directly from engagements with community members, landowners and business owners.

Secondary data was accessed through South African economic and social databases. Articles and internet searches were also used and are referenced in the text and in the reference sections of this report.

The profile of the baseline conditions includes describing the current status quo of the community; including information on a number of social and economic issues such as:

- Demographic data.
- Socio-economic factors such as income and population data.
- Access to services.
- Institutional environment.
- Social Organization (Institutional Context); and
- Statutory and Regulatory Environment.

12.11.4 Key Findings of the Study

The regional study area is a rural economy with a narrow base. The project site has few social receptors surrounding the site, and the project has a low footprint on the social environment. The social and economic impacts of the project are expected to be positive in the sense that the local economy will be stimulated and broadened. The negative impacts are limited in nature and scope and can be successfully mitigated. It is therefore found that the project, once the recommended mitigation measures have been implemented, has a net positive impact on the social environment of the regional study area.

12.11.5 Impact Assessment

Refer to **Section 13.26** below for the results from the impact assessment from this study.

12.12 Transport Impact Assessment

A summary of the Transport Impact Assessment (iWink Consulting, 2023) (contained in **Appendix E9**) follows.

12.12.1 Objectives of the Study

The Transport Impact Assessment is aimed at determining the traffic impact of the proposed land development proposal and whether such development can be accommodated by the external transportation system.

12.12.2 Methodology

The study considered the traffic impact on the surrounding road network in the vicinity of the site during the construction, operational and decommissioning phases.

The study included the following tasks:

- Project assessment;
- Access and internal roads assessment;
- Haulage route assessment;
- Traffic estimation and impact; and
- Reporting on all findings.

12.12.3 Key Findings of the Study

A feasible access road was assessed considering sight lines, access spacing requirements and road safety aspects. It is recommended to ensure that the access point is kept clear of vegetation and any other obstructions to ensure sight lines are kept.

In general, non-motorised transportation is a dominant mode of transportation in rural areas, with private cars and minibus/taxis being the second-most used mode of transport, followed by buses. Currently, there are no known future planned public transport facilities in the vicinity of the site. However, generally the developer or appointed contractor of a renewable energy project will provide shuttle busses for workers during the construction phase.

The highest trip generator for the Project is expected during the construction phase. The actual construction stage peak hour trips are dependent on the construction period, construction programming, material availability, component delivery, abnormal load permitting etc. The decommissioning phase is expected to generate similar trips as the construction phase. The traffic impact during the operational phase is considered negligible.

For the construction and decommissioning phases, the impact expected to be generated by the vehicle trips is an increase in traffic and the associated noise, dust, and exhaust pollution. Based on the high-level screening of impacts and mitigation, the Project is expected to have a negative low impact during the construction and decommissioning stages including the recommended mitigation measures.

12.12.4 Impact Assessment

Refer to **Section 13.22** below for the results from the impact assessment from this study.

12.12.5 Conclusions

The proposed development of the Rhino Solar PV Energy Facility is supported from a traffic engineering perspective provided that the recommended mitigation measures are adhere to.

13 IMPACT ASSESSMENT

13.1 General

This section focuses on the pertinent environmental impacts that could potentially be caused during the pre-construction, construction and operational phases of the Project.

Note that an 'impact' refers to the change to the environment resulting from an environmental aspect (or activity), whether desirable or undesirable. An impact may be the direct or indirect consequence of an activity.

Potential impacts were identified as follows:

- Impacts associated with listed activities contained in the EIA Regulations' Listing Notices;
- Impacts identified during the Scoping phase;
- An appraisal of the Project's activities and components;
- An assessment of the receiving biophysical, social, economic and built environments;
- Findings from specialist studies;
- Issues highlighted by environmental authorities; and
- Comments received during public participation from IAPs.

13.2 Impacts associated with Listed Activities

As mentioned, the Project requires Environmental Authorisation for certain activities listed in the EIA Regulations, which serve as triggers for the EIA. The potential impacts associated with the key listed activities are broadly stated in **Table 14** below.

Table 14: Potential Impacts associated with the key listed activities

Listed Activities	Potential Impact Overview
GN No. R. 983 of 4 December 2014 (as amended) (Listing Notice 1)	
<p>GN No. R.983 – Activity 11(i):</p> <p>The development of facilities or infrastructure for the transmission and distribution of electricity -</p> <p>(i) <u>outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;</u> or</p> <p>(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;</p> <p>excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —</p> <p>(a) temporarily required to allow for maintenance of existing infrastructure;</p> <p>(b) 2 kilometres or shorter in length;</p> <p>(c) within an existing transmission line servitude; and</p> <p>(d) will be removed within 18 months of the commencement of development.</p>	<ul style="list-style-type: none"> • Impacts associated with the footprint of the physical infrastructure (proposed power line). • Potential loss of sensitive environmental features (e.g. heritage resources, sensitive fauna and flora species, ecosystems, agricultural land) along the proposed power. • Visual impact associated with the proposed power line. • Cumulative impacts associated with aligning the proposed power line alongside existing linear developments.

Listed Activities	Potential Impact Overview
<p>GN No. R.983 – Activity 12(ii)(a) & (c):</p> <p>The development of -</p> <p>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or</p> <p>(ii) <u>infrastructure or structures with a physical footprint of 100 square metres or more;</u></p> <p>where such development occurs -</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; -</p> <p>excluding -</p> <p>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</p> <p>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</p> <p>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</p> <p>(dd) where such development occurs within an urban area;</p> <p>(ee) where such development occurs within existing roads, road reserves or railway line reserves; or</p> <p>(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.</p>	<ul style="list-style-type: none"> • Impacts associated with the footprint of the physical infrastructure within 32 m of dams/watercourses. • Adverse effects to resource quality associated with working near to the dams/watercourses. • Reduction in water quality of receiving dams/watercourses due to improper management of storm water, hazardous material and sanitation. • Altering the drainage of the site.
<p>GN No. R.983 – Activity 24(ii):</p> <p>The development of a road -</p> <p>(i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or</p> <p>(ii) <u>with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;</u></p> <p><u>but excluding a road -</u></p> <p>(a) which is identified and included in activity 27 in Listing Notice 2 of 2014;</p> <p>(b) where the entire road falls within an urban area; or</p> <p>(c) which is 1 kilometre or shorter.</p>	<ul style="list-style-type: none"> • Clearance of indigenous vegetation. • Soil destabilisation and subsequent erosion. • Proliferation of alien and invasive species. • Habitat fragmentation.
<p>GN No. R.983 – Activity no. 28(ii):</p> <p>Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:</p> <p>(i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or</p> <p>(ii) <u>will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;</u></p> <p>excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.</p>	<ul style="list-style-type: none"> • Clearance of large areas associated with the construction footprint of the PV Site and associated infrastructure. • Loss of agricultural land. • Socio-economic impacts associated with construction activities.
<p>GN No. R.983 – Activity 48(i)(c):</p> <p>The expansion of—</p> <p>(i) <u>infrastructure or structures where the physical footprint is expanded by 100 square metres or more;</u> or</p> <p>(ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more;</p> <p>where such expansion occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p>	<ul style="list-style-type: none"> • Impacts associated with the footprint of the physical infrastructure within 32 m of dams/watercourses. • Adverse effects to resource quality (i.e. flow, in-stream and riparian habitat, aquatic biota and water quality) associated with working near to the dams/watercourses. • Reduction in water quality of receiving dams/watercourses due to improper

Listed Activities	Potential Impact Overview
<p><i>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding—</i></p> <p><i>(aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</i></p> <p><i>(bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</i></p> <p><i>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 23 in Listing Notice 3 of 2014, in which case that activity applies;</i></p> <p><i>(dd) where such expansion occurs within an urban area; or</i></p> <p><i>(ee) where such expansion occurs within existing roads, road reserves or railway line reserves</i></p>	<p>management of storm water, hazardous material and sanitation.</p>
<p>GN No. R.983 – Activity 56(ii):</p> <p><i>The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre—</i></p> <p><i>(i) where the existing reserve is wider than 13,5 meters; or</i></p> <p><i>(ii) where no reserve exists, where the existing road is wider than 8 metres;</i></p> <p><i>excluding where widening or lengthening occur inside urban areas</i></p>	<ul style="list-style-type: none"> • Clearance of indigenous vegetation. • Soil destabilisation and subsequent erosion. • Proliferation of alien and invasive species.
GN No. R. 984 of 4 December 2014 (as amended) (Listing Notice 2)	
<p>GN No. R.984 – Activity no. 1:</p> <p><i>1. The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs -</i></p> <p><i>(a) within an urban area; or</i></p> <p><i>(b) on existing infrastructure.</i></p>	<ul style="list-style-type: none"> • Impacts associated with generating electricity from the Solar PV Plant. • Impacts associated with the footprint of the physical infrastructure. • Impacts to land use. • Potential loss of sensitive environmental features (e.g. heritage resources, sensitive fauna and flora species). • Visual impacts. • Soil destabilisation and subsequent erosion. • Proliferation of alien and invasive species. • Socio-economic impacts. • Traffic impacts.
<p>GN No. R.984 – Activity no. 15:</p> <p><i>The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for-</i></p> <p><i>(i) the undertaking of a linear activity; or</i></p> <p><i>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</i></p>	<ul style="list-style-type: none"> • Clearance of large areas of indigenous vegetation associated with the construction footprint of the PV Site and associated infrastructure. • Potential loss of sensitive environmental features (e.g. sensitive fauna and flora species). • Visual impacts. • Soil destabilisation and subsequent erosion. • Proliferation of alien and invasive species. • Socio-economic impacts associated with construction activities.
GN No. R. 985 of 4 December 2014 (as amended) (Listing Notice 3)	
<p>GN No. R.985 – Activity no. 4 - (h)(iv):</p> <p><i>The development of a road wider than 4 metres with a reserve less than 13,5 metres.</i></p>	<p>Impacts associated with building an access road within an area classified as CBA2 in terms of the North West Biodiversity Plan.</p>
<p>GN No. R.985 – Activity no. 12 - (h)(iv) & (vi):</p> <p><i>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</i></p>	<p>The clearance indigenous vegetation and potential loss of sensitive fauna and flora species within an area classified as CBA2 in terms of the North West Biodiversity Plan. In addition, potential impacts may be caused to dams/watercourses located to the south of the site and along the access road.</p>
<p>GN No. R.985 – Activity 14(ii)(c) – (h)(iv)</p> <p><i>The development of—</i></p>	<ul style="list-style-type: none"> • Impacts to biodiversity within CBA2 as a result of the development of infrastructure within 32 m from watercourses.

Listed Activities	Potential Impact Overview
<p>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or</p> <p>(ii) <u>infrastructure or structures with a physical footprint of 10 square metres or more;</u> where such development occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) <u>if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</u> excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p>	<ul style="list-style-type: none"> • Effects to resource quality associated with working near to dams/watercourses.
<p>GN No. R.985 – Activity 18 - (h)(v) & (ix):</p> <p>The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</p>	<p>Impacts to biodiversity as a result of the widening of roads within an area classified as CBA2 in terms of the North West Biodiversity Plan, or within 32m from a dam/watercourse.</p>
<p>GN No. R.985 – Activity 23(ii)(c) – (h)(iv):</p> <p>The expansion of—</p> <p>(i) dams or weirs where the dam or weir is expanded by 10 square metres or more; or</p> <p>(ii) <u>infrastructure or structures where the physical footprint is expanded by 10 square metres or more;</u> where such expansion occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback adopted in the prescribed manner; or</p> <p>(c) <u>if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</u> excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p>	<p>Impacts to biodiversity as a result of the widening of roads within an area classified as CBA2 in terms of the North West Biodiversity Plan, or within 32m from a dam/watercourse.</p>

13.3 Comments Raised by Organs of State and I&APs

The comments raised by authorities (both regulatory and commenting) and I&APs to date during the execution of the EIA are captured and addressed in the CRR (refer to **Appendix G**).

The consolidated comments raised by authorities and I&APs have been succinctly grouped into the following main categories (*note: please refer to the CRR for a comprehensive and accurate representation of the issues raised*):

- Land use –
 - Visual and noise impacts to surrounding landowners.
 - Clarity on site selection process.
- Health –
 - Health hazards associated with living next to a solar farm.
- Socio-economic impacts –
 - Adequate consultation required with surrounding landowners.
 - Safety and security threats.
 - Benefits to local businesses.
 - Accommodation for project personnel.

- ❑ Agriculture –
 - Impacts of solar farm with regards to glare and temperature increase, and related impacts to livestock.
- ❑ Existing infrastructure –
 - Impacts to existing infrastructure and associated requirements of custodians / owners of existing infrastructure.
- ❑ Technical information –
 - Technical details and layout for the proposed facility.
- ❑ EIA Process –
 - Confirm listed activities triggered and assess related impacts.
 - Details of project components.
 - Sufficiently detailed layout and sensitivity maps.
 - Need for amended application form.
 - Specialist studies –
 - Requirements for terms of reference.
 - Include limitations and methodologies.
 - Compliance with Protocols.
 - Registration of specialists.
 - Specialist studies based on Screening Tool.
 - Understanding of 'no-go' areas.
 - Address contradicting recommendations.
 - Detailed/practical mitigation measures.
 - Assessment of cumulative impacts.
 - Reporting on identified Environmental Themes and adherence to Screening Tool.
 - Cumulative impact assessment to consider other similar projects within a 30km radius of the proposed development site.
 - Assessment of the impacts and mitigation measures for each of the listed activities applied for.
 - Assessment of alternatives.
 - Requirements for the EMPr.
 - Public Participation:
 - Requirements for public participation process.
 - Landowner consent to be obtained.
 - Compliance with regulated requirements.
 - Recording and addressing comments from registered I&APs and organs of state.
 - Involvement of authorities and stakeholders.
 - Recommendations regarding conditions to be included in the Environmental Authorisation.
 - Future plans for the site and infrastructure after decommissioning.
 - Site visit with DFFE.

These issues received further attention during the investigations in the EIA phase, including the environmental specialist studies.

13.4 Project Activities

In order to understand the impacts related to the Project it is necessary to unpack the activities associated with the project life-cycle, as done in the sub-sections to follow.

13.4.1 *Project Phase: Pre-construction*

Some of the main Project activities, as well as high-level environmental activities, to be undertaken in the pre-construction phase are listed in **Table 15** below.

Table 15: Simplified List of Activities associated with Pre-Construction Phase

<u>Project Phase: Pre-construction</u>	
Project Activities	
•	Negotiations and agreements with the affected landowner, stakeholders and authorities
•	Lease Agreement
•	Registration of power line servitude
•	Detailed engineering design
•	Detailed geotechnical investigations, including geophysical investigations
•	Survey and mark development
•	Procurement process for Contractor
•	Review Contractor's method statements (as relevant)
•	Establish new access roads and undertake selective improvements to existing access roads to facilitate the delivery of construction plant and materials
•	Arrangements for accommodation of construction workers (off site)
•	The building of a site office and ablution facilities
•	Confirmation of the location and condition of all structures and infrastructure on the PV Site
•	Determining and documenting the conditions of the roads to be used during construction
•	Fencing off of PV Site
High Level Environmental Activities	
•	Diligent compliance monitoring of the EMPr, Environmental Authorisation and other relevant environmental legislation
•	Pre-construction environmental survey
•	Develop Environmental Monitoring Programme (air quality, water quality, noise, traffic, social)
•	Barricading of sensitive environmental features (as relevant)
•	Obtain permits for impacts to SCC, if avoidance is not possible (if required)
•	Obtain permits if heritage resources are to be impacted on and for the relocation of graves (if required)
•	On-going consultation with I&APs
•	Other activities as per EMPr

13.4.2 *Project Phase: Construction*

Some of the main Project activities, as well as high-level environmental activities, to be undertaken in the construction phase are listed in **Table 16** below.

Table 16: Simplified List of Activities associated with Construction Phase

<u>Project Phase: Construction</u>	
Project Activities	
•	Site establishment
•	Relocation of existing structures and infrastructure
•	Prepare access roads
•	Establish construction laydown area
•	Bulk fuel storage
•	Delivery of construction material
•	Transportation of equipment, materials and personnel
•	Storage and handling of material
•	Construction employment
•	Site clearing (as necessary)
•	Excavation
•	Concrete Works
•	Mechanical and Electrical Works
•	Electrical supply
•	Material delivery and offloading
•	Construction of PV Plant infrastructure
•	Stockpiling
•	Stringing of power line
•	Waste and wastewater management
High Level Environmental Activities	
•	Diligent compliance monitoring of the EMPr, Environmental Authorisation and other relevant environmental legislation
•	Implement Environmental Monitoring Programme (air quality, water quality, noise, traffic, social)
•	Reinstatement and rehabilitation of construction domain (as necessary)
•	On-going consultation with I&APs
•	Other activities as per EMPr

13.4.3 Project Phase: Operation

Some of the main Project activities, as well as high-level environmental activities, to be undertaken in the operational phase are listed in **Table 17** below.

Table 17: Simplified List of Activities associated with Operational Phase

<u>Project Phase: Operation</u>	
Project Activities	
•	Testing and commissioning the facility's components
•	Cleaning of PV modules
•	Servitude access arrangements and requirements
•	Routine maintenance inspections of power line and servitude
•	Controlling vegetation
•	Managing stormwater and waste
•	Conducting preventative and corrective maintenance
•	On-going consultation with directly affected parties
•	Monitoring of the facility's performance
High Level Environmental Activities	
•	On-going consultation with I&APs
•	Other activities as per EMPr for Operational Phase

13.5 Environmental Aspects

Environmental aspects are regarded as those components of an organisation's activities, products and services that are likely to interact with the environment and cause an impact.

The environmental aspects that have been identified for the proposed Project, which are linked to the project activities, are provided in **Table 18** below. Note that only high level aspects are provided.

Table 18: Environmental Aspects associated with Project Life-Cycle

Project Phase: Pre-construction
Environmental Aspects
• Inadequate consultation with landowner and other relevant stakeholders
• Inadequate environmental and compliance monitoring
• Poor construction site planning and layout
• Site-specific environmental issues not fully understood
• Land occupancy by temporary buildings, provisional on-site facilities and storage areas
• Inaccurate pre-construction environmental survey
• Absence of relevant permits (e.g. for protected trees, heritage resources), where applicable
• Lack of barricading of sensitive environmental features
• Poor waste management
• Absence of ablution facilities

Project Phase: Construction
Environmental Aspects
• Inadequate consultation with landowner
• Inadequate environmental and compliance monitoring
• Lack of environmental awareness creation
• Indiscriminate site clearing
• Poor site establishment
• Poor management of access and use of access roads
• Disruptions to traffic
• Poor transportation practices
• Poor fencing arrangements
• Erosion
• Disruptions to existing services
• Disturbance of topsoil
• Poor management of excavations
• Inadequate storage and handling of material
• Inadequate storage and handling of hazardous material
• Poor maintenance of equipment and plant
• Poor management of labour force
• Pollution from ablution facilities
• Inadequate management of construction camp
• Poor waste management practices – hazardous and general solid, liquid
• Wastage of water
• Poor management of pollution generation potential
• Damage to significant flora (if encountered)
• Damage to significant fauna (if encountered)
• Inadequate stormwater management
• Damage to cultural heritage and palaeontological features (if encountered)
• Poor reinstatement and rehabilitation

Project Phase: Operation
Environmental Aspects
<ul style="list-style-type: none"> • Inadequate environmental and compliance monitoring • Inadequate management of access, routine maintenance and maintenance works • Inadequate management of vegetation • Inadequate stormwater management • Pollution caused by cleaning of panels • Impacts caused by fire, explosion or leaks associated with BESS • Pollution caused by dangerous good (e.g. transformer oils) associated with substation • Inadequate management of light pollution • Failure to comply with health, safety and environmental specifications

13.6 Potentially Significant Environmental Impacts

Environmental impacts are the change to the environment resulting from an environmental aspect, whether desirable or undesirable.

Note that it is not the intention of the impact assessment to evaluate all potential environmental impacts associated by the Project’s environmental aspects, but rather to focus on the potentially significant direct, indirect and cumulative impacts identified during the Scoping phase and any additional issues uncovered during the EIA phase.

The potentially significant environmental impacts associated with the Project, as listed in **Table 19** below, were identified through an appraisal of the following:

- Project-related components and infrastructure (see **Section 9**);
- Activities associated with the project life-cycle (i.e. pre-construction, construction and operation);
- Nature and profile of the receiving environment and potential sensitive environmental features and attributes (see **Section 11**);
- Findings from specialist studies (see **Section 12**);
- Understanding of direct and indirect effects of the Project as a whole (see **Section 13**);
- Comments received during public participation (see **Section 15**); and
- Legal and policy context (see **Section 5**).

It is noted that the potentially significant environmental impacts listed in **Table 19** were evaluated as part of the specialist studies and suitable mitigation measures were identified where it was found that these impacts could possible occur. These impacts are assessed in **Sections 13.9 – 13.28** below.

