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FINAL SCOPING REPORT

for

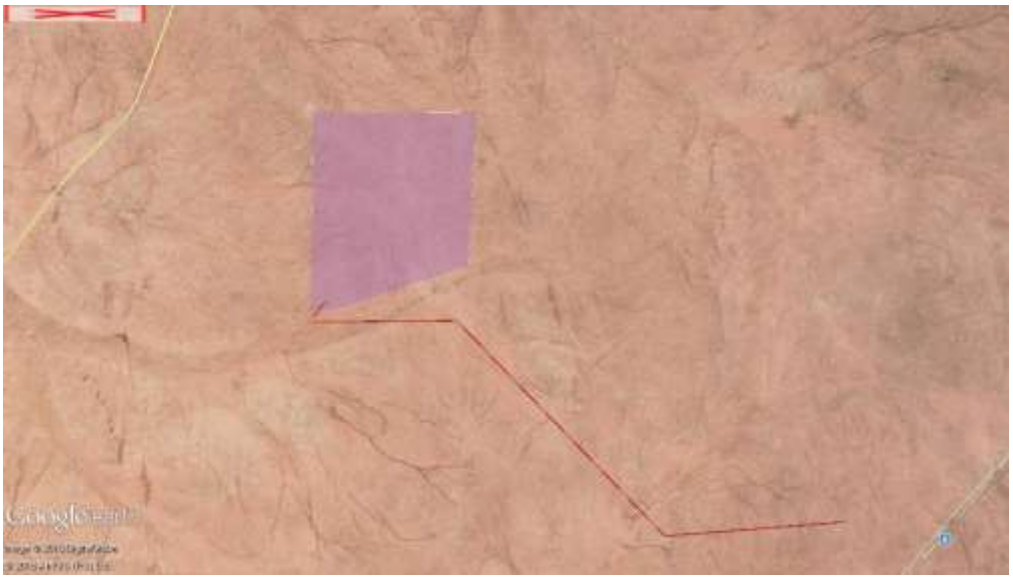
AMDA ALPHA SOLAR PV ENERGY FACILITY

on

Portion 1 of N'Rougas Zuid No 121, Straussheim, and Overhead Power Line Grid Connection across Portion 3 of Gemsbok Bult No120, Kenhardt Registration Division, Northern Cape Province

In terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended & Environmental Impact Regulations 2014



Prepared for Applicant: AMDA Alpha (Pty) Ltd.

By: *Cape EAPrac*

Report Reference: KAI428/05

DEA Reference: 14/12/16/3/3/2/941

Case Officer: Mr Mahlatse Shubane

Date: 21 July 2016

APPOINTED ENVIRONMENTAL ASSESSMENT PRACTITIONER:

***Cape EAPrac* Environmental Assessment Practitioners**

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Report written & compiled by: **Dale Holder** (Ndip Nat Con), who has 12 years' experience as an environmental practitioner.

PURPOSE OF THIS REPORT:

DEA Decision Making

APPLICANT:

AMDA Alpha (Pty) Ltd.

CAPE EAPRAC REFERENCE NO:

KAI428/05

DEPARTMENT REFERENCE:

14/12/16/3/3/2/941

SUBMISSION DATE

21 July 2016

FINAL SCOPING REPORT

in terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended &
Environmental Impact Regulations 2014

AMDA Alpha PV Energy Facility

Portion 1 of N'Rougas Zuid No 121, Straussheim, and Overhead Power Line Grid Connection across Portion 3 of Gemsbok Bult No120, Kenhardt Registration Division, Northern Cape Province

Submitted for:

Departmental Review

Report Issued by:

Cape Environmental Assessment Practitioners

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PO Box 2070
17 Progress Street
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REPORT DETAILS

Title:	**FINAL SCOPING REPORT** **AMDA Alpha PV Energy Facility**
Purpose of this report:	This Final Scoping Report forms part of a series of reports and information sources that are being provided during the Environmental Impact Assessment (EIA) for the proposed AMDA Alpha in the Northern Cape Province. In accordance with the regulations, the objectives of a scoping process is to, through a consultative process: (a) identify the relevant policies and legislation relevant to the activity; (b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location; (c) identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process; (d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment; (e) identify the key issues to be addressed in the assessment phase; (f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and (g) identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored. The Pre Application Draft Scoping Report was advertised and made available to all identified stakeholders for a 21 day review & comment period, **11 March 2016 – 01 April 2016.** All comments received during this period have been included in the formal scoping report that is made available to all registered I&AP;s for a 30 Day comment period in terms of the NEMA 2014 regulations. An application form was submitted and the formal Scoping report was then made available for a **30 day comment period** extending from **03 June 2016** to **04 July 2016**.
Prepared for:	AMDA Alpha (Pty) Ltd
Published by:	*Cape Environmental Assessment Practitioners (Pty) Ltd. (Cape EAPrac)*
Authors:	Mr Dale Holder
Reviewed by:	Ms Melissa Mackay
Cape EAPrac Ref:	KAI428/05
DEA Case officer & Ref. No:	14/12/16/3/3/2/941 Mr Mahlatse Shubane

Date:	21 July 2016
To be cited as:	*Cape EAPrac,* 2016. Final Scoping Report for the proposed AMDA Alpha PV Energy Facility. Report Reference: KAI428/05. George.

TECHNICAL CHECKLIST

The following technical checklist is included as a quick reference roadmap to the proposed project.

Company Details		
Company profile	Name and details of Developer	**AMDA Alpha (Pty) Ltd** Co Reg No 2015/300647/07
Site Details		
Project Property	Description and Size in hectares of the affected property.	Farm name and number: Portion 1 of N'Rougas Zuid No 121, Kenhardt Registration Division, Northern Cape Total Property Size: 5232.8138Ha
Development Site	Approximate EIA and development areas	Initial EIA Study Area size: Approx 900Ha Development lease area : Approx 250Ha
Technology Details		
Capacity of the facility	Capacity of facility (in MW)	Net generating capacity (AC): 75MWac Installed capacity (DC): 85MWp
Solar Technology selection	Type of technology	Solar PV on fixed tilt structures or single axis tracking technology.
	Structure orientation	Fixed-tilt in north-facing orientation, or mounted on horizontal axis trackers, tracking from east to west.
	Development component dimensions: Solar PV field footprint Project sub-station Collector sub-station Buildings Roads Permanent laydown areas Construction laydown areas	Approximate dimensions 185Ha 1Ha 1Ha 1.5Ha 22km long @6m wide = 13.2Ha 7Ha 12Ha
	Solar field tracker structure height	Approx.: 3.5m
	Perimeter fence	2.4m high multi-strand electric security fence
Connection to National Grid		
Grid connection	Substation to which project will connect.	Eskom Nieuwehoop MTS near Kenhardt, Northern Cape 29° 8'57.66"S 21°20'16.68"E
	Capacity of substation to connect facility	Confirmed capacity 245MW – Eskom letter for REIPPPP Bid Window 4 Accelerated

		Programme & 750MW in GCCA 2022 June 2015
Power line/s	Project sub-station to collector sub-station Collector sub-station to Mookodi	A single 132kV overhead line A single 132kV overhead line
	Route/s of power lines	Approx 5.5km from the collector sub-station on the property across Portion 3 of Gemsbok Bult No120 to the Nieuwehoop MTS
	Height of the Power Line	25m
	Servitude Width	50m
Auxiliary Infrastructure		
Other infrastructure	Additional Infrastructure	Water from borehole or transported from Municipal source. Auxiliary electricity supply from Eskom Sewerage by conservancy tank
	Details of access roads	A new access road across the property from the Kenhardt – Louisvale district road.

CONTENTS OF A SCOPING REPORT

Section 2 in Appendix 2 of regulation 982 details the information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact assessment process. The table below lists the minimal contents of a scoping report in terms of these regulations;

Requirement	**Details**
(a) details of - (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	This was compiled by Dale Holder of Cape Environmental Assessment Practitioners (Pty) Ltd (Cape EAPrac). Details of the EAP are included at the beginning of this report. A CV of the author as well as a company profile of Cape EAPrac is attached in **Appendix G4.**
(b) the location of the activity, including - (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	**Farm name and number**: Portion 1 of N'Rougas Zuid No 121, Kenhardt Registration Division, Northern Cape **Total Property Size**: 5232.8138Ha
(c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	A Location plan including co-ordinates of the proposed activity is attached in **Appendix A**.