Table 19: Potentially Significant Environmental Impacts associated with the Project

Environmental Factor	Construction Phase Potential Issues / Impacts	Operational Phase Potential Issues / Impacts
Land Use	<ul style="list-style-type: none"> ▪ Sterilisation of land for other land use types. ▪ Setbacks / conditions associated with surrounding land and infrastructure. 	<ul style="list-style-type: none"> ▪ Sterilisation of land for other land use types up to the decommissioning of the Project (if applicable). ▪ Servitude restrictions.

Environmental Factor	Construction Phase Potential Issues / Impacts	Operational Phase Potential Issues / Impacts
Geology	<ul style="list-style-type: none"> ▪ Suitability of geological conditions to support the Solar PV Plant to be confirmed through detailed geotechnical investigations. 	<ul style="list-style-type: none"> ▪ Suitability of geological conditions to support the Solar PV Plant to be confirmed through detailed geotechnical investigations.
Geohydrology	<ul style="list-style-type: none"> ▪ Groundwater pollution due to spillages and poor construction practices. ▪ Utilisation of boreholes, if required. 	<ul style="list-style-type: none"> ▪ Groundwater pollution due to poor operation and maintenance practices. ▪ Utilisation of boreholes, if required.
Topography	<ul style="list-style-type: none"> ▪ Visual impacts. ▪ Erosion of areas cleared for construction purposes. 	<ul style="list-style-type: none"> ▪ Visual impact caused by proposed Project infrastructure and landscape transformation. ▪ Glint and glare from solar panels.
Soil	<ul style="list-style-type: none"> ▪ Soil erosion due to clearance and inadequate stormwater management. ▪ Soil compaction. ▪ Soil contamination due to spillages and poor construction practices. ▪ Loss of topsoil. 	<ul style="list-style-type: none"> ▪ Soil erosion due to inadequate stormwater management. ▪ Soil contamination due to poor operation and maintenance practices.
Surface Water	<ul style="list-style-type: none"> ▪ Alteration of drainage over the PV Site. ▪ Surface water pollution due to spillages and poor construction practices. 	<ul style="list-style-type: none"> ▪ Sedimentation through silt-laden runoff, caused by inadequate stormwater management. ▪ Water resources could be contaminated through inadequate storage and handling of hazardous materials, leaks from the BESS and poor management of waste and wastewater. ▪ Water use requirements of the Project need to be satisfied.
Flora & Fauna	<ul style="list-style-type: none"> ▪ Habitat loss / fragmentation. ▪ Potential loss, disturbance or displacement of protected fauna and flora species. ▪ Human - animal conflicts. ▪ Noise and vibration impacts to fauna. ▪ Nights lights may affect nocturnal faunal species. ▪ Illegal harvesting and poaching of faunal and floral species by construction workers. ▪ Pollution of the biophysical environment from poor construction practices. ▪ Proliferation of invasive alien species in disturbed areas. 	<ul style="list-style-type: none"> ▪ Habitat fragmentation (e.g., barriers to animal movement). ▪ Shading out of plants by solar panels. ▪ Reflection of sunlight from the solar panels could adversely affect birds. ▪ Risk to birds from collision with infrastructure and from electrocution. ▪ Electrical faulting from birds. ▪ Chemical pollution associated with cleaning the PV panels. ▪ Proliferation of invasive alien species in disturbed areas.
Socio-economic Environment	<ul style="list-style-type: none"> ▪ Influx of people seeking employment and associated impacts (e.g., foreign workforce, cultural conflicts, squatting, demographic changes). ▪ Safety and security. ▪ Use of local road network. ▪ Nuisance from dust and noise. ▪ Consideration of local labourers and suppliers in area – stimulation of local economy (positive impact). ▪ Transfer of skills (positive impact). 	<ul style="list-style-type: none"> ▪ Direct and indirect economic opportunities as a result of the Project. ▪ Threats to human and animal health from electromagnetic field (power line and on-site substation).
Air Quality	<ul style="list-style-type: none"> ▪ Dust from the use of dirt roads by construction vehicles. ▪ Dust from bare areas that have been cleared for construction purposes. ▪ Emissions from construction equipment and machinery. ▪ Tailpipe emissions from construction vehicles. 	<ul style="list-style-type: none"> ▪ The efficiency of the solar plant could be reduced if the modules are soiled (covered) by particulates/dust. ▪ Impacts to air quality caused by the operation and maintenance of the facility include dust from the use of dirt roads and tailpipe emissions from vehicles.

Environmental Factor	Construction Phase Potential Issues / Impacts	Operational Phase Potential Issues / Impacts
Noise	<ul style="list-style-type: none"> Localised increases in noise may be caused by construction activities. 	N/A
Agriculture	<ul style="list-style-type: none"> Loss of fertile soil through land clearance. Soil erosion. Loss of topsoil. Risk of harm to livestock from construction activities. 	<ul style="list-style-type: none"> Loss of possible future agricultural land use due to direct occupation by the development footprint. Soil erosion due to inadequate stormwater management.
Historical and Cultural Features	<ul style="list-style-type: none"> Possible direct impacts on below-ground archaeological deposits and fossils as a result of ground disturbance. 	Possible impacts to the cultural landscape as a result of the introduction of incompatible structures and infrastructure to the rural landscape.
Existing Structures & Infrastructure	<ul style="list-style-type: none"> Setbacks / conditions associated with surrounding land and infrastructure. Crossing of existing infrastructure by power line. 	<ul style="list-style-type: none"> Setbacks / conditions associated with surrounding land and infrastructure. Disturbances to infrastructure traversed by power line during maintenance activities.
Transportation	<ul style="list-style-type: none"> Increase in traffic on the local road network. Transportation of materials and construction personnel to site. Impacts to road conditions. Speeding and reckless driving by construction personnel. Construction vehicles accessing and leaving the sites via N6 national road. Use of oversized vehicles/abnormal loads, as required. Risks to other road users. 	<ul style="list-style-type: none"> Transportation of maintenance materials, as well as operational and maintenance personnel, to site. Safe access, taking into consideration the high speed environment along the N6. Hazard posed by sun glare off PV panels.
Aesthetics	<ul style="list-style-type: none"> Landscape transformation. Visual impacts associated with construction activities. 	<ul style="list-style-type: none"> Landscape transformation. Inadequate reinstatement and rehabilitation of construction footprint. Light pollution. Glint and glare from PV facility. High visibility of power lines to visual receptors.
Health	<ul style="list-style-type: none"> Hazards related to construction work. Increased levels of dust and particulate matter. Increased levels of noise. Water (surface and ground) contamination. Poor water and sanitation. Communicable diseases. Psychosocial disorder (e.g. social disruptions). Safety and security. Lack of suitable health services. 	<ul style="list-style-type: none"> Hazards related to operation and maintenance work. Fire and explosion risks during BESS operation.

The cumulative impacts are discussed in **Section 13.28** below.

The findings of the specialists are of particular importance in terms of understanding the impacts of the Project and managing these during the project life-cycle, as these studies focused on the significant environmental issues identified during the execution of the EIA. As can be seen from the various impact assessments performed by the specialists, there are a host of cross-cutting impacts that are addressed in a number of these studies. The mitigation measures proposed by the specialists for these similar types of impacts are regarded as complementary and they are aligned with best practices and principles.

13.7 Impact Assessment Methodology

The impacts and the proposed management thereof are first discussed in **Section 13.9** to **Section 13.26** below on a qualitative level and thereafter quantitatively assessed by evaluating the nature, extent, magnitude, duration, probability and ultimately the significance of the impacts (refer to methodology provided in **Table 20** below). Where applicable, the impact assessments and significance ratings provided by the respective specialists are included.

The assessment considers impacts before and after mitigation, where in the latter instance the residual impact following the application of the mitigation measures is determined.

In the case of the specialist studies, some of the impact assessment methodologies deviated from the approach shown in **Table 20** below. However, the quantitative basis for these specialist evaluations of the impacts to specific environmental features still satisfied the intention of the EIA.

Table 20: Quantitative Impact Assessment Methodology

Nature (/Status)

The project could have a positive, negative or neutral impact on the environment.

Extent

- Local - extend to the site and its immediate surroundings.
- Regional - impact on the region but within the province.
- National - impact on an interprovincial scale.
- International - impact outside of SA.

Magnitude

Degree to which impact may cause irreplaceable loss of resources.

- Low - natural and social functions and processes are not affected or minimally affected.
- Medium - affected environment is notably altered; natural and social functions and processes continue albeit in a modified way.
- High - natural or social functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.

Duration

- Short term - 0-5 years.
- Medium term - 5-11 years.
- Long term - impact ceases after the operational life cycle of the activity either because of natural processes or by human intervention.
- Permanent - mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.

Probability

- Almost certain - the event is expected to occur in most circumstances.
- Likely - the event will probably occur in most circumstances.
- Moderate - the event should occur at some time.
- Unlikely - the event could occur at some time.
- Rare/Remote - the event may occur only in exceptional circumstances.

Significance

Provides an overall impression of an impact's importance, and the degree to which it can be mitigated. The range for significance ratings is as follows-

- 0 – Impact will not affect the environment. No mitigation necessary.
- 1 – No impact after mitigation.
- 2 – Residual impact after mitigation.
- 3 – Impact cannot be mitigated.

13.8 Impact Mitigation

13.8.1 Mitigation Hierarchy

Impacts are to be managed by assigning suitable mitigation measures, where the objectives are to:

- Find more environmentally sound ways of executing an activity;
- Enhance the environmental benefits of a proposed activity;
- Avoid, minimise or remedy negative impacts; and
- Ensure that residual negative impacts are within acceptable levels.

Mitigation should strive to abide by the following hierarchy – (1) prevent; (2) reduce; (3) rehabilitate (or remediate); and/or (4) compensate for the environmental impacts.

The proposed mitigation of the impacts associated with the Project includes specific measures identified by the technical team (including engineering solutions) and environmental specialists, stipulations of environmental authorities and environmental best practices.

Note that the mitigation measures in the subsequent sections are not intended to be exhaustive, but rather focus on the potentially significant impacts identified. The EMPr's (contained in **Appendix H**) provide a comprehensive list of mitigation measures for specific elements of the Project and the receiving environment, which extends beyond the impacts evaluated in the body of the EIA Report.

13.8.2 EMPr Framework

An EMPr represents a detailed plan of action prepared to ensure that recommendations for enhancing positive impacts and/or limiting or preventing negative environmental impacts are implemented during the life-cycle of a project.

The content of an EMPr must either contain the information set out in Appendix 4 of the EIA Regulations or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a Government Notice. Once the Minister has identified, through a Government Notice, that a generic EMPr is relevant to an application for Environmental Authorisation, that generic EMPr must be applied by all parties involved in the EA process, including, but not limited to, the Applicant and the Competent Authority.

In accordance with the above, the following EMPr's were developed for the Project:

- Generic EMPr for the development and expansion for overhead electricity transmission and distribution infrastructure (contained in **Appendix H2**);
- Generic EMPr for the development and expansion of substation infrastructure for the transmission and distribution of electricity (contained in **Appendix H3**); and
- Normal EMPr for the Solar PV Plant (contained in **Appendix H1**).

All liability for the implementation of the EMPr (as well as the EIA findings and Environmental Authorisation, if granted) lies with the Applicant.

The following considerations and assumptions accompany the compilation of the EMPr for the Solar PV Plant:

- ❑ The EMPr is guided by the following principles, based on Lochner (2005) -
 - **Continuous improvement** - The Applicant should be committed to review and to continually improve environmental management, with the objective of improving overall environmental performance;
 - **Broad level of commitment** - A broad level of commitment is required from all levels of management as well as the workforce in order for the implementation of the EMPr to be successful and effective; and
 - **Flexible and responsive** - The implementation of the EMPr needs to be responsive to new and changing circumstances. The EMPr report is a dynamic “living” document that will need to be updated regularly throughout the duration of the project life-cycle.
- ❑ Compliance with the EMPr must be audited in terms of Regulation 34 of the EIA Regulations.
- ❑ The EMPr provides the framework for the overarching environmental management requirements for the project life-cycle. Following detailed design and planning, the EMPr may need to be revised to render the management actions more explicit and accurate to the final project specifications. Any amendments to the EMPr must be undertaken in accordance with Regulations 35 – 37 of the EIA Regulations.
- ❑ The EMPr will be linked to the project’s overall Environmental Management System (EMS) (if applicable), where the EMS constitutes an iterative process that aims to achieve continuous improvement and enhanced environmental performance.
- ❑ Although every effort has been made to ensure that the scope and level of detail of the EMPr are tailored to the level of environmental risk (i.e., type and scale of activity and the sensitivity of the affected environment) and the project- and site-specific conditions, certain of the environmental management requirements within the EMPr may be regarded as generic to make provision for activities that may take place as part of the overall Project.

13.9 Land Use

13.9.1 *Impact Description*

Land is required for constructing the proposed infrastructure associated with the Solar PV Plant. In addition, a servitude will be required for the proposed power line (grid connection).

The areas affected by the proposed Project footprint are rural in nature. The Project’s PV Site is vacant and was historically used for agricultural purposes. The utilisation of the land for the Project has been secured by the Applicant with the landowner. The land use at the site earmarked for the proposed Solar PV Plant will change to accommodate the proposed development. Following

decommissioning, the land can be rehabilitated to a desired end state (e.g., returned to agricultural use).

13.9.2 *Impact Assessment*

Environmental Feature	Land Use						
Relevant Alternatives & Activities	All physical infrastructure and ancillary structures that form part of the Project						
Project life-cycle	Construction & operational phases						
Potential Aspects & Impacts	Proposed Management Objectives / Mitigation Measures						
<ul style="list-style-type: none"> Change of land use at site earmarked for Solar PV Plant. Impacts of power line on agricultural land use. 	<ul style="list-style-type: none"> Remove the minimum amount of vegetation required during construction to build hardstanding areas, power line towers, PV module structures and roads. Rehabilitate areas impacted on during construction. Return the site to a desired end stated at the end of the operational phase. 						
		+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	medium-high	short-term	almost certain	3	
After Mitigation	-	local	medium	short-term	moderate	1	

13.10 Soils

13.10.1 *Impact Description*

During the construction phase areas will be cleared of vegetation, which may lead to soil erosion. Erosion could also take place in the absence of suitable stormwater management. The EMPr includes suitable storm water management measures to prevent the occurrence of erosion.

Soil may be polluted by poor storage or handling of material, spillages and inadequate housekeeping practices. Specific mitigation measures are contained in the EMPr, where the primary objective is the effective and safe management of materials on site, in order to minimise the impact of these materials on the biophysical environment. The same objective applies to the correct management and handling of hazardous substances (e.g. fuel, transformer oil, batteries).

13.10.2 *Impact Assessment*

Environmental Feature	Soils
Relevant Alternatives & Activities	Construction and operational activities
Project life-cycle	Construction & operational phases
Potential Aspects & Impacts	Proposed Management Objectives / Mitigation Measures
<ul style="list-style-type: none"> Soil erosion. Soil compaction. 	<ul style="list-style-type: none"> Stabilisation of cleared areas to prevent and control erosion. Manage drainage from sites to minimise erosion. Reinstate and rehabilitate disturbed areas to prevent future erosion.

• Soil pollution.	• See mitigation measures regarding hazardous substances & waste.
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	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	medium-high	short-term	likely	3
After Mitigation	-	local	low	short-term	unlikely	1

13.11 Geohydrology

13.11.1 Impact Description

Groundwater may be impacted by the Project as follows:

- Possible influence on groundwater flow as a result of trenching and building of infrastructure and structures associated with the development footprint during construction. This will be confirmed as part of the geotechnical investigations during the Project’s design phase;
- Use of groundwater during construction and operational phases; and
- Potential contamination of groundwater during construction and operational phases as a result of inadequate management of wastewater and spillages of dangerous goods.

13.11.2 Impact Assessment

Environmental Feature	Geohydrology
Relevant Alternatives & Activities	Construction and operational activities
Project life-cycle	Construction & operational phases
Potential Aspects & Impacts	Proposed Management Objectives / Mitigation Measures
<ul style="list-style-type: none"> • Groundwater pollution. • Groundwater use. • Impacts to groundwater flow. 	<ul style="list-style-type: none"> • Provide suitable protection of groundwater during excavations. • All storage tanks containing hazardous materials must be placed in bunded containment areas with impermeable surfaces. The bunded area must be able to contain 110% of the total volume of the stored hazardous material. • Provide sufficient and suitable sanitation facilities during construction and operational phases, which shall conform to all relevant health and safety standards and codes. • Reduce sediment loads in water from dewatering operations. All dewatering shall be done through temporary sediment traps (e.g. constructed out of geo-textiles and hay bales). • If any groundwater is to be used during the construction and operational phases, it will need to comply with the provisions of the NWA.

	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	medium-high	long-term	likely	3
After Mitigation	-	local	low	long-term	unlikely	1

13.12 Surface Water

13.12.1 Impact Description

The only hydrological features associated with the Project Area include two small agricultural rainwater-fed dams. The original layout (Layout Alternative 1) was revised to avoid the small artificial dam in the north-western corner of the site. The new layout (Layout Alternative 2) does not directly encroach into a watercourse, or the regulated areas in terms of riparian habitats or wetlands.

According to GCS (2023), the elevation of the site is 30m above the floodplain of the Selons River and is not at risk to river flood waters in the 100-year event.

Potential impacts related to the movement of water over the PV Site include the following:

- The development may alter the drainage on the site and cause an increase in runoff; and
- The development may cause Impacts as a result of inadequate stormwater management at the PV Site (e.g., erosion).

13.12.1.1 Impact Assessment

Environmental Feature	Hydrology					
Relevant Alternatives & Activities	Construction and operational activities					
Project life-cycle	Construction & operational phases					
Potential Aspects & Impacts	Proposed Management Objectives / Mitigation Measures					
<ul style="list-style-type: none"> • Alteration of drainage over site. • Inadequate stormwater management. 	<ul style="list-style-type: none"> • Design suitable stormwater drainage system for the PV Site. • Identify appropriate protection measures during the design stage, taking into consideration foundation stability, access road stability, and electrical connections (amongst others). • Erosion protection measures to be installed where there are possibilities of surface water sheet flow causing erosion. • The construction camp shall not be situated nearer than 100m or within the 1:100 year flood line of any watercourse (including the two small agricultural rainwater-fed dams in the greater area). • Carry out earthworks in phases across the PV Site to reduce the total area of disturbed ground at any one time. 					
	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	medium-high	long-term	likely	2
After Mitigation	-	local	low	long-term	unlikely	1

A quantitative impact assessment was not provided by the Aquatic Ecologist as only an Aquatic Compliance Statement was deemed necessary due to the low sensitivity of the site in terms of aquatic biodiversity.

13.13 Terrestrial Ecology

13.13.1 *Impact Description & Assessment*

The findings from the Terrestrial Biodiversity Compliance Statement (Human, 2023) follow. The specialist report is contained in **Appendix E2**.

The Project Area has experienced long-term and continuous disturbance, mostly due to the agricultural grazing practices and associated impacts. The Project Area is modified and as such is assigned a sensitivity rating of 'Low'.

The identification of potential impacts and the associated mitigation measures are captured below. A quantitative impact assessment was not provided by the Terrestrial Ecologist as only a Terrestrial Biodiversity Compliance Statement was deemed necessary due to the low sensitivity of the site in terms of terrestrial biodiversity.

Impact 1	Destruction, fragmentation and degradation of habitats and ecosystems
Problem	Construction activities will require clearing of natural habitat, to be replaced by the infrastructure. This will result in permanent local loss of habitat. Daily operational activities will permanently damage habitat and fragment it further.
Type	Direct
Nature	Negative
Phases	Construction and operational
Mitigation Measures	<ol style="list-style-type: none"> 1. Restrict impact to development footprint only and limit disturbance in surrounding areas. 2. Prior to commencement of construction, compile a Rehabilitation Plan including monitoring specifications. 3. Prior to commencement of construction, compile an Alien Plant Management Plan.
Impact 2	Spread and/or establishment of alien and/or invasive species
Problem	Establishment and continued spread of alien invasive plants due to the clearing and disturbance of indigenous vegetation
Type	Indirect
Nature	Negative
Phases	Construction and Operational
Mitigation Measures	<ol style="list-style-type: none"> 1. Prior to commencement of construction, compile and implement an Alien Plant Management Plan, which highlights control priorities and areas and provides a programme for long-term control, including monitoring specifications. 2. Undertake regular monitoring to detect alien invasions early so that they can be controlled. 3. Implement control measures.
Impact 3	Direct mortality of fauna
Problem	Mortality of fauna due to higher traffic (Vehicles and staff) on site
Type	Direct
Nature	Negative
Phases	Construction and Operational
Mitigation Measures	Education and awareness of staff and construction personal regarding importance of faunal populations and ecosystem functioning
Impact 4	Reduced dispersal/migration of fauna

Problem	Internal roads, fencing and infrastructure will cut off migratory routes of faunal populations
Type	Direct
Nature	Negative
Phases	Construction and Operational
Mitigation Measures	Create corridors during construction phase for faunal species to move through artificial barriers
Impact 5	Environmental pollution due to water runoff, spills from vehicles and erosion
Type	Direct and Indirect
Nature	Negative
Phases	Construction and Operational
Mitigation Measures	Diligence checks as per storage SOP according to management plans
Impact 6	Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust, and light pollution.
Problem	Construction and maintenance vehicles moving around on site
Type	Direct and Indirect
Nature	Negative
Phases	Construction and Operational
Mitigation Measures	Keep within footprint, drive within speed limits, do not idle vehicle for unnecessary periods
Impact 7	Staff and others interacting directly with fauna (potentially dangerous) and flora or poaching of animals and plants
Problem	Staff interacting/ killing/ poaching fauna or flora species
Type	Direct
Nature	Negative
Phases	Construction and Operational
Mitigation Measures	Awareness training for staff on site regarding sensitive fauna and flora species, including relevant laws for protection of species

Additional mitigation measures are included in the EMP to safeguard terrestrial ecological features in the Project Area.

13.14 Avifauna

A separate Avifaunal Impact Assessment (de Wet, 2023) was undertaken and the findings from this study follow. The specialist report is contained in **Appendix E3**.

13.14.1 *Impact Description*

During the construction phase, vegetation clearing for the associated infrastructure will lead to direct habitat loss. Vegetation clearing will create a disturbance and will therefore potentially lead to the displacement of avifaunal species. The operation of construction machinery on site will generate noise pollution. Increased human presence can lead to poaching and the increase in vehicle traffic and heavy machinery will potentially lead to roadkill.

The principal impacts of the operational phase are electrocution, collisions, fencing, chemical pollution due to chemical cleaning of the PV panels and habitat loss. Solar panels have been implicated as a potential risk for bird collisions. Collisions are thought to arise when birds (particularly waterbirds) mistake the panels for waterbodies, or when migrating or dispersing birds become disorientated by the polarised light reflected by the panels. The combination of powerlines, fencing and large infrastructure will influence avifauna species. Visser *et al* (2019) performed a study at a utility-scale PV SEF in the Northern Cape and found that most of the species affected by the facility were passerine species. This is due to collisions with solar panels from underneath. During a predator attack while foraging under the panels, individuals may alight and then collide with the panel. Larger species were said to be more influenced by the facilities when they were found foraging close by and were disturbed by predators which resulted in collisions with infrastructure.

Large passerines are particularly susceptible to electrocution because owing to their relatively large bodies, they are able to touch conductors and ground/earth wires or earthed devices simultaneously. The chances of electrocution are increased when feathers are wet, during periods of high humidity or during defecation. Prevailing wind direction also influences the rate of electrocution casualties.

Fencing of the PV site can influence birds in the following ways (BirdLife South Africa, 2015):

- Snagging – occurs when a body part is impaled on one or more barbs or razor points of a fence;
- Snaring – when a bird's foot/leg becomes trapped between two overlapping wires;
- Impact injuries – birds flying into a fence, the impact may kill or injure the bird;
- Snarling – when birds try and push through a mesh or wire stands, ultimately becoming trapped (uncommon);
- Electrocution – electrified fence can kill or severely injure birds; and
- Barrier effect – fences may limit flightless birds including moulting waterfowl from resources.

Chemical pollution from PV cleaning, if not environmentally friendly will result in either acute or chronic affects. Should this chemical penetrate into the surrounding environment, it would impact populations on a larger scale and not just species found in and around the PV footprint

13.14.2 Impact Assessment

The tables to follow were obtained from the Avifaunal Impact Assessment (de Wet, 2023).

Table 21: Avifauna Impact Assessment - Construction Phase (de Wet, 2023)

Impact	Prior to mitigation						Post mitigation					
	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
Habitat destruction within the project footprint	5	3	4	3	5		4	2	4	3	4	
	Permanent	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Great / harmful/ ecosystem structure and function largely altered	Ecology moderately sensitive/ /important	Definite	Moderately High	Life of operation or less than 20 years: Long Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Great / harmful/ ecosystem structure and function largely altered	Ecology moderately sensitive/ /important	Highly likely	Moderate
Destruction, degradation and fragmentation of surrounding habitats	4	3	3	3	4		3	2	2	3	3	
	Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Highly likely	Moderate	One year to five years: Medium Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Small / ecosystem structure and function largely unchanged	Ecology moderately sensitive/ /important	Likely	Low
Displacement/emigration of avifauna community (including SCC) due to noise pollution	4	3	3	3	4		3	2	2	3	3	
	Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Highly likely	Moderate	One year to five years: Medium Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Small / ecosystem structure and function largely unchanged	Ecology moderately sensitive/ /important	Likely	Low
Direct mortality from persecution or poaching	4	3	3	3	4		2	2	2	3	3	
						Moderate					Likely	Low

Impact	Prior to mitigation						Post mitigation					
	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
of avifauna species and collection of eggs	Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Highly likely		One month to one year: Short Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Small / ecosystem structure and function largely unchanged	Ecology moderately sensitive/ /important		
	4	3	3	3	4		2	2	2	3	1	
Direct mortality from increased vehicle and heavy machinery traffic	Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Highly likely	Moderate	One month to one year: Short Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Small / ecosystem structure and function largely unchanged	Ecology moderately sensitive/ /important	Highly unlikely	Absent
	4	4	4	3	4		2	2	2	3	1	
Chemical pollution associated with dust suppressants	Life of operation or less than 20 years: Long Term	Regional within 5 km of the site boundary / < 2000ha impacted / Linear features affected < 3000m	Great / harmful/ ecosystem structure and function largely altered	Ecology moderately sensitive/ /important	Highly likely	Moderately High	One month to one year: Short Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Small / ecosystem structure and function largely unchanged	Ecology moderately sensitive/ /important	Highly unlikely	Absent

Table 22: Avifauna Impact Assessment – Operational Phase (de Wet, 2023)

Impact	Prior to mitigation						Post mitigation					
	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
Collisions with infrastructure associated with the PV Facility	5	2	4	3	4		4	2	3	3	4	
	Permanent	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Great / harmful/ ecosystem structure and function largely altered	Ecology moderately sensitive/ /important	Highly likely	Moderately High	Life of operation or less than 20 years: Long Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Highly likely	Moderate
Electrocution due to infrastructure associated with the PV Facility	5	2	3	3	4		4	2	3	3	2	
	Permanent	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Highly likely	Moderate	Life of operation or less than 20 years: Long Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Possible	Low
Direct mortality from roadkills, persecution or poaching of avifauna species and collection of eggs	4	3	3	3	3		4	2	2	3	2	
	Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 500ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Likely	Moderate	Life of operation or less than 20 years: Long Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features	Small / ecosystem structure and function largely unchanged	Ecology moderately sensitive/ /important	Possible	Low

Impact	Prior to mitigation						Post mitigation					
	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
								affected < 100m				
Direct mortalities and hinderance of movement from fencing infrastructure	5	3	3	3	3		4	2	2	3	3	
	Permanent	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Likely	Moderate	Life of operation or less than 20 years: Long Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Small / ecosystem structure and function largely unchanged	Ecology moderately sensitive/ /important	Likely	Low
Pollution due to chemicals used to keep the PV panels clean	4	3	3	3	3		4	2	2	3	3	
	Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Likely	Moderate	Life of operation or less than 20 years: Long Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Small / ecosystem structure and function largely unchanged	Ecology moderately sensitive/ /important	Likely	Low

Table 23: Avifauna Impact Assessment – Decommissioning Phase (de Wet, 2023)

Impact	Prior to mitigation						Post mitigation					
	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
Direct mortality due to earthworks, vehicle collisions and persecution	5	3	3	3	3		2	2	3	3	2	
	Permanent	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Likely	Moderate	One month to one year: Short Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Possible	Low
Direct mortality due to infrastructure including collisions with PV infrastructure , fences etc	5	3	3	3	4		2	2	3	3	1	
	Permanent	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Highly likely	Moderately High	One month to one year: Short Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Highly unlikely	Low
Continued habitat degradation	5	3	3	3	4		2	2	2	3	2	
											Possible	Low

Impact	Prior to mitigation						Post mitigation					
	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
due to Invasive Alien Plant encroachment and erosion	Permanent	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Highly likely	Moderately High	One month to one year: Short Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Small / ecosystem structure and function largely unchanged	Ecology moderately sensitive/ /important		

Table 24: Avifauna Impact Assessment – Management Actions (de Wet, 2023)

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Management outcome: Habitats				
The areas to be developed must be specifically demarcated to prevent movement into surrounding environments.	Life of operation	Project Manager Environmental Officer	Development footprint	Ongoing
High sensitivity areas must be declared No-go areas, they must be demarcated to ensure no vehicles or people move into these areas.	Life of operation	Project Manager Environmental Officer	Development footprint	Ongoing
Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further.	Life of operation	Project Manager Environmental Officer	Areas of indigenous vegetation	Ongoing
Solar panels must be mounted on pile driven or screw foundations, such as post support spikes, rather than heavy foundations, such as trench-fill or mass concrete foundations, to reduce the negative effects on natural soil functioning, such as its filtering and buffering characteristics, while maintaining habitats for both below and above-ground biodiversity.	Life of operation	Project Manager	Solar panels must be mounted on pile driven or screw foundations, such as post support spikes, rather than heavy foundations, such as trench-fill or mass concrete foundations, to reduce the negative effects on natural soil functioning, such as its filtering and buffering characteristics, while maintaining habitats for both below and above-ground biodiversity	Life of operation
Indigenous vegetation to be maintained under the solar panels to ensure biodiversity is maintained and to prevent soil erosion (Beatty et al, 2017; Sinha et al, 2018).	Life of operation	Project Manager	Indigenous vegetation to be maintained under the solar panels to ensure biodiversity is maintained and to prevent soil erosion (Beatty et al, 2017; Sinha et al, 2018).	Life of operation
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion. This will also reduce the likelihood of encroachment by alien invasive plant species. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are indigenous to this vegetation type.	Decommissioning /Rehabilitation	Project Manager	Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion. This will also reduce the likelihood of encroachment by alien invasive plant species. Topsoil must also be utilised,	Decommissioning /Rehabilitation

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
			and any disturbed area must be re-vegetated with plant and grass species which are indigenous to this vegetation type.	
A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.	Life of operation	Environmental Officer Contractor	Spill events, Vehicles dripping.	Ongoing
Cement mixing may occur on site if restricted to bunded areas at least 50 m away from any water resources. Waster used in the mixing process must not be allowed to permeate into the ground or create runoff, it must be evaporated or disposed of appropriately.	Planning and Construction	Project Manager Environmental Officer Contractor Engineer	Water pollution and restricted rehabilitation	During phase
Leaking equipment and vehicles must be repaired immediately or be removed from project area to facilitate repair.	Life of operation	Environmental Officer Contractor	Leaks and spills	Ongoing
A fire management plan needs to be complied to restrict the impact of fire.	Life of operation	Environmental Officer Contractor	Fire Management	During Phase
Management outcome: Avifauna				
All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting, or hunting terrestrial species, and owls, which are often persecuted out of superstition. Signs must be put up to enforce this.	Life of operation	Environmental Officer	Evidence of trapping etc	Ongoing

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
The duration of the construction should be kept to a minimum to avoid disturbing avifauna.	Construction/Operational Phase	Project Manager Environmental Officer	Construction/Closure Phase	Ongoing
Outside lighting should be designed and limited to minimize impacts on avifauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (red/green) lights should be used wherever possible.	Construction/Operational Phase	Project Manager Environmental Officer Design Engineer	Light pollution and period of light.	Ongoing
All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (20 km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.	Life of Operation	Health and Safety Officer	Compliance to the training.	Ongoing
All project activities must be undertaken with appropriate noise mitigation measures to avoid disturbance to avifauna population in the region	Construction/Operational Phase	Project Manager Environmental Officer	Noise	Ongoing
All areas to be developed must be walked through prior to any activity to ensure no nests or avifauna species are found in the area. Should any Species of Conservation Concern be found and not move out of the area, or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.	Construction	Environmental Officer	Presence of avifauna species and nests	During Phase
The design of the proposed PV and grid lines must be of a type or similar structure as endorsed by the Eskom-EWT Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa (Jenkins <i>et al.</i> , 2015).	Planning and Construction	Project Manager Environmental Officer Contractor Engineer	Presence of electrocuted birds or bird strikes	During Phase
Infrastructure should be consolidated where possible in order to minimise the amount of ground and air space used.	Planning and Construction	Project Manager Environmental Officer Contractor Engineer	Presence of bird collisions	During phase
The loop in loop out lines must join in at the closest point to the existing line as possible.	Planning and Construction	Project Manager Environmental Officer Contractor Engineer	Presence of bird collisions	During phase
All the parts of the infrastructure must be nest-proofed and anti-perch devices placed on areas that can lead to electrocution	Planning and Construction	Environmental Officer Contractor Engineer	Presence of electrocuted birds	During phase

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Use environmentally friendly cleaning and dust suppressant products	Construction and Operation	Environmental Officer Contractor Engineer	Chemicals used	During phase
<p>Fencing mitigations for ClearVu or similar fencing:</p> <ul style="list-style-type: none"> • If needed, any top strands must be smooth wire, barbed wire must be avoided; • Routinely monitor all fencing for any collisions and mortality, as well as trapped fauna. • Place markers/diverters on fences, especially towards the top • A specialist must be consulted if any collisions or mortalities are observed. <p>Conventional fencing mitigations:</p> <ul style="list-style-type: none"> • Top 2 strands must be smooth wire • Routinely retention loose wires • Minimum 300 mm between wires • Place markers on fences 	Life of Operation	Project Manager Environmental Officer Contractor Design Engineer	Presence of birds stuck /dead in fences Monitor fences for collisions or mortalities every second day for the first 6 months.	During phase
As far as possible power cables within the project site should be thoroughly insulated and preferably buried.	Construction and Operation	Project Manager Environmental Officer Design Engineer	Exposed cables	During phase
Any exposed parts must be covered (insulated) to reduce electrocution risk	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of electrocuted birds	During phase
The BESS must be enclosed in a structure with a non-reflective surface	Construction and Operation	Project Manager Environmental Officer Design Engineer	Reflective surfaces on BESS	During phase
Non-polarising white strips must be fitted along the edges of the panels to reduce reflection and therefore similarity to water and deter birds and insects, if feasible.	Operational	Project Manager Environmental Officer Design Engineer	<p>Presence of dead birds in the project site. Monitoring must be undertaken in accordance with the BirdLife South Africa best practice guidelines for solar energy facilities (BirdLife South Africa, 2017).</p> <p>The precise location of any dead birds found should be recorded and mapped (using GPS). All carcasses should be photographed as found then placed in a plastic bag,</p>	During phase. The monitoring frequency is based on the collision rate.

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
			labelled as to the location and date, and preserved (refrigerated or frozen) until identified. Feather spots (e.g., a group of feathers attached to skin) and body parts should also be collected.	
Overhead cables/lines must be fitted with bird diverters or flappers (Shaw <i>et al.</i> 2021, Prinson <i>et al</i> 2012), .	Operational	Project Manager Environmental Officer Design Engineer	Collisions. Monitoring must be undertaken in accordance with the BirdLife South Africa best practice guidelines for solar energy facilities (BirdLife South Africa, 2017).	During phase. The monitoring frequency is based on the collision rate.
There is little to no information on the recovery of the avifauna community subsequent to the closure of Solar PV facilities within South Africa. A post-closure monitoring regime is recommended for the proposed project to document any impacts and this data must be used for improving rehabilitation measures	Closure/Rehabilitation	Project Manager Environmental Officer	Avifauna community	Wet-season and dry-season survey for the initial 3-5 years after closure.
All infrastructure including powerlines must be removed if the facility is decommissioned	Closure/Rehabilitation	Project Manager Environmental Officer	Infrastructure removal	During Process

13.15 Agriculture

The findings from the Agricultural Compliance Statement (Gouws, 2023) follow. The specialist report is contained in **Appendix E4**.

13.15.1 *Impact Description*

The potential impacts of the development from an agricultural perspective are as follows:

- Loss of high potential land –
 - There will not be permanent loss of high potential land. According to the guidelines of various publications of DALRRD that deals with land capability and crop yield, the land is not high potential. The irrigated land on the property has been excluded from the development footprint.
- Loss of agricultural production –
 - The impact of the Project on agricultural production is low. The loss in net farm income from livestock production is approximately R7 503 per month. The area is too small to make any meaningful contribution to the farming income.
- Loss of agricultural infrastructure –
 - The cattle handling facility is located on the land excluded for the development. No agricultural infrastructure will be lost.
- Loss of soil due to erosion –
 - The soil is well-drained with moderately developed structure. It is also on evenly sloped land where erosion is not expected. However, the panels create areas that are cleared of vegetation, and that could be subject to erosion. Runoff from hard surfaces should be dealt with by suitable stormwater management measures.

A quantitative impact assessment was not provided by the Agricultural Specialist as only an Agricultural Compliance Statement was deemed necessary.

13.16 Cultural Heritage

The findings from the Cultural Heritage Impact Assessment (Kitto, 2023) follow. The specialist report is contained in **Appendix E5**.

13.16.1 *Impact Description*

No archaeological material, historical structures or graves were identified within or close to the Project Area. However, there is a low possibility that some archaeological material or unidentified graves could be uncovered sub-surface during construction.

13.16.2 *Impact Assessment*

The assessment of the Project's impacts to heritage resources is provided in **Table 25** below.

Table 25: Assessment of impacts on heritage resources (Kitto, 2023)

Environmental Feature		Chance finds: Heritage resources - Unidentified graves or archaeological material				
Project life-cycle		Planning, Construction				
Potential Impact		Proposed Management Objectives / Mitigation Measures				
Possible damage to or destruction of unidentified archaeological material		If any changes are made to the final design footprint prior to construction, monitoring of site clearance activities must be undertaken by a heritage specialist to identify any archaeological sites or material				
Possible damage to or destruction of unidentified graves or burials		If any changes are made to the final design footprint prior to construction, monitoring of site clearance activities must be undertaken by a heritage specialist to identify any graves/burials				
Alternative 1	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	High	Permanent	Remote	1
After Mitigation	Negative	Local	High	Long- term	Remote	1
Significance of Impact and Preferred Alternatives	No visible heritage resources were identified within the project area for Alternative 1. However, there is a remote possibility that unidentified graves/burials or archaeological material could be uncovered during site clearing or construction activities.					
Alternative 2	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	High	Permanent	Remote	1
After Mitigation	Negative	Local	High	Long- term	Remote	1
Significance of Impact and Preferred Alternatives	No visible heritage resources were identified within the project area for Alternative 2. However, there is a remote possibility that unidentified graves/burials or archaeological material could be uncovered during site clearing or construction activities.					

13.17 Palaeontology

The findings from the Palaeontological Desktop Assessment (Butler, 2023) follow. The specialist report is contained in **Appendix E6**.

13.17.1 *Impact Description*

Based on the desktop research it is concluded that fossil heritage of scientific and conservational interest in the development footprint is rare. This is in contrast with the High Sensitivity allocated to the development area by the SAHRIS Palaeosensitivity Map and Screening Tool. A medium Palaeontological Significance has been allocated for the construction phase of the PV development pre-mitigation and a low significance post mitigation. The construction phase will be the only development phase impacting Palaeontological Heritage and no significant impacts are expected to impact the Operational and Decommissioning phases. As the No-Go Alternative considers the

option of 'do nothing' and maintaining the status quo, it will have a Neutral impact on the Palaeontological Heritage of the development. The Cumulative impact of the development is considered to be Low and falls within the acceptable limits for the project.

13.17.2 Impact Assessment

The table to follow was obtained from the Palaeontological Desktop Assessment (Butler, 2023).

Nature of Impacts	Loss of Fossil Heritage in or above ground surface							
	Impacts	Extent	Probability	Duration	Magnitude	Reversibility	Irreplaceable loss	Cumulative effect
Pre-mitigation	Site (1)	Possible (2)	Permanent (4)	High (2)	Irreversible 4	Significant loss of resources 2	Low (2)	Negative Medium (30)
Post mitigation	Site (1)	Possible (2)	Permanent (4)	Low (1)	Irreversible (4)	Significant loss of resources (1)	Low (2)	Negative Low (15)

13.18 Visual Quality

The findings from the Visual Impact Assessment (Buys, 2023) follow. The specialist report is contained in **Appendix E8**.