Requirement	Details
(d) a description of the scope of the proposed activity, including - (i) all listed and specified activities triggered; (ii) a description of the activities to be undertaken, including associated structures and infrastructure;	The description of the proposed activity is detailed in section 3 on pg 14. Listed and specified activities triggered are detailed in section 2.2 on pg 5
(e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	The legislative and policy context is included in section 2 on 4 page of this report.
(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	The need and desirability of the project is included in section 5 on page 16 of this report.
(h) a full description of the process followed to reach the proposed preferred activity, site and location within the site, including - (i) details of all the alternatives considered; (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts - (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social,	(i) The details of all alternatives considered is included in section 7 on pg 22. (ii) The details of the public participation already undertaken as well as the details of the public participation for the remainder of the environmental process is detailed in section 20 on page 31. (iii) An issues and responses report will be included later on in the process. (iv) Detailed site description and attributes is included in section 11 on page 25. (v) A description of potential impacts identified by the EAP as well as participating specialists is included in section 22 on pg 36. (vi) The methodology used for the determination and ranking of significance is included in section 22.4 on pg 38. Please also refer to the specific methodologies in the specialist reports attached in Appendix E. (vii) This scoping report identifies the potential positive and negative impacts associated with the proposed project. These are included in section 22.1 on pg 37. An assessment of the significance of these identified impacts will take place in the impact assessment phase of this environmental process. (viii) The potential mitigation measures are addressed in section 13, 14 & 15. (ix) Details regarding the criteria for the selection of the preferred site selection is included in section 4 on pg 15. (x) Alternatives, including layout alternatives (for both the facility and grid connection), technological alternatives and the no-go alternative have been considered. Details of these are included in section 7 on pg 22.

Requirement	Details
economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) the outcome of the site selection matrix; (x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and (xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	(xi) The preferred alternative was determined using a risk adverse approach whereby the baseline specialist studies were used to determine the footprint of the proposed facility.
(i) a plan of study for undertaking the environmental impact assessment process to be undertaken, including - (i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; (ii) a description of the aspects to be assessed as part of the environmental impact assessment process; (iii) aspects to be assessed by specialists; (iv) a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists; (v) a description of the proposed method of assessing duration and significance; (vi) an indication of the stages at which the competent authority will be consulted; (vii) particulars of the public participation process that will be conducted during the environmental impact assessment process; and (viii) a description of the tasks that will be undertaken as part of the environmental impact assessment process; (ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	The plan of study for Environmental Impact Assessment phase of the environmental process is included in Section 22 on Pg 36.
(j) an undertaking under oath or affirmation by the EAP in relation to - (i) the correctness of the information provided in the report; (ii) the inclusion of comments and inputs from stakeholders and interested and affected parties;	The signed EAP declaration is included in **Appendix G4**.

Requirement	Details
and (iii) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	
(k) an undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	Appendix G4
(l) where applicable, any specific information required by the competent authority;	A pre-application meeting was held between the EAP and the DEA, where the need for any specific information was discussed and agreed upon. Minutes of this meeting are attached in Appendix G2. All correspondence with the competent authority is also included in this report in appendix G2.
(m) any other matter required in terms of section 24(4)(a) and (b) of the Act.	Compliance with section 24(4)(a) and (b) is included in the report.

Authority Comment on Scoping Report

The Department of Environmental Affairs and provided comment on the Scoping Report on 15 July 2016. The table below reflects these comments and discusses how they have been incorporated into this final document.

Summary of Comment	Response
Please ensure that all relevant listed activities are applied for, are specific and that it can be linked to the development activity or infrastructure as described in the project description.	Please refer to Table 1 in the Final Scoping Report, which includes a table of all listed activities applied for as well as well as exactly a description as to which components of the proposed project each are applicable to.
If the activities applied for in the application form differ from those mentioned in the FSR, an amended application form must be submitted.	The activities considered in this FSR are the same activities as applied for in the Application form.
Please ensure that the application form is signed by the applicant and that a signed landowners notification form is submitted to this department.	The applicants originally signed declaration was included in appendix 7 of the application form. The signed landowner consent was included in Appendix 3 of the application form and is also included in Annexure G3 of the FSR.
The final SR must investigate and Identify all traffic impacts associated with the proposed development.	A traffic specialist was appointed to provide input into this environmental process. A copy of the traffic study is included in annexure E10.
Please ensure that all issues raised and comments received during the circulation of the SR from registered I&AP's are adequately addressed in the scoping report. Proof of correspondence must be included. Should you be unable to obtain comments, proof of the attempts to obtain comment should be included.	Please refer to annexure F6 and F7 for this information.

Summary of Comment	Response
The public participation must be conducted in terms of Regulation 39, 40, 41, 42, 43 and 44 of the EIA regulations 2014.	Please refer to section 21 of this report where compliance with these specific regulations is discussed in detail.
Please provide a description of any identified alternatives for the proposed activity that are feasible including the advantages and disadvantages that the proposed activity or alternatives.	The consideration of alternatives is attached in section 7 of the scoping report.
It is noted that activities that trigger section 19; S21 (i) and (c) of the NWA. A separate hydrological assessment to assess the impacts on surface water hydrology features is required.	The final scoping report includes a plan of study for a hydrological assessment to be undertaken.
The Study area falls within the ambit of the square kilometre array – South Africa. The impacts associated with radio frequency interference on the SKA must form part of the environmental impact assessment. The applicant must engage with the SKA-SA on the specific terms of reference for any EMI and RFI studies that must take place as part of the Environmental Process.	The plan of study for environmental impact assessment makes provision to undertake the necessary studies to the satisfaction of the SKA. The applicant is in the process of engaging with SKA – SA on the exact requirements and timing of studies to be undertaken during the EIA phase as well as those that have to take place at a later stage.
You are hereby advised that the final SR must provide the names of the specialists that will conduct the various studies as outlined in the PoSEIA.	The authors of the proposed specialist studies are listed in the scoping report.
All specialist studies that were done in house must be peer reviewed externally before the submission of the Final EIR.	No specialist studies have been done in house and as such no review process is required.
The Department requires that a cumulative impact assessment be undertaken in the final SR to determine potential fatal flaws. This assessment must incorporate cumulative impacts from all specialist assessments.	This scoping report does consider potential cumulative impacts, including both the other proposed projects on the property as well as those in the surrounding areas. The potential impacts identified by specialists are reflected. These will however be assessed in more detail in the Environmental Impact Assessment Phase of the Projects as per the Plan of Study for EIR.
The terms of reference for the Agricultural Specialist study must include: - Assessment of the loss of Agricultural land; - The impact of the loss of agricultural land on the property as well the greater area.	These points have been included in the terms of reference for the agricultural specialist study.
A graphical representation of the proposed development within the respective geographical areas must be provided.	The intent of this requirement is very unclear. The “respective geographic area” is deemed to be the Northern, and as such, the series of plans attached in Appendix A are deemed to comply with this requirement.
In terms of Appendix 2 of the EIA regulations 2014, the report must include an undertaking under oath or affirmation by the EAP in relation to:	The EAP declaration included in Annexure G4 is deemed to be an affirmation that complies with this requirement as outlined in Appendix 2.
In terms of Appendix 2 the name of the EAP who compiled the report as well as his expertise to undertake such work.	This scoping report was authored by Mr Dale Holder of Cape EAPrac. A summary of his CV is included in Annexure G4.
Furthermore, you are reminded that the Final Scoping Report submitted to the department must	Cape EAPrac believes that the scoping report does comply with these requirements. The table above

Summary of Comment	Response
comply with all the requirements in terms of the scope of assessment and content of scoping reports in accordance with Appendix 2 and Regulations 21(1) of the EIA regulations, 2014.	provides a quick reference as to how these requirements have been incorporated into this scoping report.