13.18.1 Impact Description

Solar PV facilities are considered long-term in nature and long-term structures will be constructed. The primary visual impacts associated with a change from the current state of the site (fallow lands, cultivated fields and grassland vegetation) to a solar PV facility will have the greatest visual impact due to the visibility of the site from sensitive receptors. The visual impacts will be assessed based on a synthesis of criteria (nature of impact, extent, duration, probability, intensity, status, degree of confidence, level of significance and significance after mitigation) as defined by the EIA Regulations. The nature of the visual impacts will be the visual effect that the activity would have on the receiving environment. These visual impacts include the following:

- ❑ The construction and operation of the proposed PV facility and its associated infrastructure may have a visual impact on the study area, especially within (but not restricted to) a 1 - 5km radius of the proposed facility. The visual impact will differ amongst places, depending on the distance from the facility.
- ❑ Visibility from sensitive receptors. The proposed development will be visible to receptors outside the proposed project area, which include the following –
 - Site personnel at the operation;
 - People travelling to work and commercial activities in the surrounding areas;
 - People travelling on the surrounding access routes to their place of residence;

- Surrounding farming communities; and
- Surrounding residential areas.

Based on the results of the impact assessment, the majority of the potential visual impacts were considered to be moderate before mitigation and with the successful implementation this can be reduced to low. With regards to the proposed activities, due to the terrain of the proposed boundary, vegetation, VAC, and current land uses, the proposed activities are expected to result in a moderate visual impact on the receiving environment. The proposed activities will have a long-term temporal visual impact, due to the very nature of the Project and associated infrastructure. The activity will have a localised visual impact over a long-term duration. The activity will be able to continue with the implementation of appropriate mitigation strategies during the construction, operational and decommissioning phases.

13.18.2 Impact Assessment

The tables to follow were obtained from the Visual Impact Assessment (Buys, 2023).

Table 26: Visual Impact Assessment – Construction, Operational & Decommissioning Phases (Buys, 2023)

Phase	Potential Visual Impacts	Visual Significance											
		Before Mitigation					After Mitigation						
		M	D	S	P	SP	RATING	M	D	S	P	SP	RATING
Construction	Site establishment <ul style="list-style-type: none"> This will involve the vegetation clearance and stripping of soil in areas designated for surface infrastructure. 	6	2	3	3	33	Medium	6	2	3	2	22	Low
	Site Clearing of the project footprint: <ul style="list-style-type: none"> Removal of vegetation leading to increased visual contrast and loss of VAC and increase visual intrusion on sensitive receptors. Alteration of current landscape features impacting on landscape character and sense of place. 	6	2	3	4	44	Medium	6	2	3	2	22	Low
	Construction of Solar PV facility and associated infrastructure.	6	2	3	4	44	Medium	6	2	3	2	22	Low
	Construction vehicle movement and increased human activity in and around the proposed site.	6	2	3	2	22	Low	6	2	3	1	11	Low
	General and hazardous waste management.	2	2	2	2	12	Low	2	2	2	1	6	Low
	Formation of dust plumes as a result of construction activities.	4	2	3	2	18	Low	4	2	3	1	9	Low
	Use of security lighting.	4	2	2	2	16	Low	4	2	2	1	8	Low
	Topographical alteration which will lead to increased visual intrusion and potential impact on sense of place.	6	2	3	4	44	Medium	6	2	3	2	22	Low

Phase	Potential Visual Impacts	Visual Significance											
		Before Mitigation						After Mitigation					
		M	D	S	P	SP	RATING	M	D	S	P	SP	RATING
Operational	Topographical alteration which will lead to increased visual intrusion and potential impact on sense of place.	6	4	3	4	52	Medium	6	4	3	2	26	Low
	Increased vehicle and human activity in and around the Solar PV facility and associated infrastructure.	6	4	3	2	26	Low	6	4	3	1	13	Low
	Night-time illumination due to security lighting and lighting associated with the Solar PV facility and associated infrastructure.	6	4	2	3	36	Medium	6	4	2	2	24	Low
	Potential visual impact of solar glint and glare as a visual distraction.	6	4	3	3	39	Medium	6	4	3	2	26	Low

Phase	Potential Visual Impacts	Visual Significance											
		Before Mitigation						After Mitigation					
		M	D	S	P	SP	RATING	M	D	S	P	SP	RATING
Decommissioning	General decommissioning and closure activities leading to visual intrusion on sensitive receptors.	6	1	3	2	20	Low	6	1	2	2	14	Low
	Dismantling and removal Solar PV facility and associated infrastructure.	6	1	3	1	10	Low	6	1	2	1	7	Low
	Cleaning, landscaping, and replacement of soils over the disturbed area.	6	1	3	1	10	Low	6	1	2	1	7	Low
	Waste generation and disposal	4	1	2	2	14	Low	4	1	2	1	7	Low
	Ineffective rehabilitation leading to landscape scarring, permanent visual contrast and a permanent alteration of the landscape character and sense of place.	6	4	3	3	39	Medium	6	1	2	3	21	Low

Management Actions for Visual Impacts

Visual mitigation can be divided into two options. Typically using a combination of the two options is most effective. The first option is an attempt to "hide" the source of the visual impact from view, by placing visually appealing elements between the viewer and the source of the visual impact. The second option aims to minimise the severity of the visual impact itself. This can be achieved in numerous ways for example limiting heights or by blending the infrastructure to match the surrounding environment.

During the construction phase, the following mitigation measures should be implemented to minimise the visual impact.

General site management:

- Maintain the construction site in a neat and orderly condition at all times;
- Plan the placement of lay-down areas and any potential temporary construction camps in order to minimise vegetation clearing;
- Ensure that rubble, litter, and disused construction materials are managed and removed regularly; and
- Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way.

Height and Orientation:

- The height and orientation of the solar panels should be considered during the design phase. Panels should be oriented to minimize glare and reflection, and their height should be kept as low as possible to reduce their visual impact.

Infrastructure:

- All constructed facilities and buildings should cause minimum visual disturbance by reducing the contrast and blending in with the surrounding vegetated natural area. This could be achieved by painting rooftops and walls of buildings in the hues and tones of the surrounding vegetation and/or by adding matt paints to highly reflective surfaces, as well as sharp protruding features on the structures. All of these solutions are subject to the technical design of individual buildings and facilities and should be pursued by the technical design and/or construction team, taking into consideration added value from reduced visibility, engineering feasibility and cost.
- Enhancing the natural landscape in the area around the proposed development with moderate height indigenous trees to hide the buildings and infrastructure.

Dust Management:

- Implement dust suppression using a water cart to minimise airborne dust;
- Enforce a 50 km/h speed limit on-site for Light-Duty Vehicles and a 40 km/h speed limit for large construction vehicles and machinery.

During the operational phase the following mitigation measures should be implemented to minimise the visual impact.

☐ Light pollution management:

- Plan the lighting requirements of the facilities to ensure that lighting meets the need to keep the site secure and safe, without resulting in excessive illumination.
- Avoid up-lighting of structures by rather directing lighting downwards and focusing on the area to be illuminated.
- Reduce the height and angle of illumination from which floodlights are fixed as much as possible while still maintaining the required levels of illumination.
- Lighting should be shielded in areas where specific objects are to be illuminated.
- Minimise the use of lighting, where possible.
- Lighting should exclude the blue-rich wavelengths and be closer to the red-rich wavelength spectrum.
- Globes used in lighting outside areas should be warm white. This also applies to light spilling out from within buildings. A colour temperature of no more than 3000 Kelvins is recommended for lighting.
- Light intensity of illuminating lights should be limited as far as possible, i.e., to limit lighting to areas required to serve operational functionality.
- Illumination where not permanently required should be fitted with timers, motion-activated sensors or be dimmable to reduce total light emitted.

☐ Site management:

- Shape any slopes and embankments to a maximum gradient of 1:4 and vegetate, to prevent erosion and improve their appearance.
- Utilise vegetation screens as visual screening devices around the proposed project where possible, specifically buildings.
- Plant indigenous trees in landscaped areas where possible, as well as around the solar PV facility and associated infrastructure.
- Eradicate invasive alien plant species.

During decommissioning and closure phase, the following mitigation measures should be implemented to minimise the visual impact:

- Eradicate invasive alien plant species;
- Remove all built infrastructure; and
- Re-shape all footprint areas to be as natural in appearance as possible and revegetate using locally occurring vegetation.

13.19 Air Quality

13.19.1 *Impact Description*

Receptors to air quality pollution include people residing in surrounding settlements and farm dwellings, ecological features (fauna and flora), livestock and crops.

The Project proposes the use of a renewable resource (solar), which is a cleaner form of energy generation than using fossil fuels, with environmental benefits.

Sources of air quality impacts associated with the Project may include:

- Construction phase –
 - Dust from the use of dirt roads by construction vehicles;
 - Dust from bare areas that have been cleared for construction purposes; and
 - Emissions from construction equipment and machinery.
- Operational phase –
 - Impacts to air quality caused by the operation and maintenance of the facility include dust from the use of dirt roads and tailpipe emissions from vehicles.

Mitigation measures are included in the EMPr to ensure that the air quality impacts during the construction phase are suitably monitored and managed and that regulated thresholds are not exceeded. The EMPr also includes measures to control and minimize greenhouse gas emissions by optimising the utilisation of construction resources, as well as preventing fires related to construction activities.

During the operational phase of the Solar PV Plant, local atmospheric pollution may reduce the irradiation received or contain significant levels of airborne corrosive substances. The efficiency of the solar plants be also reduced if the modules are soiled (covered) by particulates/dust.

13.19.2 *Impact Assessment*

Environmental Feature	Air Quality
Relevant Alternatives & Activities	Construction domain of development footprint
Project life-cycle	Construction phase
Potential Aspects & Impacts	Proposed Management Objectives / Mitigation Measures
<ul style="list-style-type: none"> • Excessive dust levels as a result of construction activities. • Emissions from construction equipment and machinery. 	<ul style="list-style-type: none"> • Appropriate dust suppression measures or temporary stabilising mechanisms to be used when dust generation is unavoidable (e.g., dampening with water, chemical soil binders, straw, brush packs, chipping), particularly during prolonged periods of dry weather. Dust suppression to be undertaken for all bare areas created by the development footprint. All dust suppression requirements should be based on the results from the dust monitoring and the proximity of sensitive receptors. • Speed limits to be strictly adhered to. • All vehicles and machinery used at the site are to be in good working condition and fitted with appropriate emission controls. • Construction plant to be operated efficiently and turned off when not in use.

	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	medium	short-term	likely	3
After Mitigation	-	local	low	short-term	unlikely	1

Environmental Feature	Air Quality					
Relevant Alternatives & Activities	Operation of the Solar PV Plant					
Project life-cycle	Operational phase					
Potential Aspects & Impacts	Proposed Management Objectives / Mitigation Measures					
<ul style="list-style-type: none"> Influence of air quality and soiling on operational efficiency of Solar PV Plant. 	<ul style="list-style-type: none"> An appropriate maintenance and cleaning plan is to be developed for the PV panels. 					
	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	medium	long-term	likely	2
After Mitigation	-	local	low	long-term	unlikely	1

13.20 Noise

13.20.1 *Impact Description*

Sensitive receptors to noise impacts in the study area include people residing in the surrounding rural areas, ecological receptors (fauna) and livestock.

During construction, localised increases in noise will be caused by earthworks, establishment and operating of site construction laydown area, construction of proposed infrastructure, transportation of construction workers and material, activities at the construction camp, and general construction noise.

Solar PV facilities produce electricity during the daytime hours, when the sun's rays are collected by the panels. When there is little to no irradiance, noise emitted by the equipment is significantly reduced. The main sources of noise from the Project will be the rack mounted inverters and the central step-up transformer, which are only expected to be audible to operational staff who will come in close proximity to these components. Other sources of noise include operation and maintenance vehicles and activities.

During the operational phase, power lines produce an audible sound or buzz because they are producing something called a corona discharge that is interacting with the surrounding air. The corona discharge is a side-effect of the electric field the power line generates by carrying electricity. The discharge can be greater and the buzzing louder if there is increased moisture or pollutants in the air. Under normal conditions, corona-generated noise is not audible. The noise may be audible under certain wet conditions. Conductors are selected based on factors such as audible noise, corona, and electromagnetic field mitigation. In addition, corona rings can be fitted if deemed necessary. Corona is not associated with any adverse health effects in humans or livestock.

Noise that emanates from construction and operational activities are addressed through targeted best practices in the EMP. The associated regulated standards need to be adhered to.

Project personnel working on the construction site will experience the greatest potential exposure to the highest levels of noise and vibration. Workplace noise and vibration hazards will be managed as part of the Occupational Health and Safety Management System to be employed on site, which will include specific measures aimed at preventing hearing loss and other deleterious health impacts.

13.20.2 *Impact Assessment*

Environmental Feature	Noise					
Relevant Alternatives & Activities	Construction domain of development footprint					
Project life-cycle	Construction phase					
Potential Aspects & Impacts	Proposed Management Objectives / Mitigation Measures					
<ul style="list-style-type: none"> Noise as a result of construction activities 	<ul style="list-style-type: none"> The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents. Working hours to be agreed upon with Project Manager, so as to minimise disturbance to landowners/occupiers and community members. Noise preventative measures (e.g., screening, muffling, timing, pre-notification of affected parties) to be employed. 					
	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	medium	short-term	likely	2
After Mitigation	-	local	low	short-term	unlikely	1

13.21 Hazardous Substances & Waste

13.21.1 *Impact Description*

Improper management of hazardous substances and waste may pollute the biophysical environment (air, water and soil), and pose risks to humans, flora and fauna. It may also cause visual impacts.

Hazardous substances to be stored and used during the construction and operational phases of the Project include oil, fuel, solvents, pesticides, lithium-ion batteries (BESS), etc.

General construction waste will comprise of surplus or off-specification materials (e.g., concrete, wooden pallets, packaging paper or plastic, wood, metals, etc.) and construction debris. Domestic waste will include food waste, plastic, glass, aluminum cans and waste paper. A small proportion of the waste generated during construction phase will be hazardous and may include used oil, hydraulic fluids, waste fuel, grease and waste oil containing rags. Wastewater, including water adversely affected in quality through construction-related activities and human influence, will

include sewage, water used for washing purposes (e.g., equipment, staff) and drainage over contaminated areas (e.g., workshop, equipment storage areas).

Waste types likely to be generated during routine operation and maintenance activities include dielectric fluids, clearing agents, oils, solvents, wastewater, defunct / damaged PV cells and substation components, as well as domestic waste.

Provision is made in the EMPr to manage impacts associated with hazardous substances and waste.

13.21.2 Impact Assessment

Environmental Feature	Hazardous Substances & Waste
Relevant Alternatives & Activities	Storage and use of hazardous substances & generation of waste
Project life-cycle	Construction & operational phases
Potential Aspects & Impacts	Proposed Management Objectives / Mitigation Measures
<ul style="list-style-type: none"> Environmental pollution caused by improper management of hazardous substances and waste. 	<ul style="list-style-type: none"> Hazardous substances shall be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), Occupational Health and Safety Act (No. 85 of 1993), relevant associated Regulations and applicable SANS and international standards. Storage and use of hazardous materials will be strictly controlled to prevent environmental contamination and will adhere to the requirements stipulated on the Material Safety Data Sheets. In the event of spillages of hazardous substances the appropriate clean up and disposal measures shall be implemented. BESS to have electrical and fire protection measures in the form of battery temperature monitoring, circuit breakers, fire detection and fire suppression as per regulatory requirements. Waste to be disposed of at a licenced waste disposal facility. Water used for cleaning of PV panels will not contain any harmful chemicals or additives. Wastewater to be properly disposed of. Contaminated water will not be discharged to the environment. Used lithium-ion batteries and PV panels are to be removed by the suppliers, who are to recycle material and recover any hazardous substances (as relevant). Provision to be made in the supply agreements between the Proponent and the selected suppliers.

	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	medium-high	long-term	likely	3
After Mitigation	-	local	low	long-term	unlikely	1

Potential risks and related control measures associated with the BESS facility are captured in **Table 27** below. A detailed risk assessment will need to be undertaken based on the type of BESS technology selected and the final design of the Solar PV Plant. The outcomes of this risk assessment will need to be incorporated into the Operational EMPr (as required).

Table 27: Proposed management of risk to BESS (based on Arup, 2018)

No.	Risk	Possible Consequences	Control Measures
1	Risk posed by veld fires (external to site) to BESS facility	Damage to BESS	<ul style="list-style-type: none"> ▪ Implementation of a fire break around the site ▪ Include measures to deal with veld fires in the Emergency Response Plan ▪ Coordination with local fire authorities ▪ Provide fire extinguishers on site
2	Damage caused to cells by an external event	Lithium Ion Cell leakage	<ul style="list-style-type: none"> ▪ Lithium batteries do not contain free liquid electrolytes ▪ Individual cells are used which minimises extent of release
3	Damage to batteries from vehicle collision	<ul style="list-style-type: none"> ▪ Damage to battery cells ▪ Electrical risks 	<ul style="list-style-type: none"> ▪ Use of perimeter fence around BESS facility ▪ Appropriately designed internal access roads ▪ Limit of speed limit within fenced facility ▪ Earthing system installed as per normal electrical facilities
4	Transformer oil leakage due to corrosion of tank base or leakage of oil tank	Leakage of transformer oil to environment, with resultant pollution	<ul style="list-style-type: none"> ▪ Use of fully bunded oil storage for transformers ▪ Regular tank inspections
5	Collapse or fall of overhead electricity line onto BESS facility	Damage to BESS facility	<ul style="list-style-type: none"> ▪ BESS facility to be located outside of power line servitude
6	Security breach into BESS facility for theft of components	Theft of equipment or risk to personnel	<ul style="list-style-type: none"> ▪ Installation of security fencing around entire Solar PV Plant and around the BESS facility ▪ Installation of security system to monitor key areas ▪ Inspections to monitor for security breaches
7	Spread of fire across BESS facility between battery packs	Localised fire causing damage by spreading to BESS facility	<ul style="list-style-type: none"> ▪ Separation distances between battery packs in accordance with manufacturer recommendations ▪ Adherence to fire management measures ▪ Provide fire extinguishers on site ▪ BESS area will have a non-flammable buffer area to prevent the spread of fire. ▪ BESS will have electrical and fire protection measures in the form of battery temperature monitoring, circuit breakers, fire detection and fire suppression
8	Electrocution due to electrical fault	Electrical fault causing personnel injury	<ul style="list-style-type: none"> ▪ Normal electrical standards and installation of appropriate earthing system ▪ Use of appropriately qualified maintenance personnel
9	Lightning striking BESS facility	Lightning strike causing damage to facility or personnel	<ul style="list-style-type: none"> ▪ Include lightning protection measures, if deemed necessary
10	High rainfall and flooding to site	Damage to electrical equipment	<ul style="list-style-type: none"> ▪ BESS facility to be developed outside of the 1:100 year floodline of any watercourse and to be safeguarded against excessive rain.
11	High wind events and seismic events	Structural damage to equipment or battery packs	<ul style="list-style-type: none"> ▪ Appropriate design of BESS facility, taking into consideration <i>inter alia</i> climatic and geotechnical conditions

13.22 Traffic

13.22.1 *Impact Description*

The information to follow was extracted from the Transport Impact Assessment (iWink Consulting, 2023).

Construction Phase

The potential impact on the surrounding environment is expected to be generated by the development traffic, of which traffic congestion and associated noise, dust, and exhaust pollution form part of. It must be noted that the significance of the impact is expected to be higher during the construction and decommissioning phases because these phases generate the highest development traffic.

The construction phase includes the transportation of people, construction materials and equipment to the site. This phase also includes the construction of the solar power facility and associated infrastructure, including grid connections, construction of footings, roads, excavations, trenching, and ancillary construction works. This phase will temporarily generate the most development traffic. The nature of the impact expected to be generated at this phase would be traffic congestion and delays on the surrounding road network as well as the associated noise, dust, and exhaust pollution due to the increase in traffic. Traffic generated by the construction of the solar facility will have a notable impact on the surrounding road network. The exact number of trips generated during construction can only be determined later in the project when the contractor and the haulage company are appointed and once more detail is available regarding the staff requirements and where equipment is sourced from. In the interim, an estimate was made.

At present, solar panels are locally produced in SA by only a few select firms. The largest of them is located in Pinetown, Kwa-Zulu Natal. Owing to their limited annual production capacity of approximately 325MW, the bulk of solar modules being deployed on South African PV projects are imported, primarily from the Far East. Where panels are sourced locally, these are typically delivered to site via flatbed trucks. For the purpose of the Transport study and calculation of trips, it is assumed that all panels will be imported. Considering a loading capacity of around 600 solar panels per 40ft container, the total number of trips will result in approximately 217 trips for a 65 MW development. Spacing the transport of the panels over a one-month period (i.e., 22 workdays), the daily number of trips would result in approximately 10. Looking at a maximum of 40% of these trips occurring during the peak traffic periods, the number of trips for the delivery of the panels during peak traffic will be around 4 trips, which can be accommodated by the external road network.

Around 150 workers are estimated to be active on-site during construction and the resulting daily staff trips are then 48.

The exact number of vehicle trips for the transportation of materials during the construction phase depends on the type of vehicles, planning of the construction, source/location of construction material, etc. However, for the purpose of this study, it was estimated that at the peak of construction, approximately 100 construction vehicle trips will access the site per day.

With the recommended mitigation measures in the Transport Impact Assessment, the impact on the surrounding road network and the general traffic is deemed acceptable, as the 123 trips will be distributed over a 9-hour workday. It is expected that the majority of the trips will occur outside the peak hours. It must also be noted that vehicle trips from material delivery vary depending on the construction task/program, fuel supply arrangements, as well as distance from the material source to the site. Project planning can be used to reduce material delivery during peak hours.

The development traffic impact during the construction phase can be assessed as manageable, considering that the construction phase is temporary in nature and mitigation measures, mentioned in this report, are adhered to and keep the impact level low.

Operational Phase

The operational phase includes the operation and maintenance of the Rhino Solar PV Facility throughout its life. The nature of the impact expected to be generated at this phase would be traffic and the associated noise, dust and exhaust pollution due to the operational traffic trips.

The exact number of permanent staff expected for the operational phase is still unknown. Based on similar studies, it can be estimated that approximately 25 full-time employees will be stationed on site. Assuming a worst-case scenario of 40% of the trips occurring during peak traffic periods, approximately 10 peak hour trips are estimated for the operational phase, which will have a nominal impact on the external road network. It is assumed that the solar modules would need to be cleaned twice a year.

To limit any traffic impact on the surrounding road network, it is recommended to schedule these trips outside of peak traffic periods and to clean the solar modules over the course of a few days i.e., spread the trips over a 5-day work week, which would reduce the daily trips to 26 and the peak hour trips to max 10 (i.e., max ~40%). Additionally, the provision of rainwater tanks on site or borehole water would decrease the number of trips.

13.22.2 Impact Assessment

The tables to follow were obtained from the Transport Impact Assessment (iWink Consulting, 2023).

Table 28: Impact Table – Construction Phase / Decommissioning Phase (iWink Consulting, 2023)

TRAFFIC & TRANSPORT						
<i>CONSTRUCTION / DECOMMISSIONING PHASE</i>						
Potential Impact		Mitigation				
Increase of construction vehicles on the roads will occur, which may have an impact on communities and general traffic; increase of noise and dust pollution.		<ul style="list-style-type: none"> • Stagger component delivery to site • Reduce the construction period where possible • Stagger the construction phase • The use of mobile batch plants and quarries in close proximity to the site would decrease the impact on the surrounding road network. • Staff and general trips should occur outside of peak traffic periods as much as possible • Maintenance of haulage routes • Design and maintenance of internal roads 				
Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	National	Low	Short-term	Almost certain	2
With Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	National	Low	Short-term	Likely	2

Table 29: Impact Table – Operational/Maintenance Phase (iWink Consulting, 2023)

TRAFFIC & TRANSPORT						
<i>OPERATIONAL PHASE</i>						
Potential Impact		Mitigation				
Slight increase of vehicle trips due to permanent staff traveling to site, periodically (bi-annual) trips to site for transport of water and irregular maintenance trips.		<ul style="list-style-type: none"> ▪ Source on-site water supply if possible. ▪ Utilise cleaning systems for the panels needing less vehicle trips. ▪ Schedule trips for the provision of water for the cleaning of panels outside peak. traffic times as much as possible. 				
Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Long-term	Almost certain	2
With Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Long-term	Likely	1

Table 30: Impact Table – Construction Phase / Decommissioning Phase - Cumulative (iWink Consulting, 2023)

TRAFFIC & TRANSPORT						
CONSTRUCTION / DECOMMISSIONING PHASE - CUMULATIVE						
Potential Impact	Mitigation					
Further increase of development trips during construction phase if Onderstepoort Solar 1, Onderstepoort Solar 2 and Rhino Solar PV will be constructed at the same time.	<ul style="list-style-type: none"> Same mitigation measures as Table 7-2. <p>It is noted that it is deemed unlikely that all three developments will be constructed at the exact same time. However, for the event that the developments have similar construction periods, it is recommended to agree on a delivery schedule between the respective projects.</p>					
Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	National	High	Short-term	Likely	2
With Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	National	Medium	Short-term	Likely	2

Table 31: Impact Table – Operational/Maintenance Phase - Cumulative (iWink Consulting, 2023)

TRAFFIC & TRANSPORT						
OPERATIONAL PHASE - CUMULATIVE						
Potential Impact	Mitigation					
Increase of vehicle trips due to permanent staff traveling to site, periodically (bi-annual) trips to site for transport of water and irregular maintenance trips.	<ul style="list-style-type: none"> Same mitigation measures as Table 7-3. 					
Without Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Long-term	Likely	1
With Mitigation	Status	Extent	Magnitude	Duration	Probability	Significance
	Negative	Local	Low	Long-term	Likely	1

Management Actions – Traffic Impacts

The following are general mitigation measures to reduce the impact that the additional traffic will have on the road network and the environment (iWink Consulting, 2023):

- The delivery of components to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- Dust suppression of gravel roads located within the site boundary, including the main access road to the site and the site access roads, during the construction phase, if required.

- ❑ Regular maintenance of gravel roads located within the site boundary, including the access roads to the site, by the Contractor during the construction phase and by the Owner/Facility Manager during the operational phase, if required.
- ❑ The use of mobile batch plants and quarries near the site would decrease the traffic impact on the surrounding road network, if available and feasible.
- ❑ Staff and general trips should occur outside of peak traffic periods as far as possible.
- ❑ The Contractor should ensure that all drivers, entering the site, adhere to the traffic laws.
- ❑ Vehicular movements within the site boundary are the responsibility of the respective Contractor and the Contractor must ensure that all construction road traffic signs and road markings (where applicable) are in place. It should be noted that traffic violations on public roads are the responsibility of Law Enforcement, and the public should report all transgressions to Law Enforcement and the Contractor.
- ❑ If required, low hanging overhead lines (lower than 5.1m) e.g., Eskom and Telkom lines, along the proposed routes will have to be moved (to be arranged by the haulage company and communicated beforehand with the service provider of the OHL) to accommodate the abnormal load vehicles. The Contractor and the Developer are to ensure that the haulage company is aware of this requirement.
- ❑ The haulage company is to provide evidence to the Contractor and the Developer that any affected overhead lines have been moved or raised.
- ❑ The preferred route should be surveyed by the developer to identify problem areas (e.g., intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients, which may require modification). After the road modifications have been implemented, it is recommended to undertake a “dry-run” with the largest abnormal load vehicle, prior to the transportation of any components, to ensure that delivery will occur without disruptions. This process is to be undertaken by the haulage company transporting the components and the contractor, who will modify the road and intersections to accommodate abnormal vehicles. The “dry-run” should be undertaken within the same month that components are expected to arrive. The haulage company is to provide evidence that the route has been surveyed and deemed acceptable for the transportation of the abnormal load.
- ❑ The Contractor needs to ensure that the gravel sections of the haulage routes (i.e., the site access road and the main access road to the site) remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.
- ❑ Design and maintenance of internal roads. The internal gravel roads will require grading with a grader to obtain a camber of between 3% and 4% (to facilitate drainage) and regular maintenance blading will also be required. The geometric design of these gravel roads needs to be confirmed at detailed design stage. This process is to be undertaken by a civil engineering consultant or a geometric design professional.

13.23 Civil Aviation

13.23.1 Impact Description

Possible impacts that may be caused by a Solar PV Plant to civil aviation include potential glare and glint from *inter alia* PV panels, steel array mounting, glass windows and rooftops that might cause temporary loss of vision to pilots on arrival or departure. Towers and transmission lines can disrupt airplane flight paths in and near airports and endanger low-flying airplanes, especially those used in agricultural management activities.

Glint and glare are caused by many reflective materials, whereby light from the sun is reflected off such materials with a potential to cause hazard, nuisance or unwanted visual impact. It is noted that solar panels are designed to absorb, not reflect, irradiation.

As verified, based on the Screening Report (refer to **Section 12.2** above), the Project Area has low sensitivity in terms of civil aviation as there are no major or other types of civil aviation aerodromes in proximity to the site. Accordingly, no Glint and Glare Impact Assessment in terms of Obstacle Notice 4/2017 was undertaken.

The SACAA was engaged with as part of the EIA and the Applicant will adhere to the requirements of this authority.

13.23.2 Impact Assessment

A quantitative impact assessment was not undertaken from a civil aviation perspective, due to the reasons provided in **Section 13.23.1** above.

13.24 Existing Structures and Infrastructure

13.24.1 Impact Description

The Project may cause disruptions to services or damage existing infrastructure as a result of construction activities.

A detailed survey will be conducted to identify all physical features that are located within the final project footprint. Optimisation of the layout during the design phase will seek to avoid existing structures and infrastructure, where possible. The setbacks / conditions required by the custodians of infrastructure in proximity to the PV Site and along the power line route will need to be adhered to.

During the public participation process conducted to date, certain infrastructure owners and custodians provided wayleave requirements and conditions when working near to existing services.

13.24.2 *Impact Assessment*

Environmental Feature	Existing Structures and Infrastructure
Relevant Alternatives & Activities	All activities that affect existing structures and infrastructure
Project life-cycle	Construction & operational phases
Potential Aspects & Impacts	Proposed Management Objectives / Mitigation Measures
<ul style="list-style-type: none"> • Disruption of existing services. • Damage to existing structures and infrastructure. 	<ul style="list-style-type: none"> • Identify and record existing services and infrastructure. • Conform to requirements of relevant service providers and infrastructure custodians (e.g., Eskom, Transnet, Telkom, North West Department of Public Works and Roads, etc.). • Ensure access to infrastructure is available to service providers at all times. • Immediately notify service providers of disturbance to services. Rectify disturbance to services, in consultation with service providers. Maintain a record of all disturbances and remedial actions on site. • Adequate reinstatement and rehabilitation of affected environment.

	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	medium-high	short-term to permanent	likely	3
After Mitigation	-	local	low	short-term	unlikely	1

13.25 Health and Safety

13.25.1 *Impact Description*

Construction Phase

Health and safety related risks associated with the Project during the construction phase include the following:

- Hazards related to construction work;
- Increased levels of dust and particulate matter, as well as noise;
- Water (surface and ground) contamination;
- Poor water and sanitation services for construction workers;
- Communicable diseases;
- Psychosocial disorder (e.g. social disruptions);
- Safety and security to the local community; and
- Lack of suitable health services.

These risks are addressed through mitigation measures identified under other environmental features, such as socio-economic environment, air quality, noise, traffic, hazardous substances and waste as well as best practices included in the EMP. Additional management requirements will be included in the Project's Occupational Health and Safety system.

Operational Phase

The predominant types of hazards associated with battery systems include electric shock, stored energy, chemical, flammable emission, thermal runaway, transportation, kinetic energy and manual handling (Energy Storage Council, 2016). A lithium-ion based BESS must be designed with proper disconnects, relays, thermal management, enclosures, layout, monitoring and controls to mitigate risks to the required level of safety. Operating strategies spanning proper planning, risk assessment, storage methods, maintenance protocols, and response protocols are the other important factors in mitigating lithium-ion safety risks (Butler, 2013).

Electromagnetic fields (EMFs) are produced whenever electricity is used. Research into electric and magnetic fields undertaken at utility scale PV installations in California by Chang and Jennings (1994), indicated that magnetic fields were significantly less for solar arrays than for household applications. Chang and Jennings (1994) found magnetic fields from solar arrays were not distinguishable from background levels at the site boundary, suggesting the health risk of EMFs from solar arrays is minimal.

For a transmission line, the strength of the electric field varies generally with the operating voltage of the line (measured in volts) while the magnetic field strength is related to the current flowing in the line (measured in amps) (Parsons Brinckerhoff, 2013). EMF strengths dependent on *inter alia* the height of the electrical wires above the ground and their geometric arrangements, which are supported by the transmission structures.

Even though the EMF inside a substation is high (but less than occupational limits), the fields outside the substation decrease with distance, as is the case with power lines (Wolhuter & Holtzhausen, 2015). It is documented in literature that EMF levels reduce rapidly with distance from the source. The Project's proposed substation, which contains high voltage transformers, will be enclosed by security fencing to prevent unauthorised access and the exposure to high voltage electricity. This will also provide safe distance between electrical equipment and the general public.

Other health and safety risks associated with the Project during the operational phase include the following:

- Leaching of materials from broken or fire damaged PV modules;
- Injuries to workers from operation and maintenance activities (vehicle accidents, replacement of components/parts, etc.);
- Emergency fire hazards; and
- Electrocutation of workers.

13.25.2 Impact Assessment

Environmental Feature	Health and Safety
Relevant Alternatives & Activities	Construction activities
Project life-cycle	Construction phase

Potential Aspects & Impacts	Proposed Management Objectives / Mitigation Measures
<ul style="list-style-type: none"> Health and safety risks during construction. 	<ul style="list-style-type: none"> Dedicated Occupational Health and Safety system to be implemented by the Contractor. Undertake a hazard identification and risk assessment and identify preventive and protective measures. Conduct basic safety awareness training with construction workers. Provide all workers with the necessary Personal Protective Equipment (PPE). Prevent environmental contamination. Provide potable water and sanitation services to workers. All workers shall be clearly identifiable and shall remain within the construction domain during working hours. Prepare an Emergency Response Plan. Ensure adequate control of communicable diseases. Maintain access control to construction domain.

	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	high	short-term	likely	3
After Mitigation	-	local	low	short-term	unlikely	1

Relevant Alternatives & Activities	Operation and maintenance activities					
Project life-cycle	Operational phase					
Potential Aspects & Impacts	Proposed Management Objectives / Mitigation Measures					
<ul style="list-style-type: none"> Health and safety risks posed by operation and maintenance activities. 	<ul style="list-style-type: none"> Dedicated Occupational Health and Safety system to be implemented by the Operator of the PV Plant. Conduct basic safety awareness training with all operational staff. Temporary Contractors to adhere to Occupational Health and Safety requirements. Provide potable water and sanitation services to operational staff. Prepare an Emergency Response Plan. Measures at the battery storage area to manage fire risks will include a non-flammable buffer area to prevent the spread of fire, battery temperature monitoring, circuit breakers, fire detection and fire suppression as per fire and electrical regulatory requirements. Provide adequate access/egress for installation and maintenance at the BESS. Maintain servitude. Ensure EMF remain less than occupational limits within substation. Control access to the substation. 					

	+/- Impacts	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	-	local	high	long-term	likely	3
After Mitigation	-	local	low	long-term	unlikely	1

13.26 Social Environment

The findings from the Social Impact Assessment (Tanhuke & Chidley, 2023) follow. The specialist report is contained in **Appendix E7**.

13.26.1 *Impact Description*

The activities, aspects and impacts associated with the social environment are captured in **Table 32** below.

Table 32: Activities, aspects and impacts related to the social environment (Tanhuke & Chidley, 2023)

Activity	Aspect	Potential Impact – Positive	Potential Impact – Negative	
Planning Phase	Land Acquisition		Loss of agricultural production	
			Loss of land through land acquisition for project infrastructure	
	Servitude Rights		Some restrictions on use of productive land, owing to servitude rights being established	
Construction Phase	Access into private property		Property Damage	
			Risk of trespassing	
	Solar Park Construction – piling, frame erection and solar panel mounting, electrical installation and rehabilitation		Employment of local staff	
			Opportunity for local business	
			Skills development	
				Noise
				Dust
				Cultural Resistance to Women in the Workplace
				Injuries and poor workforce health
				Increased community conflicts due to employment of outsiders
				Influx of people seeking employment and associated impacts (e.g., cultural conflicts, squatting, demographic changes, anti-social behaviour, and incidence of HIV/AIDS)
		Livestock and game animal theft		

Activity	Aspect	Potential Impact – Positive	Potential Impact – Negative
	Transport of goods to site and employment of staff		Increased traffic
	Rehabilitation		Damage or wear to access roads
			Security
			Damage to property or equipment
Operations	Electricity generation	Economic growth and induced impacts	
	Supply of goods and services to the project	Opportunity for local business	
		Employment of local staff	
	Administration and Technical Input	Employment of local staff	
		Skills development	

13.26.2 Impact Assessment

The tables to follow were obtained from the Social Impact Assessment (Tanhuke & Chidley, 2023).

Table 33: Planning Phase Impacts – Land Acquisition and Servitude Rights (Tanhuke & Chidley, 2023)

Environmental Feature	Land Acquisition and Servitude Rights					
Project life cycle	All Phases					
Potential Impact	Proposed Management Objectives / Mitigation Measures					
Loss of agricultural production	<ul style="list-style-type: none"> This impact has been considered by a dedicated specialist study. The SIA defers to the opinions of the agricultural specialists in this regard and their mitigation measures should be adopted 					
Loss of land through acquisition for project infrastructure	<ul style="list-style-type: none"> Any land acquisition should be conducted on a willing buyer, willing seller basis and that the owner is not treated unfairly in the process. 					
Some restrictions on use of productive land, owing to servitude rights being established	<ul style="list-style-type: none"> Any servitude establishment should result in fair compensation for land owners. The establishment of servitude rights should not reduce the existing productivity of land owner’s land holdings. 					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Site	Moderate	Long Term	High	2
After Mitigation	Negative	Site	Low	Long Term	High	1
Significance of Impact and Preferred Alternatives	<p>The impact on project progress could be significant if land acquisition is not compensated. This can be effectively mitigated.</p> <p>The impact has no consequence for project alternatives.</p>					

Table 34: Construction Phase Impacts - Economic Opportunities (Tanhuke & Chidley, 2023)

Environmental Feature	Economic Opportunities					
Project life-cycle	Construction phase					
Potential Impact	Proposed Management Objectives / Mitigation Measures					
Employment of people locally	<ul style="list-style-type: none"> Youth development should be considered as an initiative so that there is a benefit of transferring skills to the community. This can be achieved through the assistance of the local municipality. 					
	<ul style="list-style-type: none"> The main contractor should employ non-core labour from the regional study area as far as possible during the construction phase. 					
Opportunity for local business	<ul style="list-style-type: none"> Local SMMEs should be given an opportunity to participate in the construction of the project through the supply of services, material or equipment. 					
Skills development	<ul style="list-style-type: none"> A skills transfer plan should be put in place at an early stage and workers should be given the opportunity to develop skills whilst in employment. 					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Positive	Regional	Medium	Short Term	Likely	1
After Mitigation	Positive	Regional	Large	Short Term	Likely	3
Significance of Impact and Preferred Alternatives	<p>Individuals who will benefit during the construction are limited to those who actively participate in the construction activity through employment, sub-contracting or other economic opportunities. Active local participation should be encouraged.</p> <p>The economic benefits of construction will take place irrespective of which alternative is presented.</p>					

Table 35: Construction Phase Impacts – Noise, Dust and Traffic (Tanhuke & Chidley, 2023)

Environmental Feature	Noise, Dust and Traffic
Project life-cycle	Construction phase
Potential Impact	Proposed Management Objectives / Mitigation Measures
Increase in Dust	<ul style="list-style-type: none"> Dust can be mitigated using appropriate dust suppression mechanisms. Limit road speeds on site through the erection of speed limits signage
Noise impacts	<ul style="list-style-type: none"> Prior notice should be given to surrounding communities of noisy events such as blasting. Construction work should take place during working hours – defined as 07h00 to 17h00 on weekdays and 07h00 to 14h00 on Saturdays. Should overtime work be required, that will generate noise, notice should be given to the affected community or landowners.
Increase in Traffic	<ul style="list-style-type: none"> This impact has been considered by a dedicated specialist study. The SIA defers to the opinions of the traffic specialists in this regard and their mitigation measures should be adopted

Damage or wear to access roads	<ul style="list-style-type: none"> This impact has been considered by a dedicated specialist study. The SIA defers to the opinions of the traffic specialists in this regard and their mitigation measures should be adopted 					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Short Term	Likely	2
After Mitigation	Negative	Local	Low	Short Term	Moderate	1
Significance of Impact and Preferred Alternatives	<p>Nosie and dust during construction is to be expected. These can then be successfully mitigated through contractor controls and through the continuous monitoring of contractor progress during the construction phase.</p> <p>Negative impacts owing to the construction will unfortunately be experienced irrespective of the site and routing alternative that is most preferred and chosen.</p>					

Table 36: Construction Phase Impacts - Cultural resistance towards women (Tanhuke & Chidley, 2023)