ORDER OF REPORT

Draft Scoping Report – Main Report

Appendix A	:	Location, Topographical Plans
Appendix B	:	Biodiversity Overlays
Appendix C	:	Site Photographs
Appendix D	:	Solar Facility Layout Plans and Technical Layout Report (AMDA, 2016)
Appendix E	:	Specialist Reports
Annexure E1	:	Ecological Scoping Report (Todd, 2016)
Annexure E2	:	Agricultural Potential Study (Lubbe, 2016)
Annexure E3	:	Archaeology Scoping Report (Nilssen, 2016)
Annexure E4	:	Palaeontology Desktop Study (Almond, 2016)
Annexure E5	:	Integrated Heritage Study (de Kock, 2016)
Annexure E6	:	Engineering Report (AMDA, 2016)
Annexure E7	:	Visual Statement (Stead, 2016)
Annexure E8	:	Avifaunal Study (Zoghby & Todd, 2016)
Annexure E9	:	Planning Statement (Macroplan, 2016)
Annexure E10	:	Traffic Assessment and Transport Plan (KMA engineers, 2016)
Appendix F	:	Public Participation Process
Annexure F1	:	I&AP Register
Annexure F2	:	Comments and Response Report
Annexure F3	:	Adverts & Site Notices
Annexure F4	:	Draft Scoping Report Notifications
Annexure F5	:	Draft Scoping Report Comments and Responses
Annexure F6	:	Scoping Report Notifications
Annexure F7	:	Scoping Report Comments and Responses
Appendix G	:	Other Information
Annexure G1	:	Correspondence with Authorities
Annexure G2	:	Minutes of Pre- Application Meeting with DEA
Annexure G3	:	Landowner Consent
Annexure G4	:	EAP Declaration & CV
Annexure G5	:	Specialist Declarations
Annexure G6	:	Title Deed / Windeed Report

Annexure G7 : Correspondence with Project Team (site selection)

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REPORT SUMMARY

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FINAL SCOPING - OVERVIEW

1 PROJECT OVERVIEW

NOTE: The pre application Draft Scoping Report was provided as a background to the proposed development and was made available prior to the submission of a formal application. The formal scoping report followed the submission of an application to the Department of Environmental Affairs (DEA) and registered I&AP's were given an additional opportunity to comment on the formal scoping. This Document now constitutes the Final Scoping Report that is herewith submitted to the Department of Environmental Affairs for Decision Making.

Cape EAPrac has been appointed by AMDA Alpha (Pty) Ltd., hereafter referred to as the Applicant, as the independent Environmental Assessment Practitioner EAP), to facilitate the Scoping & Environmental Impact Reporting (S&EIR) process required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed development of the 'AMDA Alpha PV Energy Facility' near Kenhardt in the Northern Cape Province of South Africa.

AMDA Alpha (Pty) Ltd. Have an option to sub-lease a section of Portion 1 of N'Rougas Zuid No 121, Straussheim from the landowner, Wilcaris (Pty) Ltd, for the purposes of developing the proposed solar facility. A copy of a letter from Wilcaris (Pty) Ltd providing consent for the continuation of the EIA is attached in **Annexure G6**.

The total generation capacity (contracted capacity)of the solar facility will not exceed 75MW for input into the national Eskom grid. The project will feed into the National Grid via the Niewehoop Major Transmission Substation (MTS).

The purpose of this ***Scoping Report*** is to describe the environment to be affected, the proposed project, the process followed to date to allow registered interested and affected parties the opportunity to provide informed comment on the potential impacts associated with the development of the AMDA Alpha PV Development and associated grid connection. On acceptance of this final scoping report, an Environmental Impact assessment Report (EIR) will be compiled and provided to I&AP's for further review and comment.

The pre application Draft Scoping Report was available for review and comment for a period of 21 Days extending from: **11 March 2016 – 01 April 2016**. All comments received during this period have been included in this scoping report.

A formal application for this development has been submitted and this Scoping report is made available for a further 30 day comment period extending from **03 June 2016** –**04 July 2016**.

It was requested that all comments on this report must be submitted to Cape EAPrac by no later than **04 July 2016**:

All comments received during this timeframe, as well as those received outside of this timeframe have been incorporated into this Final Scoping report that is herewith submitted to the DEA for consideration and decision making.

2 NEED AND DESIRABILITY

Need and desirability has been considered in detail in this environmental process. The overall need and desirability in terms developing renewable energy generation in South Africa is considered in section 1 of the Scoping report, while the project specific need and desirability is considered in section 5 of the Scoping Report.

3 ENVIRONMENTAL REQUIREMENTS

The current assessment is being undertaken in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998). This Act makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority (in this case, the national Department of Environmental Affairs, DEA) based on the findings of an Environmental Assessment.

The proposed development entails a number of listed activities, which require a **Scoping & Environmental Impact Reporting (S&EIR) process**, which must be conducted by an independent environmental assessment practitioner (EAP). Cape EAPrac has been appointed to undertake this process.

The listed activities associated with the proposed development, as stipulation under 2014 Regulations **983, 984 and 985** are as follows:

Listed activity as described in GN R.983, 984 and 985	**Description of project activity that triggers listed activity**
Regulation 983 – Basic Assessment	
GN R983 Activity 11: *The development of facilities or infrastructure for the transmission and distribution of electricity-* *(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or* *(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.*	The proposed AMDA Alpha PV Energy Facility will connect to the national electricity via the Niewehoop MTS sub-station. The proposed distribution and transmission infrastructure includes the construction of an on-site substation and a 132kV overhead power line from the on-site substation.
GN R983 Activity 12: The development of- (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured	The construction of internal and access roads and PV panel infrastructure across possible ephemeral washes. An ecologist has been appointed to undertake.

from the edge of a watercourse;	
GN R983 Activity 19: *The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic* *(i) a watercourse;*	Movement material for the piling of PV panels as well as the construction of internal tracks may exceed the 5 cubic metre threshold of this activity. The relevance of this activity will be determined by the ecological specialist
Regulation 984 – Scoping and Environmental Impact Reporting	
GN R984 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 within an urban area.	The proposed AMDA Alpha PV Energy Facility will have a maximum generation Capacity (Contracted Capacity) of 75 megawatts and as such exceeds the threshold defined in this activity.
GN R984 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.	The proposed AMDA Alpha PV Energy Facility will have a maximum footprint of 250ha and as such exceeds the threshold defined in this activity.
Regulation 985 – Basic Assessment	
NO Activities in terms of Regulation 985.	

NOTE: Basic Assessment as well as Scoping and Environmental Impact Reporting Activities are being triggered by the proposed development and as such, the Environmental Process will follow a Scoping and Environmental Impact Reporting process.

It must be noted that these activities are all to be considered at the scoping phase, but certain of the activities listed above may no longer be relevant after the outcome of the specialist studies. In this case, these activities will be excluded from further assessment and an amended application form will be submitted to the DEA

Before any of the above mentioned listed activities can be undertaken, authorisation must be obtained from the relevant authority, in this case the National Department of Environmental Affairs (DEA). Should the Department approve the proposed activity, the Environmental Authorisation does not exclude the need for obtaining relevant approvals from other Authorities who has a legal mandate in respect of the activity.

4 DEVELOPMENT PROPOSAL & ALTERNATIVES

The proposed photovoltaic (PV) SEF will have a net generating capacity of 75 MW_{AC} with an estimated maximum footprint of ± 250 ha. A preliminary study area of ± 900 ha was identified by the Project Developer. The project footprint within this larger 900ha area was identified taking potential constraints identified by the EAP, Project Engineer and Ecological Specialist..

The technology under consideration is (PV) modules mounted on either of fixed or tracking structures. Other infrastructure includes inverter stations, internal electrical reticulation, internal roads, an on-site switching station / substation, a 132 kV overhead (OH) transmission line, auxiliary buildings, construction laydown areas and perimeter fencing and security infrastructure. The on-site switching station / substation will locate the main power transformer/s that will step up the generated electricity to a suitable voltage level for transmission into the national electricity grid, via the OH line. Auxiliary buildings include, *inter alia*, a control building, offices, warehouses, a canteen and visitors centre, staff lockers and ablution facilities and gate house and security offices.

5 SPECIALIST STUDIES

The following specialists have and will continue provided input into this environmental process:

- Faunal	- Mr Simon Todd (**Appendix E1**)
- Flora	- Mr Simon Todd (**Appendix E1**)
- Avifaunal	- Mr Blair Zoghby (**Appendix E8**)
- Archaeology	- Dr Peter Nilssen (**Appendix E3**)
- Palaeontology	- Dr John Almond (**Appendix E4**)
- Integrated Heritage	- Stefan de Kock (**Appendix E5**)
- Agricultural Potential	- Mr Christo Lubbe (**Appendix E2**)
- Visual	- Stephen Stead (**Appendix E7**)
- Technical aspects	- AMDA Developments (**Appendix E6**)
- Planning	- Macroplan (**Appendix E9**)
- Freshwater Ecology	- Dr Brian Colloty (will form part of EIR)
- Socio Economic	- Mr Tony Barbour (will form part of EIR)
- EMI and RFI	- To be appointed (will form part of the EIR)
- Stormwater	- To be appointed (will form part of EIR)
- Traffic and Transportation	- KMA Engineers (**Appendix E10**)

6 PLANNING CONTEXT

A Planning specialist, Macroplan has provided input into this environmental process. A planning statement is attached in **Appendix E9**. The following key requirements will need to take place in terms of the planning process:

- The property is currently zoned as Agricultural Zone I in terms of the Kai !Garib Scheme Regulations. In order to allow for the development of a renewable energy facility thereon, the applicable portion of the property will have to be rezoned to an appropriate zoning.
- There is no default zoning in the Kai !Garib Scheme Regulations allowing for renewable energy development and a Special Zone will have to be proposed. The Special Zone is custom-defined to the exact needs of the developer.

- The application for land use change will be compiled and submitted in terms of the Spatial Planning and Land Use Management Act, Act 16 of 2013 (SPLUMA).

The planning specialist will furthermore likely engage with the following authorities as part of the planning process. Where relevant, these authorities will also be engaged with as part of the Environmental Process and will be given an opportunity to provide input and comment on this scoping report.

- **Kai Garib Municipality** for approval in terms of the relevant Zoning Scheme;
- **Northern Cape Department of Agriculture** as well as the **National Department of Agriculture, Forestry & Fisheries** (DAFF) for approval in terms of Act 70 of 70 (SALA) and Act 43 of 83(CARA);
- **District Roads Engineer** for comment on the land use application;
- **Department of Water and Sanitation** (DWS) for comment in terms of the National Water Act and the land use application;
- **Department of Mineral Resources** for approval in terms of Section 53 of Act 28 of 2002;
- **Department of Transport & Public Works** for comment on the land use application;
- **South African Heritage Resource** (SAHRA) Agency for comment on the land use application;
- **Civil Aviation Authority** for comment on the land use application;
- **Eskom** Northern Cape for comment on the land use application; and
- **Northern Cape Nature** Conservation for comment on the land use application.

7 CONCLUSIONS & RECOMMENDATIONS

This scoping exercise is currently being undertaken to present concept proposals to the public and potential Interested & Affected Parties and to identify environmental issues and concerns raised as a result of the proposed development alternatives to date. This will allow Interested & Affected Parties (I&APs), authorities, the project team, as well as specialists to provide input and raise issues and concerns, based on baseline / scoping studies undertaken. The AMDA Alpha PV Energy Facility will be analysed from Ecological, Avifaunal, Agricultural Potential, Heritage and Visual perspectives, and site constraints and potential impacts identified.

This Scoping Report (DSR) summarises the process to date, reports on the relevant baseline studies that have been undertaken.

The results of the baseline / scoping studies have not found any fatal flaws that should prevent the project from being considered further. The EIR phase of this environmental process will further assess the potential impacts, including cumulative impacts that may occur as a result of this development.

Cape EAPrac is of the opinion that the information contained in this Scoping Report and the documentation attached hereto is sufficient to allow the general public and key stakeholders to apply their minds to the potential negative and/or positive impacts associated with the development, in respect of the activities applied for. It furthermore provides sufficient information in order for the competent authority to decide whether or not the project should proceed to the next phase of the environmental process.

The Draft Scoping Report (DSR) was made available for stakeholder review and comment for a period of 21-days, extending from **11 March 2016 – 01 April 2016**. All comments received, have been considered and addressed, and feedback provided to registered stakeholders.

An application has been submitted to the National Department of Environmental Affairs along with this Scoping report, which is herewith available for a further **30 Day period** extending from **03 June 2016 – 04 July 2016**.

This Final Scoping report constitutes the final report that is submitted to the competent authority for decision making.

FINAL SCOPING - MAIN REPORT

1 INTRODUCTION

NOTE: The pre application Draft Scoping Report was provided as a background to the proposed development and was made available prior to the submission of a formal application. This formal scoping report follows the submission of an application to the Department of Environmental Affairs (DAE) and registered I&AP's will be given an additional opportunity to comment on the formal scoping report that will be made available after the submission of the application for environmental authorisation. This Final Scoping Report is herewith submitted to the competent authority for final decision making.

Cape EAPrac has been appointed by **AMDA Alpha (Pty) Ltd**, hereafter referred to as the Applicant, as the independent Environmental Assessment Practitioner EAP), to facilitate the Scoping & Environmental Impact Reporting (S&EIR) process required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed development of the '**AMDA Alpha PV Energy Facility**' near Kenhardt in the Northern Cape.

AMDA Alpha (Pty) Ltd have an option to sub-lease a section Portion 1 of N'Rougas Zuid No.121, Straussheim from the landowner, **Wilcaris (Pty) Ltd**, for the purposes of developing the proposed solar facility. A copy of a letter from **Wilcaris (Pty) Ltd** providing consent for the continuation of the EIA is attached in **Appendix G3**.

All other land owners where the alternative grid connection (linear activity) may take place will be notified of the availability of the Draft Scoping Report and this scoping report and have been given an opportunity to participate in this environmental process.

The total generation capacity (contracted capacity) of the photovoltaic **power generation facility** will not exceed **75 Megawatts** (MW) for input into the national Eskom grid.

The purpose of this **Scoping Report** is to describe the environment to be affected, the proposed project, the process followed to date (focussing on the outcome of the initial public participation process and baseline specialist studies), to present the site constraints identified by the various specialist during their initial site assessments, and provide Plan of Study for the Impact Assessment phase of this development. This scoping report is made available to all stakeholders that were agreed upon with DEA during the pre-application meeting as well as I&AP's that registered in response to the Adverts or Site Notices.

The Pre Application Draft Scoping Report was available for review and comment for a period of 21 Days extending from: **11 March 2016 – 01 April 2016.** All comments considered during this period have been considered and included in the Scoping Report.

An application has been submitted to the National DEA along with the scoping report which was available for a **30 day comment period** extending from **03 June 2016** –**04 July 2016**.

All comments received during this period as well as those receives outside of this period have been include in this Final Scoping Report which is submitted to the competent authority for decision making.

1.1 OVERVIEW OF ALTERNATIVE ENERGY IN SOUTH AFRICA AND THE NORTHERN CAPE.

South Africa has for several years been experiencing considerable constraints in the availability and stability of electrical supply. Load shedding procedures have been applied since December 2005 due to multi-technical failures, as well as generation and transmission constraints.

Eskom generates about 95% of South Africa's electricity supply, and has undertaken to increase capacity to meet growing demands. At the moment, the country's power stations are 90% coal-fired, and two huge new facilities are being built to add to this capacity. However, Eskom's plans to increase its national capacity by 40 000 megawatts in the period to 2025 have had to be scaled down due to the global economic recession (Northern Cape Business website).

International best-practice requires a 15% electricity reserve margin to deal with routine maintenance requirements and unexpected shutdowns in electricity supply systems. South Africa has historically enjoyed a large reserve margin (25% in 2002, 20% in 2004 and 16% in 2006), but that has declined over the recent past to 8% - 10%, as a result of robust economic growth and the associated demand for electricity. The spare power available to provide supply at any time of the day is known as the reserve capacity and the spare plant available when the highest demand of the year is recorded is known as the reserve margin (National Response to South Africa's Electricity Shortage, 2008). This has resulted in limited opportunities for maintenance and necessitated that power stations are run harder. This results in station equipment becoming highly stressed and an increase in unplanned outages and generator trips. The expected demand growth will rapidly erode this margin, as well as Eskom's ability to recover after it's already stressed systems shutdown.

This necessitates the additional generation of at least 3 000MW in the shortest possible time, to allow the reserve necessary to bring Eskom's system back into balance (*ibid*). This need can either be addressed from the *supply* or the *demand* side. Where the demand side interventions include short, medium and long term aspects of a national Power Conservation Programme to incentivise the public to use less electricity (as mentioned above), one of the supply side options (besides Eskom building new plants and returning old plants to service) is to allow **Independent Power Producers** (IPPs) to contribute electricity to the national grid (National Response Document, 2008). **AMDA Alpha (Pty) Ltd.** is one such body, which intends generating electricity from a renewable energy resource, namely solar.

In March 2011, the Cabinet approved South Africa's Integrated Resource Plan 2010, in terms of which energy from renewable sources will be expected to make up a substantial 42% of all new electricity generation in the country over the next 20 years. The government's New Growth Path for the economy also envisages up to 300 000 jobs being created in the "green" economy by 2020 (South Africa info website).

The Northern Cape is suggested by many to be the ideal location for various forms of alternative energy. This has resulted in a number of feasibility studies being conducted, not least of which an investigation by the Industrial Development Corporation in 2010 (R33-million spent) into potential for photo-voltaic, thermal, solar and wind power (Northern Cape Business website).

The area of the Northern Cape and Namibia boasts the highest solar radiation intensity anywhere in southern Africa. Solar energy is therefore likely to be the most viable alternative energy source for the Northern Cape, although wind-power potential is generally good along the coast (State of the Environment, S.A.)