Environmental Feature	Cultural resistance towards women					
Project life-cycle	All phases					
Potential Impact	Proposed Management Objectives / Mitigation Measures					
Cultural resistance towards women because of increased gender representation in the workforce	<ul style="list-style-type: none"> Sensitise staff in respect of gender issues that are pertinent to the workplace. 					
	<ul style="list-style-type: none"> Ensure gender inclusivity and equity with respect to all compensation. 					
	<ul style="list-style-type: none"> Prioritise gender inclusivity and equity in access to resources, goods, services and decision making with the aim of empowering women. 					
	<ul style="list-style-type: none"> Promote equal job opportunities for women and men during the construction phase 					
	<ul style="list-style-type: none"> Employment practises should be demonstrated free of coercion or harassment. 					
	<ul style="list-style-type: none"> Develop a grievance procedure to specifically address gender matters. There should be a policy on harassment that is well understood by all. 					
	<ul style="list-style-type: none"> There should be separate changing and ablution facilities for men and women, and they should be clearly marked as such. 					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Site	Moderate	Short term	High	2
After Mitigation	Positive	Site	Low	Short term	High	1
Significance of Impact and Preferred Alternatives	<p>The employment of women during the construction phase will have moderately negative impacts should workforce integration not be addressed. If workforce integration is successfully implemented, the impact on the project be positive.</p> <p>The impact has no influence on the choice between project alternatives.</p>					

Table 37: Construction Phase Impacts – Injuries and Poor Workforce Health (Tanhuke & Chidley, 2023)

Environmental Feature		Injuries and Poor Workforce Health				
Project life cycle		Construction Phase				
Potential Impact		Proposed Management Objectives / Mitigation Measures				
Injuries and poor workforce health		<ul style="list-style-type: none"> The provisions of the OHS Act 85 of 1993 and the Construction Regulations of 2014 should be implemented on all sites; Account should be taken of the safety impacts on the local community when carrying out the longitudinal aspects of the project, such as the access road Contractors should establish HIV/AIDS awareness programmes at their site camps. Measures should be taken to provide condoms and, where necessary, access to counselling to address any risks to health 				
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Short Term	Likely	2
After Mitigation	Negative	Local	Low	Short Term	Moderate	1
Significance of Impact and Preferred Alternatives	<p>The potential significance of the impact is high if a lack of attention to this aspect results in injuries to staff. The implementation of a safety system on site will minimise the risk of injuries and poor staff health during the construction phase.</p> <p>The impact has no influence on the choice between project alternatives.</p>					

Table 38: Construction Phase Impacts - Influx of Job Seekers (Tanhuke & Chidley, 2023)

Environmental Feature		Influx of Job Seekers				
Project life cycle		Construction Phase				
Potential Impact		Proposed Management Objectives / Mitigation Measures				
Influx of people seeking employment and associated impacts (e.g., cultural conflicts, squatting, demographic changes, anti-social behaviour, and incidence of HIV/AIDS)		<ul style="list-style-type: none"> All employment of locally sourced labour should be controlled and formalised. No employment should take place from the project gate and contracts of employment should be entered into taking into account the Labour Relations Act; If possible, and if the relevant Ward Councillors deems it necessary, the employment process should include the affected Ward Councillors and their ward committee. To limit the growth of informal settlements in the project area, labour should be sourced from existing labour sending areas, from people who resided in the area prior to appointment. This process should include the Ward Councillor to ensure that only local residents are employed, rather than labour migrants. No staff accommodation should be allowed on site; To limit the growth of settlements near the project site the project proponent should provide worker transport to and from the work site for the duration of construction. The risk exists that un-controlled Spaza/informal trader shops may open next to the site to cater for construction workers. These should be controlled by the contractor to limit their footprint and to ensure that the municipal by-laws are complied with. 				

Increased community conflicts due to employment of local and non-local labourers	<ul style="list-style-type: none"> Programmes should be developed to boost the local economy. These should be in the form of Corporate Social Responsibility (CSR) that will favour local empowerment. 					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Site	Moderate	Short term	High	2
After Mitigation	Negative	Site	Low	Short term	High	1
Significance of Impact of Preferred Alternatives	<p>The unmitigated significance of the impact is high as community attitudes can be altered. The implementation of the overall mitigation measures is essential and necessary to minimise the impact from job-seekers influx and community impacts.</p> <p>The impact has no influence on the choice between project alternatives</p>					

Table 39: Construction Phase Impacts - Property and Security Impacts (Tanhuke & Chidley, 2023)

Environmental Feature	<i>Property and Security Impacts</i>					
Project life-cycle	Construction phase					
Potential Impact	Proposed Management Objectives / Mitigation Measures					
Risk of trespassing	<ul style="list-style-type: none"> A project policy on management of workers should be developed. This would include education and awareness to be conducted with regards trespassing. 					
Livestock and game animal theft	<ul style="list-style-type: none"> There should be clear demarcation of the area in development so that livestock and game animals are prevented from wandering nearby. 					
Security	<ul style="list-style-type: none"> The camp site and the project areas should be fenced for the duration of construction; All contractors' staff should be easily identifiable through their respective uniforms; A project policy on management of workers should be developed. This would include education and awareness to be conducted with regards crime, trespassing and not gathering outside the site. Security staff alone should be allowed to reside at contractor camps and no other employees. 					
Damage to property or equipment	<ul style="list-style-type: none"> If a risk exists of damage taking place on a property owing to construction, a condition survey should be undertaken prior to work commencing. The contractor is to acknowledge and make good any damage that occurs on any property as a result of construction work; Where crops are damaged, compensation is to be paid to the farmer for the proven loss of these crops; The farmer should be compensated for any loss of income experienced on account of the contractor. 					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Short Term	Likely	2
After Mitigation	Negative	Local	Low	Short Term	Moderate	1
Significance of Impact of Preferred Alternatives	Property and security impacts during construction are to be expected and must be mitigated. Such impacts can be successfully mitigated through contractor specifications that are issued at a tender stage and through the continuous monitoring of contractor progress performance during the construction phase.					

Negative impacts owing to the construction will unfortunately be experienced irrespective of the site and routing alternative that is most preferred and chosen

Table 40: Construction Phase Impacts - Influx of Job Seekers (Tanhuke & Chidley, 2023)

Environmental Feature	Influx of Job Seekers					
Project life cycle	Construction Phase					
Potential Impact	Proposed Management Objectives / Mitigation Measures					
Job seekers influx into the community.	<ul style="list-style-type: none"> All employment of locally sourced labour should be controlled and formalised. No employment should take place from the project gate and contracts of employment should be entered into taking into account the Labour Relations Act; If possible, and if the relevant Ward Councillors deems it necessary, the employment process should include the affected Ward Councillors and their ward committee. To limit the growth of informal settlements in the project area, labour should be sourced from existing labour sending areas, from people who resided in the area prior to appointment. This process should include the Ward Councillor to ensure that only local residents are employed, rather than labour migrants. No staff accommodation should be allowed on site; To limit the growth of settlements near the project site the project proponent should provide worker transport to and from the work site for the duration of construction. 					
Increased community conflicts due to employment of local and non-local labourers	<ul style="list-style-type: none"> Programmes should be developed to boost the local economy. These can be in the form of Corporate Social Responsibility (CSR) that will favour local empowerment. 					
Increase health risk	<ul style="list-style-type: none"> Measures should be taken to provide condoms and, where necessary, access to counselling to address any risks to health. 					
Increased social pathologies such as crime, drug abuse and sexual behaviours.	<ul style="list-style-type: none"> The mitigation method will require a change in community values and attitudes; This can be done through creating social awareness, and educating the workforce with regards crime awareness and social pathology prevention 					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Site	Moderate	Short term	High	2
After Mitigation	Negative	Site	Low	Short term	High	1
Significance of Impact and Preferred Alternatives	The significance of the impact is high as community attitudes can be altered. The implementation of the overall mitigation measures is essential and necessary to minimise the impact from job-seekers influx and community impacts.					

Table 41: Construction Phase Impacts - Security (Tanhuke & Chidley, 2023)

Environmental Feature	Security
Project life cycle	Construction Phase
Potential Impact	Proposed Management Objectives / Mitigation Measures

Ensuring the security of the project site	<ul style="list-style-type: none"> The camp site for the project and the longitudinal construction sub-site laid down areas should be fenced for the duration of construction; All contractors' staff should be easily identifiable through their respective uniforms; A project policy on management of workers should be developed. This would include education and awareness to be conducted with regards crime, trespassing and not gathering outside the site could be conducted. Security staff should only be allowed to reside at contractor camps and no other employees. 					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Negative	Local	Medium	Short Term	Likely	2
After Mitigation	Negative	Local	Low	Short Term	Moderate	1
Significance of Impact and Preferred Alternatives	Disturbances and irritation during construction are to be expected. These can then be successfully mitigated through contractor specifications that are issued at a tender stage and through the continuous monitoring of contractor proceedings and performance during construction phase.					

Table 42: Operational Phase Impacts - Economic Impacts (positive) (Tanhuke & Chidley, 2023)

Environmental Feature	Economic Impacts (positive)					
Project life-cycle	Operational Phase					
Potential Impact	Proposed Management Objectives / Mitigation Measures					
Economic growth and induced impacts	<ul style="list-style-type: none"> The solar park will stimulate the local economy through the provision of jobs and through local procurement. It will contribute to the improvement of the national electricity supply at a price that has been set by a competitive bidding process 					
Opportunity for local business	<ul style="list-style-type: none"> Local SMMEs should be given an opportunity to participate in the operation of the project through the supply of services, material or equipment. 					
	<ul style="list-style-type: none"> A procurement policy promoting the use of local business where possible, should be put in place and applied throughout the operational phases of the project. 					
Employment of local staff	<ul style="list-style-type: none"> Women should be given equal employment opportunities and encouraged to apply for positions. 					
Skills development	<ul style="list-style-type: none"> A skills transfer plan should be put in place at an early stage and workers should be given the opportunity to develop skills whilst in employment. 					
	Nature	Extent	Magnitude	Duration	Probability	Significance
Before Mitigation	Positive	Regional	High	Long Term	Likely	3
After Mitigation	Positive	Regional	High	Long Term	Likely	3
Significance of Impact and Preferred Alternatives	<p>The solar park will provide economic stimulus to the regional study area for the long-term. The solar park should adopt policies that are supportive of local procurement and support for local enterprises.</p> <p>The impact has no influence on the choice between project alternatives</p>					

13.27 “No-Go” Impacts

The “no-go option” is the alternative of not implementing the activity / development. The “no-go option” also provides the baseline against which the impacts of other alternatives are compared.

The “no go option” needs to be considered in light of the motivation (see **Section 3** above) as well as the need and desirability of the Project (see **Section 8** above).

SA has identified the need to supply diversified power generation that includes renewable energy technologies, such as proposed by the Project. This is in light of the country’s endeavour and commitment to reduce the carbon footprint created by the current heavy reliance on coal to produce electricity. In this regard, the Applicant intends to bid for the current and future REIPPPP bid windows and/or other renewable energy markets within SA.

In contrast, should the proposed Project not go ahead, any potentially significant environmental issues associated with the Project (refer to **Section 13.9** to **Section 13.26** above) would be irrelevant and the status quo of the local receiving environment would not be affected by the Project-related activities. The prerogative will lie with the landowner to determine whether to proceed with the current land use or an alternative future desired use where the Solar PV Plant is proposed. It is noted that the site was historically used for agricultural purposes, but it is currently used for grazing.

With the “no-go option” the objectives of the Project would not be met. This will *inter alia* mean that the Project’s intended benefits will not materialise. From a social perspective, the “no-go option” will present the following implications:

- The opportunity to improve the overall supply of electricity in the regional will be missed; and
- The economic stimulus presented by the Project will be foregone.

Taking the above into consideration, the “no go option” is not preferred.

13.28 Cumulative Impacts

13.28.1 Introduction

A cumulative impact, 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.

13.28.2 Other Renewable Energy Projects in Proximity to the Proposed PV Site

Cumulative impacts can be identified by combining the potential environmental implications of the Project with the impacts of projects and activities that have occurred in the past, are currently

occurring, or are proposed in the future within the Project Area. It is noted that the accurate characterisation of the future state of the Project area is inherently speculative to an extent, due to the dynamic nature of future decisions related to land use and growth, protection of terrestrial and aquatic biological resources, water use (consumptive, waste-related and encroachments), etc.

According to the REEA Database (quarter 4, 2022), no renewable energy applications have been made for properties that are located within a 30km radius of the PV Site (refer to **Figure 55** below). There are two other known renewable energy applications in close proximity to the site, namely Onderstepoort Solar 1 and Onderstepoort Solar 2 (refer to **Figure 56** below). Onderstepoort Solar 1 and Onderstepoort Solar 2 are located approximately 2.6km and 1.75km to the north-east of the site. These two applications were submitted concurrently with the Rhino Solar PV application, and the respective EIA processes are running concurrently.

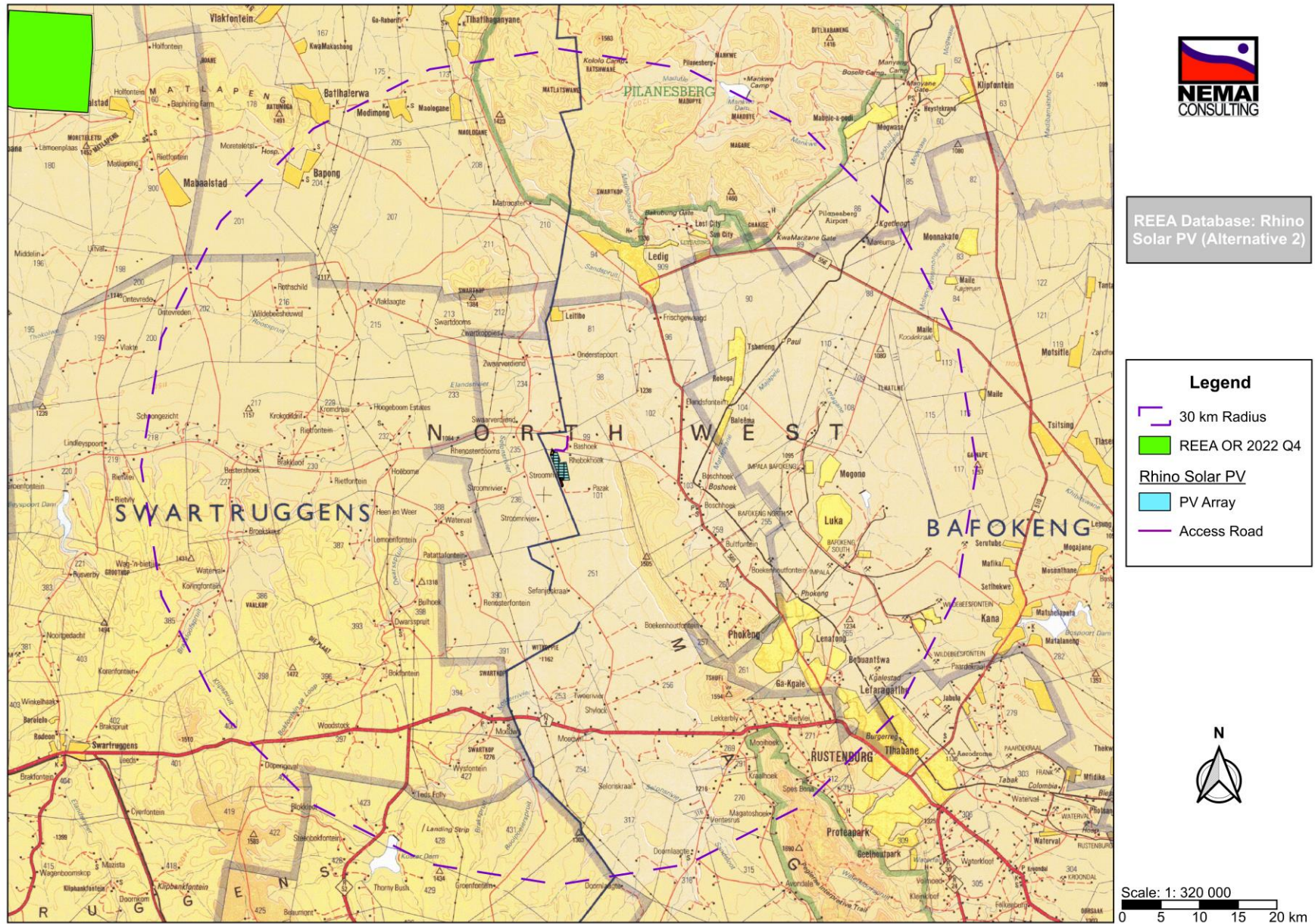


Figure 55: Renewable energy applications in relation to the Project (within a 30km radius)

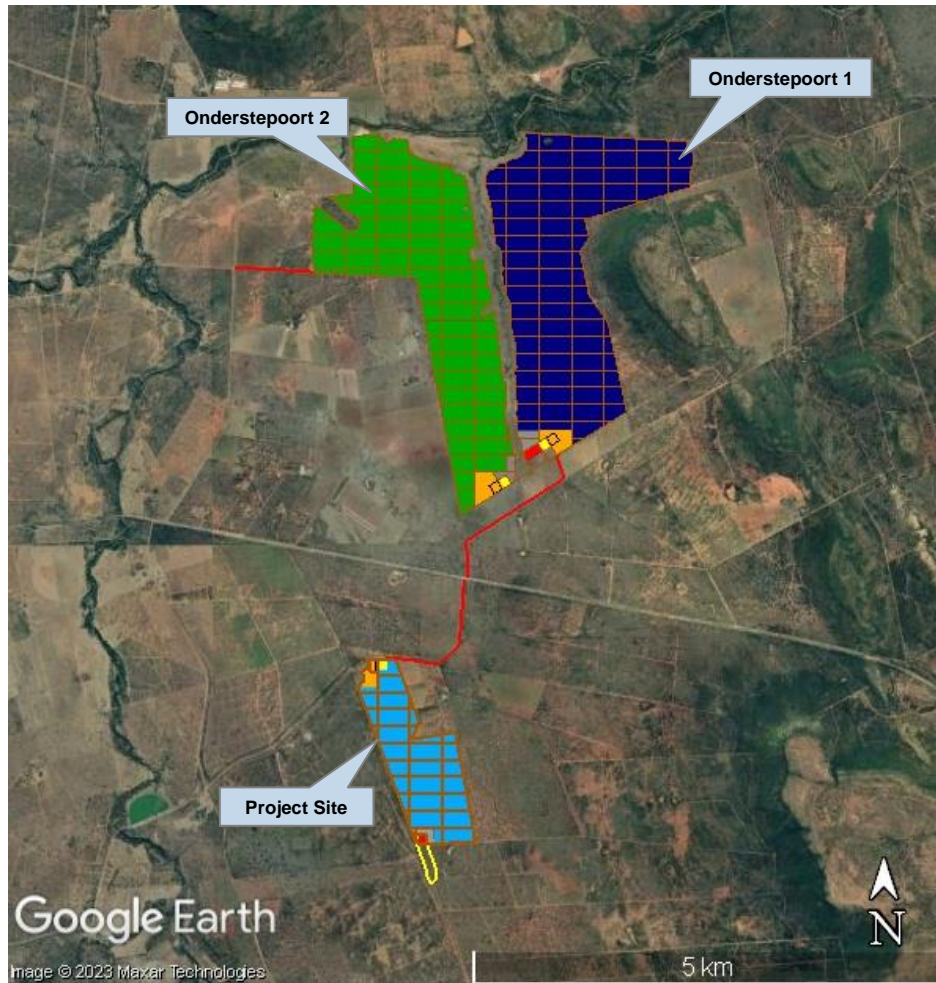


Figure 56: Proximity of the Project Area to Onderstepoort Solar 1 and 2

The following is noted in terms of the cumulative impacts of the Project and the Onderstepoort Solar 1 and Onderstepoort Solar 2 renewable energy applications:

- ❑ There will be a cumulative loss of indigenous vegetation for these renewable energy developments. The total footprint area of the proposed Project's Solar PV Plant is difficult to estimate since most of the vegetation falling under the panels will be retained, and only hardstanding areas will be stripped of vegetation. It is noted that the Terrestrial Biodiversity Compliance Statement confirmed that the Project Area is of a 'Low' sensitivity. The total footprints of Onderstepoort Solar 1 and Onderstepoort Solar 2 are 400 ha and 367 ha, respectively. As with the Project Area, both Onderstepoort Solar 1 and Onderstepoort Solar 2 have also been disturbed by agricultural activities.
- ❑ Cumulative impacts to freshwater resources through sedimentation (silt-laden runoff) caused by inadequate stormwater management, as well as contaminated through inadequate storage and handling of hazardous materials and poor management of waste and wastewater, would affect the same catchment (see **Figure 57** below). According to GCS (2023), the elevation of the site is 30m above the floodplain of the Selons River and is not at risk to river flood waters in the 100-year event. The site is also approximately 2.5km from the Selons River and is not in proximity to any perennial or non-perennial rivers that drain towards the Selons River. Provision

is made in the Project's EMPr to manage stormwater and to prevent pollution of water resources.