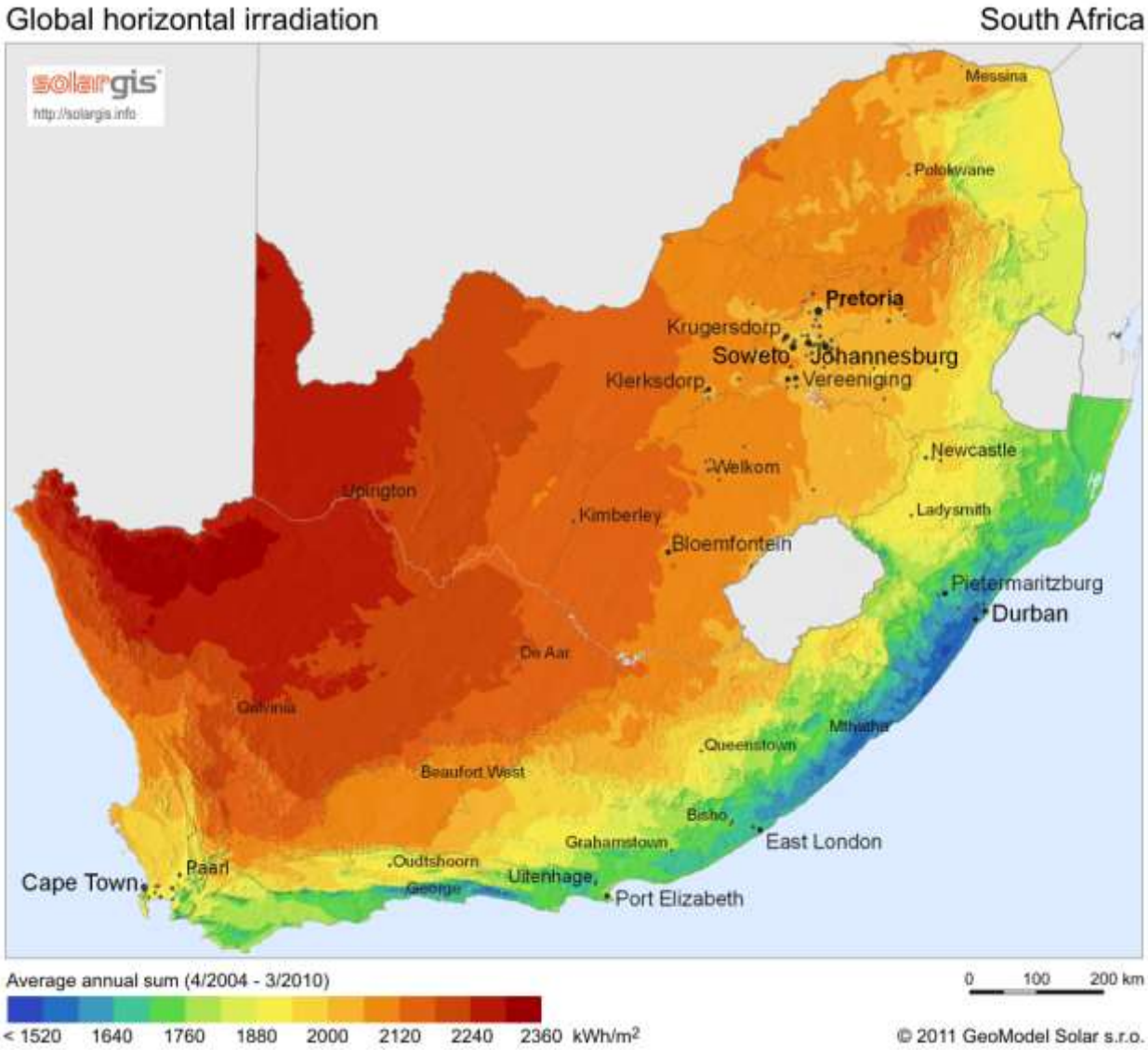

Figure 1: Global Horizontal radiation map for South Africa (Source: http://solargis.info, 2015).

The Northern Cape area is considered to have extremely favourable solar radiation levels over the majority of the year, making it ideal for the production of solar-power via Photovoltaic (fixed and tracking panels) and Concentrated (solar thermal) Solar technology systems. Several solar irradiation maps have been produced for South Africa, all of which indicate that the Northern Cape area has **high solar irradiation**.

A solar-investment conference was held in November 2010 at Upington and was attended by 400 delegates from all over the world. Dipuo Peters, the national Minister of Energy at that time, outlined the competitive advantages of the Northern Cape, over and above its extremely high irradiation levels, amongst others:

- relative closeness to the national power grid compared to other areas with comparable sunshine;
- water from the Orange River;
- access to two airports; and
- good major roads and a flat landscape (Northern Cape Business website – solar power).

The Northern Cape is not too dusty, the land is flat and sparsely populated, and there are little to no geological or climate risks, meaning that the sun can be used year-round (BuaNews online). An

advantage that the Northern Cape has over the Sahara Desert is the relatively wind-free environment that prevails in large portions of the province. A Clinton Climate Initiative (CCI) pre-feasibility study has found that South Africa has one of the best solar resources on the planet (Northern Cape Business website – solar power).

AMDA Alpha (Pty) Ltd. is one such IPP solar project which intends to generate 75MW of electricity from solar-energy for inclusion into the National grid. The AMDA Alpha PV Energy Facility development site is considered ideal, primarily due to:

- The flat topography of the proposed development site and it's the availability for use for an alternative energy generation facility;
- The grid connection alternatives based in proximity other renewable energy activities and the Niewehoop MTS sub-station; and
- Its location within a landscape, in that it is set back from roads with possible scenic quality.

Please **Appendix G7** of this report for the details of the site selection matrix.

Minister Tina Joemat-Pettersson, the current Minister of Energy issued a media statement on 16 April 2015 on the Expansion and Acceleration of the Independent Power Producer Procurement Programme.

In this statement, she stated that resolving the energy challenge remains a critical element of the South African Cabinet¡¦s list of nine strategic priorities to be pursued in partnership with the private sector and all stakeholders.

In this press release, the Minister confirmed that she instructed the Department and the IPP Office to accelerate and expand the Renewable Energy IPP Procurement Programme through:

- Utilising the enabling provisions in the current RFP to allocate additional MWs from Bid Window 4 procurement process.
- Issuing a Request for Further Proposals for an expedited procurement process of 1800MW from all technologies.
- Redesign the current RFP for the Fifth Bid Submission phase to be ready for release in the second quarter of 2016.

The Department of Energy (DoE) has set a number of dates for the submission of bid documents for private companies to apply for a licence to generate electricity. The bidding deadlines for the first two stages were as follow:

- 1st Bid Submission: 4 November 2011.
- 2nd Bid Submission: 5 March 2012.
- 3rd Bid submission: 19th of August 2013.
- 4th Bid submission: 18 August 2014.
- 5th Bid Submission: To be confirmed.

NOTE: It is the intention that the AMDA Alpha PV Energy Facility solar development will submit a bid under this Renewable Energy Independent Power Producers Procurement Programme (REIPPP).

2 LEGISLATIVE AND POLICY FRAMEWORK

The legislation that is relevant to this study is briefly outlined below. These environmental requirements are not intended to be definitive or exhaustive, but serve to highlight key environmental legislation and responsibilities only.

2.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

The Constitution of the Republic of South Africa (Act 108 of 1996) states that everyone has a right to a non-threatening environment and that reasonable measure are applied to protect the environment. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

2.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA)

The current assessment is being undertaken in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998)[1] . This Act makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority (in this case, the national Department of Environmental Affairs, DEA) based on the findings of an Environmental Assessment.

The proposed development entails a number of listed activities, which require a **Scoping & Environmental Impact Reporting (S&EIR) process**, which must be conducted by an independent environmental assessment practitioner (EAP). Cape EAPrac has been appointed to undertake this process. Figure 2 below depicts a summary of the S&EIR process.

[1] On 18 June 2010 the Minister of Water and Environmental Affairs promulgated new regulations in terms of Chapter 5 of the National Environmental Management Act (NEMA, Act 107 of 1998), viz, the Environmental Impact Assessment (EIA) Regulations 2014. These regulations came into effect on 08 December 2014 and replace the EIA regulations promulgated in 2006 and 2010.