- ❑ The renewable energy developments will require water for construction and operational purposes. As explained in **Section 9.8.2** above, water for the Project will be supplied from approved sources such as the KLM, Private Contractor, existing or new registered boreholes. Provision is made in the Project's EMPr to manage the consumptive use of water.
- ❑ Localised impacts in terms of noise, reduction in air quality (dust) and traffic disruptions will be managed by the provisions of the EMPr for the respective renewable energy developments.
- ❑ All three sites (Rhino Solar, Onderstepoort Solar 1 and Onderstepoort Solar 2) are accessed by roads that are linked to the R556, which is the road between Lindleyspoort and Boschhoek. The cumulative traffic impact assumes that all the proposed renewable energy projects will be constructed at the same time. The construction and decommissioning phases are the only significant traffic generators for renewable energy projects. The duration of these phases is short term (i.e., the impact of the generated traffic on the surrounding road network is temporary and renewable energy facilities, when operational, do not add any significant traffic to the road network). Even if all renewable energy projects within the area are constructed at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable. Provision is made in the Project's EMPr to manage traffic-related impact.

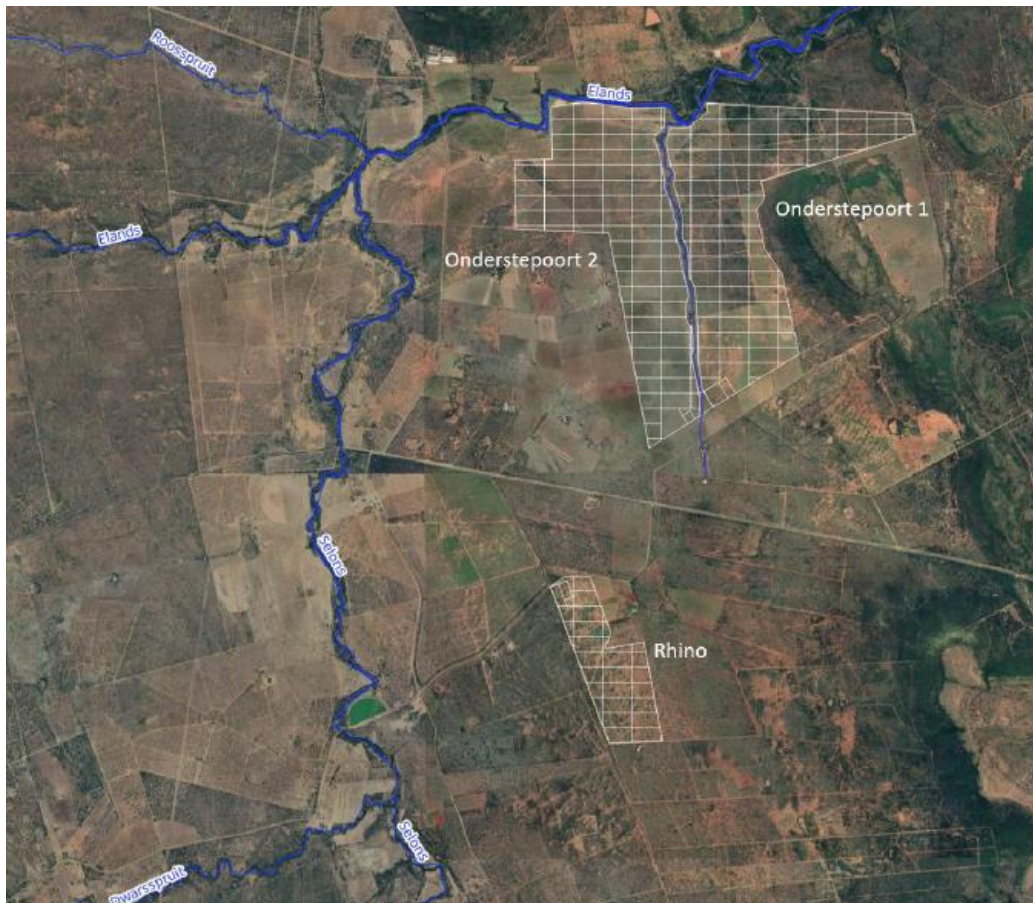


Figure 57: Major rivers in relation to the Project Area and Onderstepoort Solar 1 and 2

13.28.3 The Proposed Project's contribution towards Cumulative Impacts

The following is noted in terms of the Project's contribution towards cumulative impacts:

- ❑ The construction period may cause traffic-related impacts in terms of the local road network, which will be associated with heavy vehicle construction traffic for the delivery of material, transportation of construction workers and general construction-related traffic. This may compound traffic impacts if other large-scale projects are planned during the same period, such as the Onderstepoort Solar 1 and 2 projects to the north of the site. The EMPr includes mitigation measures to manage traffic-related impacts.
- ❑ The clearance of the vegetative cover over large areas associated with the Project's development footprint may cause erosion. According to Gouws (2023), the on the site soil is well-drained with moderately developed structure, and it is also on evenly sloped land where erosion is not expected. Mitigation measures to control erosion are included in the EMPr.
- ❑ From an agricultural perspective, the proposed development will not have impacts on farming land due to fragmentation or subdivisions of land that can lead to unsustainable farming units. There is no subdivision proposed and the land will return to farming after the life of the Project.
- ❑ There will be an increase in the dust levels during the construction phase, as a result of earthworks, use of haul roads and other gravel roads, stockpiles, material crushing, etc. Sensitive receptors to dust and other air quality impacts in the study area are discussed in **Section 13.19.1** above. Measures to manage dust are included in the EMPr.
- ❑ Construction of the proposed facilities along with construction activities of other developments in the Project Area could potentially increase noise impacts on surrounding land uses. This impact will be temporary in nature. It is further noted that noise is a localised issue that diminishes in intensity with distance from the source. Sensitive receptors to noise in the study area are discussed in **Section 13.20.1** above. The Project's contribution to cumulative noise impacts is thus not anticipated to be significant. Measures are included in the EMPr to manage noise impacts that may be caused by the Project.
- ❑ Changes in demographics in the region due to the influx of employment seekers may cause problems such as crime, STDs, conflicts with local communities, etc. This was assessed as part of the Social Impact Assessment and mitigation measures are included in the EMPr.
- ❑ There is a potential for positive cumulative economic effects from the construction of multiple developments in the area. The increased creation of jobs and economic input into local businesses would provide a benefit to local communities.
- ❑ Specialists' assessment of cumulative impacts –
 - Heritage Impact Assessment (Kitto, 2023):
 - The Project Area and surrounding region has been affected by the following impacts:
 - Past impacts: The past HIA reports recovered from the SAHRIS database indicated that the site and surrounding region has been affected by several development and other activities that would have disturbed the heritage resources which occur in the area. These include prospecting and mining related projects, powerline construction and recreation developments, in addition to historical farming and platinum mining activities in the general region around Rustenburg.

- Current impacts: the immediate area of the site is affected mainly by farming activities (cattle and game).
- The baseline impacts are considered to be Very Low for heritage resources, and additional project impacts (if no mitigation measures are implemented) will increase the significance of the existing baseline impacts, where the cumulative unmitigated impact will probably be of a low significance. The impact is going to happen and will be long-term in nature, however, the impact risk class will remain Low.
- Visual Impact Assessment (Buys, 2023):
 - In terms of the potential cumulative impacts, the proposed site is surrounded by various commercial and agricultural activities. Most of the proposed site is currently grassland vegetation and the clearance and subsequent development of the site will result in the alteration of this space. Consequently, the development of this site will add cumulatively to the loss of sense of place. While the result in a change in the sense of place for those areas that look onto the project site, the magnitude of the impact is likely to be low as most of the sensitive receptors are located more than 5km from the project site.
- Avifauna Impact Assessment (de Wet, 2023):
 - Localised cumulative impacts include those from operations that are close enough to potentially cause additive effects on the local environment or any sensitive receivers (such as nearby large road networks, other solar PV facilities, and power infrastructure). Relevant activities and impacts include dust deposition, noise and vibration, loss of corridors or habitat, disruption of waterways, groundwater drawdown, groundwater and surface water depletion, and transport activities. Long-term cumulative impacts associated with the site development activities can lead to the loss of endemic and threatened species, including natural habitat and vegetation types, and these impacts can even lead to the degradation of conserved areas such as the adjacent game parks and reserves.
 - The total area within the 30 km buffer around the Project Area amounts to 376 845.686 ha, but when considering the transformation (94 457.686 ha) that has taken place within this radius, 278 388 ha of intact habitat remains according to the 2018 National Biodiversity Assessment. Therefore, the area within 30 km of the project has experienced approximately 26.13% loss in natural habitat. Considering this context, the Project footprint, and similar projects that exist in the 30 km region (including Onderstepoort Solar 1 and 2) measuring a maximum of 1 121.37 ha (as per the latest REAA Database). This means that the total amount of remaining habitat lost as a result of solar projects in the region amounts to 0.4% (the sum of all related developments as a percentage of the total remaining habitat).
 - Approximately 26.13% of the habitat has already been lost, and the proposed solar developments (Rhino Solar, Onderstepoort Solar 1 and Onderstepoort Solar 2) will result in a cumulative loss of approximately 0.4% from only similar developments in the area (see **Figure 58**), as such the cumulative impact from the proposed development is rated as Moderately high. This means that the careful spatial management and planning

of the entire region must be a priority, and existing large infrastructure projects must be carefully monitored over the long term.

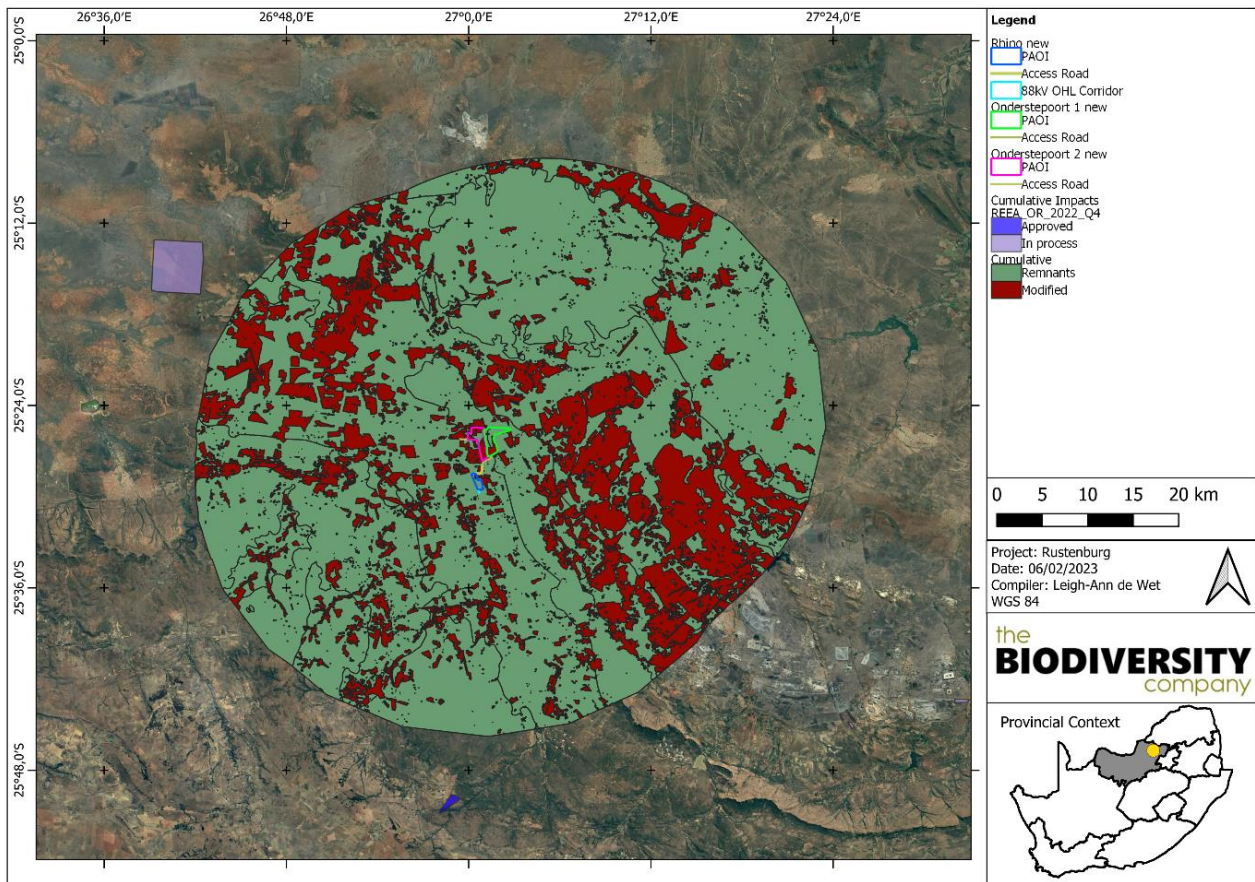


Figure 58: Additional renewable energy developments within the landscape overlaid onto the remnant vegetation types (Rhino Solar, Onderstepoort Solar 1 and Onderstepoort Solar 2) (de Wet, 2023)

13.28.4 Cumulative Environmental Impact Statement

According to the REEA Database (quarter 4, 2022), there are no approved renewable energy applications for properties that are located within a 30km radius of the PV Site. There are two other known renewable energy applications in close proximity to the site, namely Onderstepoort Solar 1 and Onderstepoort Solar 2.

Cumulative impacts in relation to the Project were assessed individually in **Section 13.9** to **Section 13.26** above, as well as through the specialist studies (see **Section 13.28.3** above for key findings), and mitigation measures were developed for each of the impact categories.

14 ANALYSIS OF ALTERNATIVES

14.1 General

Alternatives are the different ways in which a project can be executed to ultimately achieve its objectives. Examples could include carrying out a different type of action, choosing an alternative location or adopting a different technology or design for the project.

By conducting the comparative analysis, the Best Practicable Environmental Option (BPEO) can be selected with technical and environmental justification. Münster (2005) defines BPEO as the alternative that “*provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term*”.

14.2 “No-Go” Option

The implications of the “no-go” option are discussed in **Section 13.27** above. The “no go option” is not preferred, as the objectives of the Project will not be met, and the associated benefits will not materialise. Although not proceeding with the Project would avoid the adverse environmental impacts, these impacts are considered to be manageable through the provisions contained in the EIA Report and EMPr.

14.3 Layout Alternatives

The extent of the site allows for the identification of layout/design alternatives to manage impacts to environmental sensitivity. Layout Alternative 1 (shown in **Figure 3**) constitutes the initial layout contemplated during the Scoping Phase. During the course of the EIA process, the layout was revised to avoid a small artificial dam in the north-western corner of the site (shown in **Figure 59** below). Layout Alternative 2 is shown in **Figure 4** above.

Table 43 below indicates the preference expressed by the Specialists between Layout Alternative 1 and 2:

Table 43: Preference expressed by the Specialists between Layout Alternative 1 and 2

Specialist Studies	Layout Alternative 1	Layout Alternative 2	No Preference
Aquatic Compliance Statement		×	
Terrestrial Biodiversity Compliance Statement			×
Avifauna Impact Assessment		×	
Agricultural Compliance Statement			×

Specialist Studies	Layout Alternative 1	Layout Alternative 2	No Preference
Heritage Impact Assessment			×
Desktop Paleontological Impact Assessment			×
Visual Impact Assessment		×	
Social Impact Assessment			×
Transport Impact Assessment			×

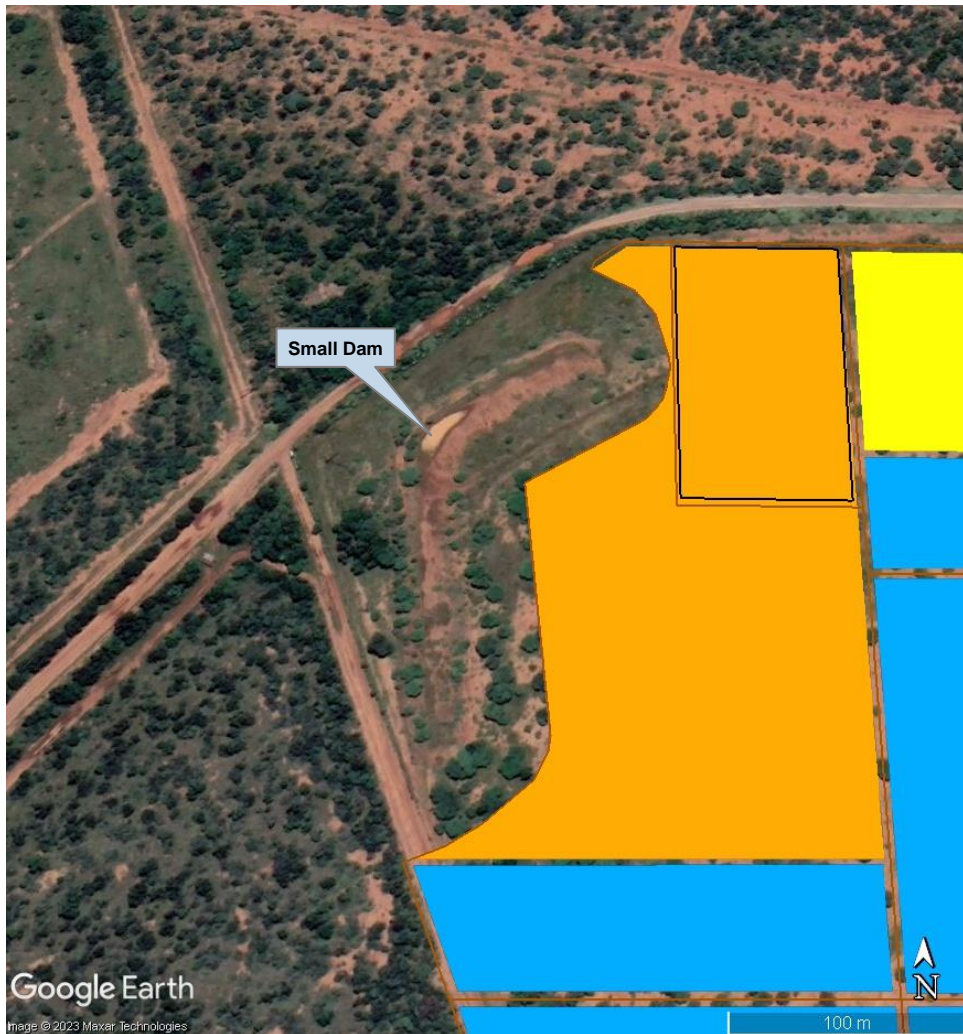


Figure 59: Small dam in north-western corner of property that is avoided in Layout Alternative 2

Based on the technical and environmental considerations, Layout Alternative 2 was identified as the BPEO (shown in **Figure 60** below).

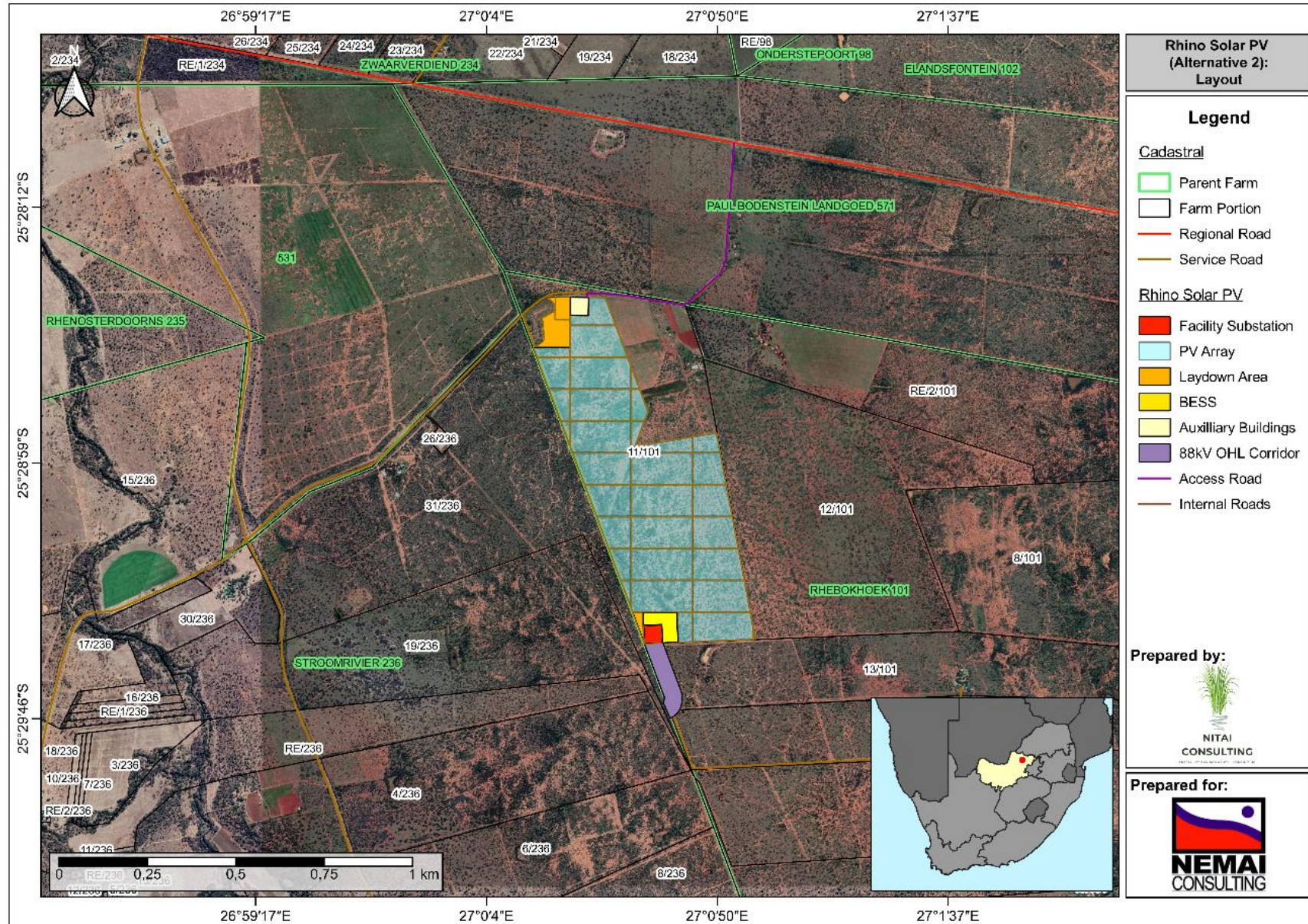


Figure 60: BPEO - Layout Alternative 2

14.4 Technology Alternatives

14.4.1 *PV Technology*

The different solar PV technologies, as explained in **Section 10.4.1** above, include a single axis tracker system and bifacial solar panels. These technology options do not constitute alternatives as the choice of technology will be determined during detailed design.