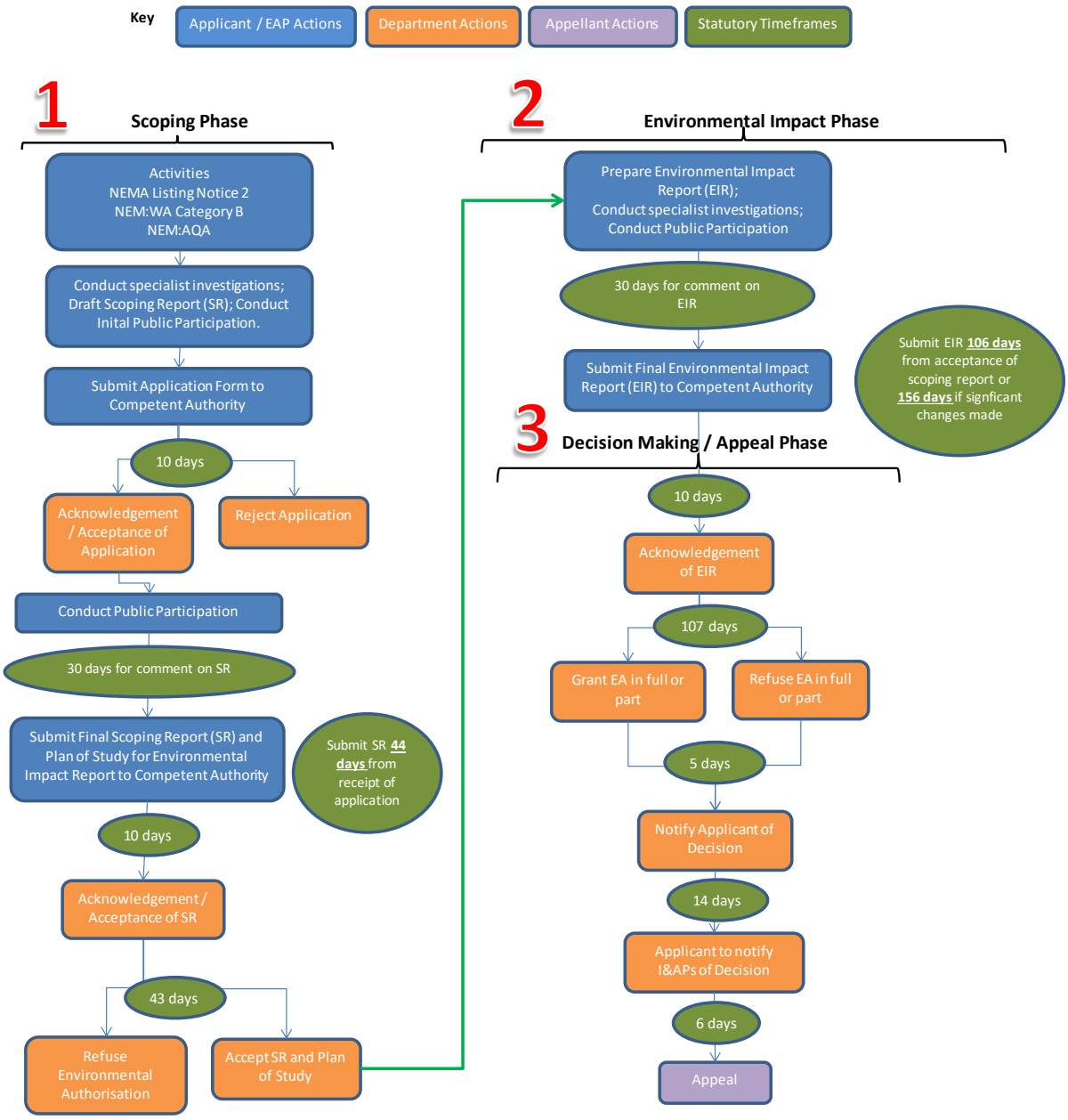

Figure 2: Summary of Scoping & EIR Process in terms of the 2014 Regulations.

The listed activities associated with the proposed development, as stipulation under 2014 Regulations **983, 984 and 985** are as follows:

Table 1: NEMA 2014 listed activities for the AMDA Alpha PV Energy Facility

Listed activity as described in GN R.983, 984 and 985	Description of project activity that triggers listed activity
Regulation 983 – Basic Assessment	
GN R983 Activity 11: *The development of facilities or infrastructure for the transmission and distribution of electricity-* *(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or* *(ii) inside urban areas or industrial*	The proposed AMDA Alpha PV Energy Facility will connect to the national electricity via the Niewehoop MTS sub-station. The proposed distribution and transmission infrastructure includes the construction of an on-site substation and a 132kV overhead power line from the on-site substation.

complexes with a capacity of 275 kilovolts or more.	
GN R983 Activity 12: The development of- (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	The construction of internal and access roads and PV panel infrastructure across possible ephemeral washes. An ecologist has been appointed to undertake.
GN R983 Activity 19: *The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic* *(i) a watercourse;*	Movement material for the piling of PV panels as well as the construction of internal tracks may exceed the 5 cubic metre threshold of this activity. The relevance of this activity will be determined by the ecological specialist
Regulation 984 – Scoping and Environmental Impact Reporting	
GN R984 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 within an urban area.	The proposed AMDA Alpha PV Energy Facility will have a maximum generation Capacity (Contracted Capacity) of 75 megawatts and as such exceeds the threshold defined in this activity.
GN R984 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.	The proposed AMDA Alpha PV Energy Facility will have a maximum footprint of 250ha and as such exceeds the threshold defined in this activity.
Regulation 985 – Basic Assessment	
NO Activities in terms of Regulation 985.	

NOTE: Basic Assessment as well as Scoping and Environmental Impact Reporting Activities are being triggered by the proposed development and as such, the Environmental Process will follow a Scoping and Environmental Impact Reporting process.

It must be noted that these activities are all to be considered at the scoping phase, but certain of the activities listed above may no longer be relevant after the outcome of the specialist studies. In this case, these activities will be excluded from further assessment.

Before any of the above mentioned listed activities can be undertaken, authorisation must be obtained from the relevant authority, in this case the National Department of Environmental Affairs (DEA). Should the Department approve the proposed activity, the Environmental Authorisation does not exclude the need for obtaining relevant approvals from other Authorities who has a legal mandate.

2.3 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY (ACT 10 OF 2004)

The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA) provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The Draft National List of Threatened Ecosystems (Notice 1477 of 2009, Government Gazette No 32689, 6 November 2009) has been gazetted for public comment.

The list of threatened terrestrial ecosystems supersedes the information regarding terrestrial ecosystem status in the NSBA 2004. In terms of the EIA regulations, a basic assessment report is required for the transformation or removal of indigenous vegetation in a critically endangered or endangered ecosystem regardless of the extent of transformation that will occur. **However, all of the vegetation types on both the study sites are classified as Least Threatened.**

NEMBA also deals with endangered, threatened and otherwise controlled species. The Act provides for listing of species as threatened or protected, under one of the following categories:

- **Critically Endangered**: any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.
- **Endangered**: any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species.
- **Vulnerable**: any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species.
- **Protected species**: any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Certain activities, known as Restricted Activities, are regulated by a set of permit regulations published under the Act. These activities may not proceed without environmental authorization.

According to the national vegetation map (Mucina & Rutherford 2006), the site falls entirely within a single vegetation type, Bushmanland Arid Grassland. Bushmanland Arid Grassland is the second most extensive vegetation type in South Africa and occupies an area of 45 478 km^2 and extends from around Aggeneys in the west to Prieska in the east. It is associated largely with red-yellow apedal (without structure), freely drained soils, with a high base status and mostly less than 300 mm deep. Due the arid nature of the unit which receives between 70 and 200 mm annual rainfall, it has not been significantly impacted by intensive agriculture and more than 99% of the original extent of the vegetation type is still intact and its' conservation status is classified as Least Threatened. Mucina & Rutherford (2006) list 6 endemic species for the vegetation type which is relatively few given the extensive nature of the vegetation type.

The site consists of stony plains with occasional areas on deeper soils in lower-lying areas and run-on sites. Despite being classified as Bushmanland Arid Grassland, the site is largely dominated by woody shrubs, which is typical on stony soils of the area. Typical species include *Zygophyllum lichtensteinianum, Lycium cinereum, Hermannia spinosa, Pteronia sordida, Pteronia inflexa, Osteospermum armatum and Aristida adscensionis. On deeper soils Phaeoptilum spinosum, Lycium horridum, Pentzia incana, Ruschia spinosa, Aptosimum marlothii, Rosenia humilis, Pegolettia retrofracta, Stipgrostis obtusa, Enneapogon desvauxii, Stipagrostis ciliata and Eragrostis lehmanianna.*

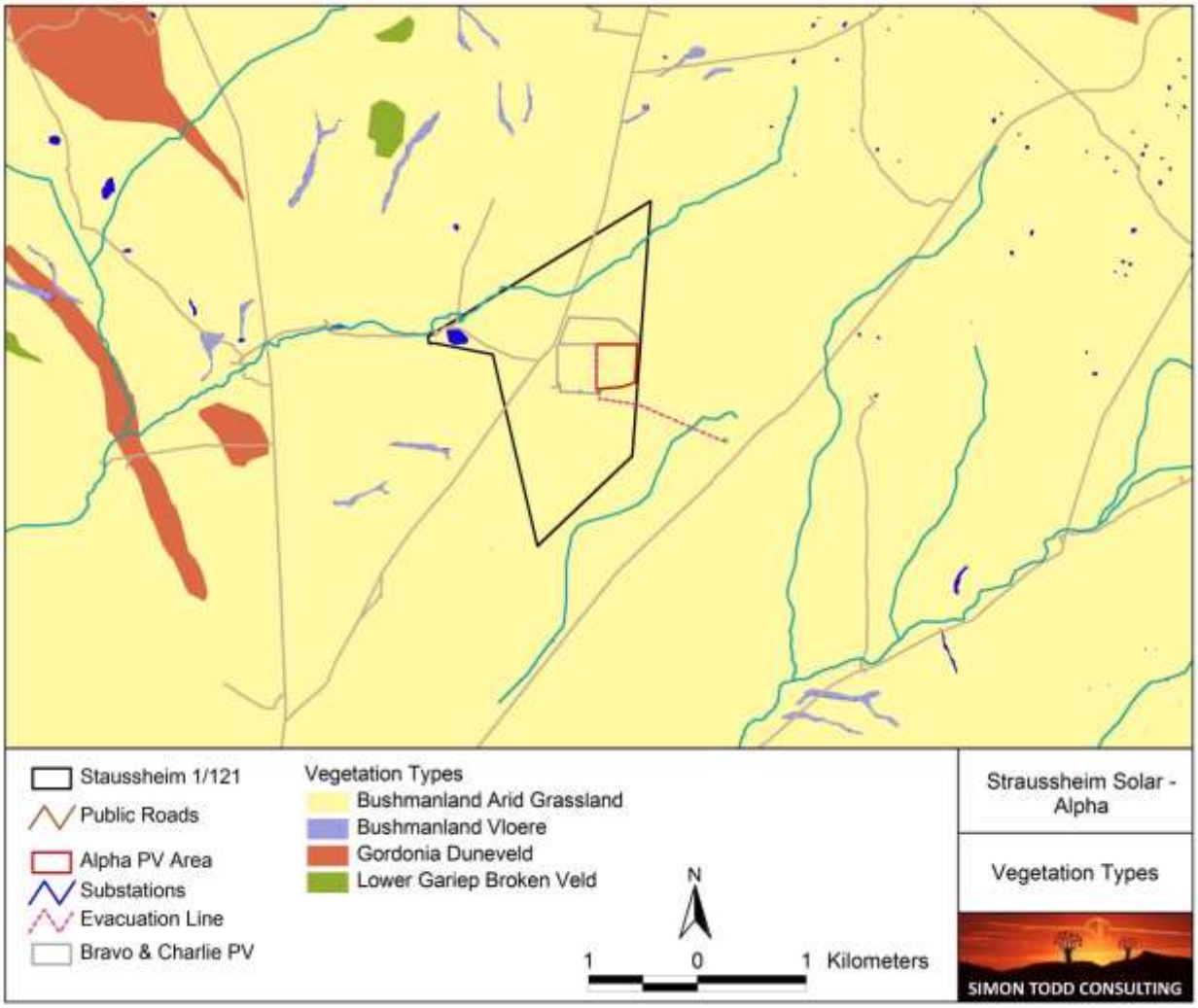

Figure 3: Broad-scale overview of the vegetation in and around the Straussheim site (Todd, 2016)

The vegetation map is an extract of the national vegetation map as produced by Mucina & Rutherford (2006), and also includes rivers and wetlands delineated by the National Freshwater Ecosystem Priority Areas assessment (Nel et al. 2011).

Please refer to the ecological scoping report attached in Appendix E1 for further information in this regard.

2.4 NATIONAL PROTECTED AREA EXPANSION STRATEGY (NPAES) FOR S.A. 2008 (2010)

Considering that South Africa's protected area network currently falls far short of sustaining biodiversity and ecological processes, the NPEAS aims to achieve cost-effective protected area expansion for ecological sustainability and increased resilience to Climate Change. Protected

areas, recognised by the National Environmental Management: Protected Areas Act (Act 57 of 2003), are considered formal protected areas in the NPAES. The NPAES sets targets for expansion of these protected areas, provides maps of the most important protected area expansion, and makes recommendations on mechanisms for protected area expansion.

The NPAES identifies 42 focus areas for land-based protected area expansion in South Africa. These are large intact and un-fragmented areas suitable for the creation or expansion of large protected areas. **There are no NPAES expansion areas that have been identified in close proximity to the site**.

The site does not fall within a National Protected Areas Expansion Strategy Focus Area (NPAES), indicating that the area has not been identified as an area of exceptional biodiversity or of significance for the long-term maintenance of broad-scale ecological processes and climate change buffering within the region.

2.5 CRITICAL BIODIVERSITY AREAS.

According the South African National Biodiversity Institute Biodiversity Geographic Information System (SANBI BGIS) and the Ecological Specialist, Mr Simon Todd, no fine-scale conservation planning has been conducted for the region and as a result, no Critical Biodiversity Areas have been defined for the study area.

Please refer to the ecological scoping report attached in **Appendix E1** for further information in this regard.

2.6 NATIONAL FORESTS ACT (NO. 84 OF 1998):

The National Forests Act provides for the protection of forests as well as specific tree species, quoting directly from the Act: "*no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated".*

According to the SIBIS database, only thee red data-listed plant species are known from the area, *Hoodia officinalis subsp. officinalis* (NT), *Aloe dichotoma* (VU) and *Haworthia venosa subsp. venosa* (VU). Of these, *Aloe dichotoma* can be confirmed present at low density and might be impacted by the development. Although the total number of individuals affected would be low and the affected trees can be transplanted to a safe site outside of the footprint to partly mitigate this impact. There is also a variety of provincially protected species which may be present at the site which would potentially be impacted by the development such as *Boscia foetida subsp. foetida*. However the density and abundance of such species at the site is low and significant impact on any protected species is highly unlikely.

Please refer to the Ecological Scoping Report attached in **Appendix E1** for further information in this regard.

2.7 CONSERVATION OF AGRICULTURAL RESOURCES ACT – CARA (ACT 43 OF 1983):

CARA provides for the regulation of control over the utilisation of the natural agricultural resources in order to promote the conservation of soil, water and vegetation and provides for combating weeds and invader plant species. The Conservation of Agricultural Resources Act defines different categories of alien plants:

- Category 1 - prohibited and must be controlled;
- Category 2 – must be grown within a demarcated area under permit; and
- Category 3 - ornamental plants that may no longer be planted, but existing plants may remain provided that all reasonable steps are taken to prevent the spreading thereof, except within the flood lines of water courses and wetlands.

The abundance of alien plant species on the AMDA Alpha PV Energy Facility site is very low, which can be ascribed mainly to the aridity of the site.

The Department of Agriculture, Land Reform and Rural Development is guided by Act 43 of 1983.

In order to comply with their mandate in terms of this legislation, the developer must take care of the following:

Article 7.(3)b of Regulation 9238: CONSERVATION OF AGRICULTURE RESOURCES, 1983 (Act 43 of 1983)

Utilisation and protection of vleis, marshes, water sponges and water courses

- 7.(1) “no land user shall utilize the vegetation in a vlei, marsh or water sponge or within the flood area of a water course or within 10 meters horizontally outside such flood area in a manner that causes or may cause the deterioration of or damage to the natural agriculture resources.”
- (3)(b) “cultivate any land on his farm unit within the flood area of a water course or within 10 meters horizontally outside the flood area of a water course”

The proposed AMDA Alpha layout has been developed in such a manner as to insure its impacts in terms of article 7 of CARA are kept to an absolute minimum.

2.8 NORTHERN CAPE NATURE CONSERVATION ACT, NO. 9 OF 2009:

The Northern Cape Nature Conservation Act provides inter alia for the sustainable utilisation of wild animals, aquatic biota and plants as well as permitting and trade regulations regarding wild fauna and flora within the province. In terms of this act the following section may be relevant with regards to any security fencing the solar development may require.

Manipulation of boundary fences: *19. No Person may –*

(a) erect, alter, remove or partly remove or cause to be erected, altered, removed or partly removed, any fence, whether on a common boundary or on such person’s own property, in such a manner that any wild animal which as a result thereof gains access or may gain access to the property or a camp on the property, cannot escape or is likely not to be able to escape therefrom.

It is recommended that the perimeter fencing around the solar development site will be constructed in a manner which allows for the passage of small and medium sized mammals: The biodiversity specialist will make recommendations with regard to the specific fencing configuration during the EIA phase of this project.

Please refer to the Ecological Scoping Report attached in **Appendix E1**.

2.9 THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or the Bonn Convention) is an intergovernmental treaty and is the most appropriate instrument to deal

with the conservation of terrestrial, aquatic and avian migratory species. The convention includes policy and guidelines with regards to the impact associated with man-made infrastructure. CMS requires that parties (South Africa is a signatory) take measures to avoid migratory species from becoming endangered (Art II, par. 1 and 2) and to make every effort to prevent the adverse effects of activities and obstacles that seriously impede or prevent the migration of migratory species i.e. power lines (Art 111, par. 4b and 4c).

2.10 THE AGREEMENT ON THE CONVENTION OF AFRICAN-EURASIAN MIGRATORY WATER BIRDS

The Agreement on the Conservation of African-Eurasian Migratory Water birds (AEWA) is an intergovernmental treaty dedicated to the conservation of migratory waterbirds and their habitat across Africa, Europe, the Middle East Central Asia, Greenland and the Canadian Archipelago. The AEWA covers 255 species of birds ecologically dependent on wetlands for at least part of their annual cycle and is a legally binding agreement by all contracting parties (South Africa included) to guarantee the conservation of migratory waterbirds within their national boundaries through species and habitat protection and the management of human activities.

2.11 THE NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT

The National Environmental Management: Biodiversity Act (No. 10 of 2004, NEMBA) regulations on Threatened and Protected Species (TOPS) provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities. The national Act and several sets of provincial conservation legislation provide for among other things, the management and conservation of South Africa's biodiversity; protection of species and ecosystems that necessitate national protection and the sustainable use of indigenous biological resources.

2.12 GUIDELINES TO MINIMISE THE IMPACTS ON BIRDS OF SOLAR FACILITIES AND ASSOCIATED INFRASTRUCTURE IN SOUTH AFRICA

The "Guidelines to minimise the impact on birds of Solar Facilities and Associated Infrastructure in South Africa" (Smit, 2012) is perhaps the most important (although not legally binding) document from an avifaunal impact perspective currently applicable to solar development in South Africa. The guidelines are published by BirdLife South Africa (BLSA) and detail the recommended procedure for conducting an avifaunal specialist study as well as list all of the potential impacts of interactions between birds and solar facilities and associated infrastructure. We are aware of changes to the BirdLife South Africa best-practise guidelines recently published at the Birds and Renewable Energy Forum in Johannesburg (2015) and although the revised requirements are still a work in progress and have not yet been ratified, they will inform this assessment where applicable.

2.13 NATIONAL HERITAGE RESOURCES ACT

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). South African National Heritage Resources Agency (SAHRA) is the enforcing authority in the Northern Cape, and is registered as a Stakeholder for this environmental process.

In terms of Section 38 of the National Heritage Resources Act, SAHRA will comment on the detailed Heritage Impact Assessment (HIA) where certain categories of development are proposed. Section 38(8) also makes provision for the assessment of heritage impacts as part of an EIA process.

The National Heritage Resources Act requires relevant authorities to be notified regarding this proposed development, as the following activities are relevant:

- *the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- *any development or other activity which will change the character of a site exceeding 5 000 m² in extent;*
- *the re-zoning of a site exceeding 10 000m² in extent.*

Furthermore, in terms of Section 34(1), no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the SAHRA, or the responsible resources authority.

Nor may anyone destroy, damage, alter, exhume or remove from its original position, or otherwise disturb, any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority, without a permit issued by the SAHRA, or a provincial heritage authority, in terms of Section 36 (3).

In terms of Section 35 (4), no person may destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object, without a permit issued by the SAHRA, or the responsible resources authority.

Please refer to the following appendices for further issues in this regard:

- Archaeology Scoping Report (Nilssen, 2016) – Appendix E3
- Palaeontology Desktop Study (Almond, 2016) – Appendix E4
- Integrated Heritage Study (de Kock, 2016) – Appendix E5

Furthermore, the South African Heritage Resources Authority (SAHRA) have been registered as a key stakeholder in this environmental process.

2.14 NATIONAL WATER ACT, NO 36 OF 1998

Section 21c & i of the National Water Act (NWA) requires the Applicant to apply for authorisation from the Department of Water and Sanitation for an activity in, or in proximity to any watercourse. Such an application would be required for any access road or PV infrastructure that crosses any watercourse.

Section 21(a) of the National Water Act is related to the abstraction of water from .a water resource (including abstraction of groundwater). A Water Use Licence (WUL) would be required for such abstraction.

Water required for the construction and operation of the AMDA Alpha PV Energy Facility is to be sourced from Kai !Garib Local Municipality. In Future, should the project consider abstraction from a water resource for the purposes of construction or operating of the facility, such abstraction will likely require a licence in terms of Section 21(a) of the NWA.

The ecologist has identified some medium sensitivity Ephemeral washes on the site. The crossing of these with infrastructure associated with the facility will likely require a licence in terms of section 21(i) and (c) of the National Water Act.

The Department of Water and Sanitation have been registered as a key stakeholder in this environmental process.

2.15 Astronomy Geographic Advantage Act, 2007 (Act No 21 Of 2007)

The purpose of the Act is to preserve the geographic advantage areas that attract investment in astronomy. The entire Northern Cape Province, excluding the Tsantsabane Municipality, has been declared an astronomy advantage area. The Northern Cape optical and radio telescope sites were declared core astronomy advantage areas. The Act allowed for the declaration of the Southern Africa Large Telescope (SALT), Meerkat and Square Kilometre Array (SKA) as astronomy and related scientific endeavours that has to be protected.

The South African SKA Project Office have been registered as a key stakeholder on this environmental process and have provided comment on this environmental process and concluded the following:

- The location of the proposed facilities has been provided for in the form of a Google Earth shapefile,
- The nearest SKA station has been identified as SKA 2362, at approximately 25 km from the proposed installation;
- Based on distance to the nearest SKA station, and the information currently available on the detailed design of the PV installations, these facilities poses a **medium to high risk** of detrimental impact on the SKA;
- Any transmitters that are to be established, or have been established, at the site for the purposes of voice and data communication will be required to comply with the relevant AGA regulations concerning the restriction of use of the radio frequency spectrum that applies in the area concerned;
- As a result of the medium to high risk associated with the multiple photovoltaic facilities, significant mitigation measures would be required to lower the risk of detrimental impact to an acceptable level. The SKA project office recommends that further EMI and RFI detailed studies be conducted as significant mitigation measures would be required to lower the risk of detrimental impact to an acceptable level. The South African SKA Project Office would like to be kept informed of progress with this project, and reserves the right to further risk assessments at a later stage.

The project developers have committed to undertaking these studies prior to construction in order to determine the type and level of mitigation measures required satisfy the requirement of the SKA. Please refer to technical report attached in **Annexure E8**. AMDA Developments have confirmed the following:

- This project is within the AGAA demarcated areas and in order to ensure that the proposed facility will comply with the electromagnetic and radio frequency interference limitations in the AGAA, the appropriate precautions will be implemented.
- Prior to any construction or site preparation taking place, appropriate Electromagnetic Interference (EMI) studies will be conducted by the Developer and the appropriate risk mitigation measures instituted in order to mitigate the risk of Electromagnetic Interference on the SKA.
- The risk associated with radio frequency interference on the SKA will be confirmed by measurement following construction of the facility and the appropriate risk mitigation measures instituted in order to mitigate the risk of radio frequency interference on the SKA.

Furthermore, AMDA Developments are in direct contact with SKA SA to determine exactly which portions of these studies need to take place as part of the Environmental Process and which studies need to take place at a later stage.

2.16 ENVIRONMENTAL IMPACT ASSESSMENT GUIDELINE FOR RENEWABLE ENERGY PROJECTS

The Minister of Environmental Affairs published the Environmental Impact Assessment Guideline for Renewable Energy in terms of section 24J of the National Environmental Management Act, 1998 (Act No. 107 of 1998) on 16 October 2016.

In pursuit of promoting the country's Renewable Energy development imperatives, the Government has been actively encouraging the role of Independent Power Producers (IPPs) to feed into the national grid. Through its Renewable Energy IPPs Procurement Programme, the DoE has been engaging with the sector in order to strengthen the role of IPPs in renewable energy development. Launched during 2011, the IPPs Procurement Programme is designed so as to contribute towards a target of 3 725MW, and towards socio-economic and environmentally sustainable development, as well as to further stimulate the renewable industry in South Africa.

In order to facilitate the development of first phase IPPs procurement programme in South