14.4.2 *BESS Technology*

The BESS can be broken into solid state and flow battery systems. A single battery technology, namely solid state, will be implemented for the Project.

15 PUBLIC PARTICIPATION

15.1 Introduction

The purpose of public participation includes the following:

- ❑ To provide I&APs with an opportunity to obtain information about the Project;
- ❑ To allow I&APs to express their views, issues, and concerns with regard to the Project;
- ❑ To grant I&APs an opportunity to recommend measures to avoid or reduce adverse impacts and enhance positive impacts associated with the Project; and
- ❑ To enable the Applicant to incorporate the needs, concerns, and recommendations of I&APs into the Project, where feasible.

The public participation process that is being undertaken is governed by NEMA and the EIA Regulations. **Figure 61** below outlines the public participation process for the upfront Announcement Phase (completed), Scoping Phase (completed) and EIA Phase (current).

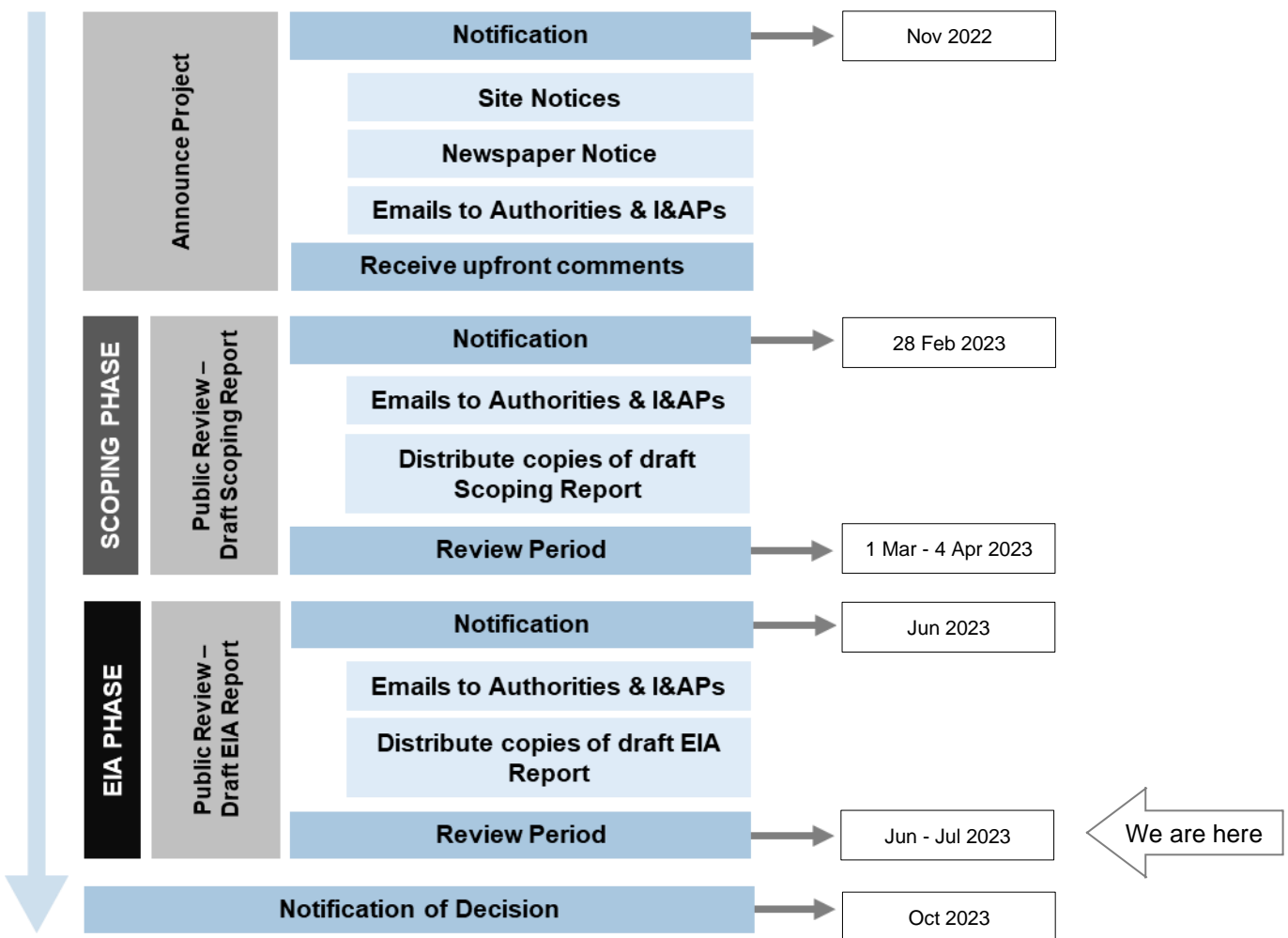


Figure 61: Outline of Public Participation Process (*note: dates are subject to change*)

15.2 Public Participation during the Announcement & Scoping Phases

The primary tasks undertaken as part of public participation during the Announcement and Scoping Phases included the following (details provided in the Scoping Report):

1. Compiling a database of organs of state and I&APs;
2. Announcing the Project by placing notices in newspapers, erecting site notices and circulating a Background Information Document and Reply Form to organs of state and I&APs;
3. Lodging the draft Scoping Report for public review and notifying organs of state and I&APs; and
4. Compiling and maintaining a CRR (contained in **Appendix G**).

15.3 Public Participation during the EIA Phase

15.3.1 *Maintenance of the Stakeholders' Database*

The database of stakeholders (contained in **Appendix F**), which includes authorities, different spheres of government (national, provincial and local), parastatals, stakeholders, landowners, interest groups, members of the general public and I&APs, was maintained during the EIA phase.

15.3.2 *Period to Review the Draft EIA Report*

In accordance with Regulation 43(1) of the EIA Regulations, organs of state and I&APs are granted an opportunity to review and comment on the draft EIA Report from **20 June until 20 July 2023**.

15.3.3 *Notification of Review of Draft EIA Report*

Organs of state and I&APs contained in the database (refer to **Appendix F**) were notified of the review of the draft EIA Report. Proof of notification will be included in the final EIA Report.

15.3.4 *I&APs' Access to the Draft EIA Report*

The draft EIA Report can be accessed as follows:

- A hardcopy of the draft EIA Report was placed at the Rustenburg Public Library; and
- An electronic copy was uploaded to the following website, for downloading purposes:
<https://nema.co.za/downloads/>.

The draft EIA Report was provided to the following parties, which include key regulatory and commenting authorities with jurisdiction over the receiving environment:

- DFFE (including Biodiversity Conservation Unit);
- DEDECT;
- DWS: North West Region;
- DMRE;
- North West Department of Public Works and Roads; and
- KLM and BPDM.

A Comment Sheet is provided in **Appendix J**, which can be used to provide comments on the draft EIA Report.

15.3.5 Public Meeting to Present the Draft EIA Report

Anyone that has an interest in attending a public meeting will need to inform Nemai Consulting in writing by 27 June 2023. Should a public meeting be requested, a suitable date will be confirmed. Only preregistered parties that confirmed interest will receive an invitation to the public meeting.

15.3.6 Comments Received on the Draft EIA Report

The CRR will be updated with all comments received from organs of state and I&APs during the review period of the draft EIA Report. The updated CRR will be appended to the final EIA Report that will be submitted to DFFE.

15.4 Notification of DFFE Decision

Registered I&APs will be notified after having received written notice from DFFE (in terms of NEMA) on the final decision for the Project. The notification will include the appeal procedure to the decision and key reasons for the decision.

16 EIA CONCLUSIONS

16.1 Outcomes of the EIA Phase

The following key tasks were undertaken during the EIA phase for the proposed Project:

- ❑ The specialist studies identified in the Plan of Study for the EIA were undertaken and the findings were incorporated into the EIA Report in terms of understanding the environmental status quo and sensitive features, assessing the potential impacts and establishing concomitant mitigation measures, as well as identifying the preferred alternatives;
- ❑ Potentially significant impacts pertaining to the pre-construction, construction and operational phases of the Project were identified and assessed, and mitigation measures were provided; and
- ❑ Alternatives for achieving the objectives of the proposed activity were considered, and the BPEO was identified. The “no-go” option is not supported when considering the implications of not implementing the Project.

The outcomes of these tasks are captured below.

16.2 Sensitive Environmental Features

The following sensitive environmental features associated with the Project’s receiving environment are highlighted, for which mitigation measures are included in the EIA Report and EMPr:

- ❑ Although the site does not contain any sensitive freshwater features (drainage lines, streams, rivers and wetlands), small rainwater-fed dams were identified to the south of the site and along the access road. The original layout (Layout Alternative 1) was revised to avoid a small artificial dam in the north-western corner of the site. The new layout (Layout Alternative 2) does not directly encroach into a watercourse.
- ❑ The site encroaches into areas designated as CBA2, as well as small areas of ESA1 and ESA2, in terms of the North West Biodiversity Sector Plan. During the field survey, mammal activity was low due to the extent of disturbance in general and cattle grazing the area, as well as the poor habitat condition. No SCC in terms of mammals and herpetofauna were observed during the field survey. During the avifaunal survey, one of the species recorded were SCC i.e., *Sagittarius serpentarius* (Secretarybird).
- ❑ The proposed activities should have a moderate to low visual impact on the receiving environment. While the result in a change in the sense of place for those areas that look onto the project site, the magnitude of the impact is likely to be low as most of the sensitive receptors are located more than 5km from the project site.

The combined sensitivity maps overlaid with Layout Alternative 1 and Layout Alternative 2 (BPEO) are provided in **Figure 62** and **Figure 63** below, respectively.

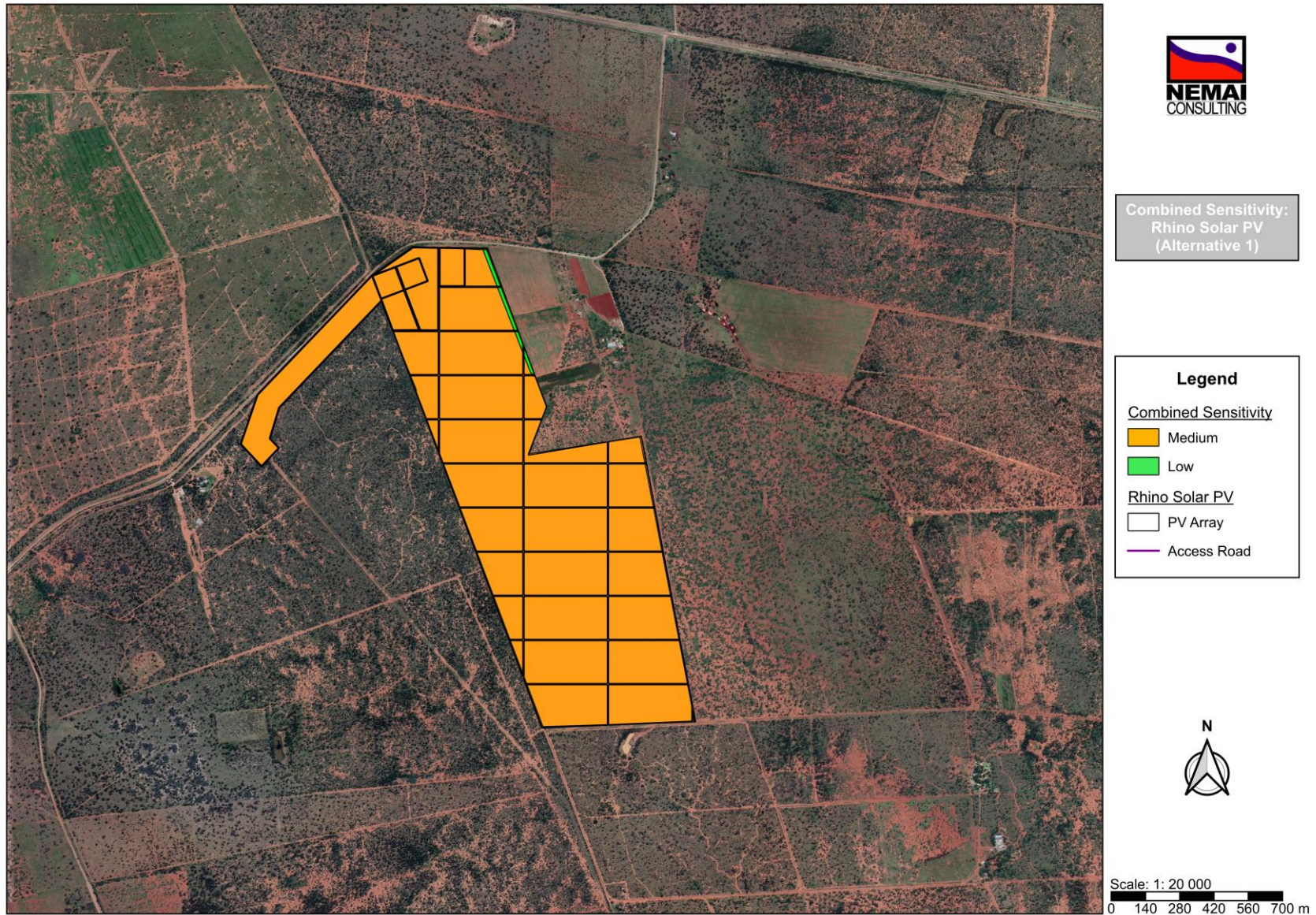


Figure 62: Combined sensitivity map of Layout Alternative 1

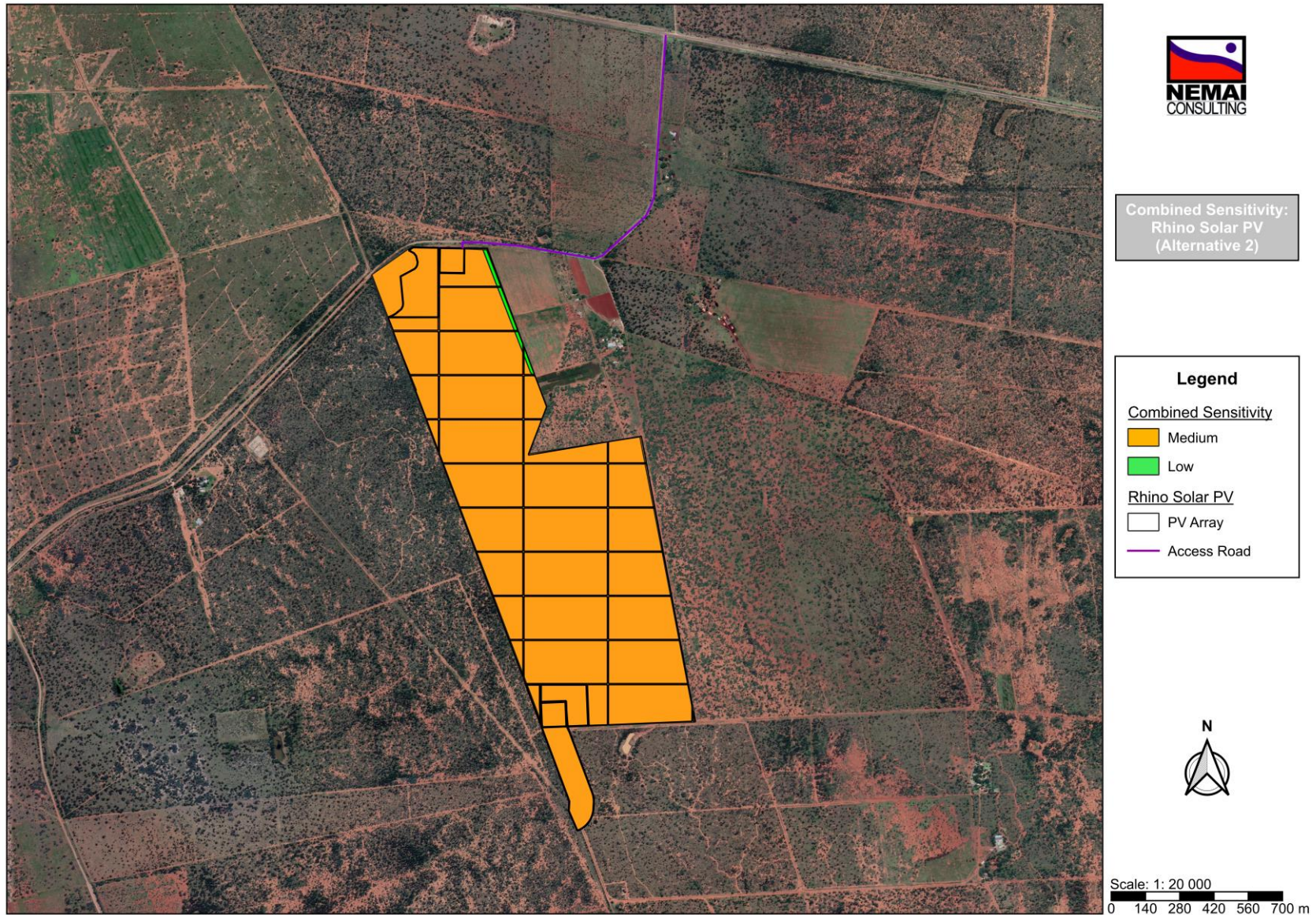


Figure 63: Combined sensitivity map of Layout Alternative 2 (identified as BPEO)

16.3 Environmental Impact Statement

The Project's strategic intent is linked to the SA Government's pursuit of promoting the country's renewable energy development imperatives, which encourages the role of Independent Power Producers (IPPs) to feed into the national grid. In this regard, the Applicant intends to bid for the current and future REIPPPP bid windows and/or other renewable energy markets within SA.

The rationale for the siting of the Project is based on its suitable geographic location, including the area's favourable solar irradiation levels, short distance to grid connection point, flat topography, suitable site access and availability of land. During the course of the EIA process, the layout was revised to avoid a small artificial dam in the north-western corner of the site. The new layout is known as Layout Alternative 2.

Based on the technical and environmental considerations, Layout Alternative 2 was identified as the BPEO.

The potentially significant environmental impacts were investigated through the relevant specialist studies. Key findings from the EIA, apart from the sensitive environmental features and aspects listed in **Section 16.2** above, which may also influence the conditions of the Environmental Authorisation (if granted), include the following:

- ❑ Adhere to the requirements of the North West Department of Public Works and Roads for gaining access from the R556 and for upgrading the access road.

The Project is considered to be compatible with existing land uses encountered in the area. The impacts and risks assessed as part of the EIA process that was undertaken for the Project are considered manageable with the effective implementation of the measures stipulated in this EIA Report and EMPr.

With the selection of the BPEO, the adoption of the mitigation measures included in the EIA Report and the dedicated implementation of the EMPr, it is believed that the significant environmental aspects and impacts associated with this Project can be suitably mitigated. With the aforementioned in mind, it can be concluded that there are no fatal flaws associated with the Project and that authorisation can be issued, based on the findings of the specialists and the impact assessment, through the compliance with the identified environmental management provisions.

It is further the opinion of the EAP and EIA team that the EIA was executed in an objective manner and that the process and EIA Report conform to the requirements stipulated in the EIA Regulations. The period for which the EA is required is 10 years.

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APPENDICES
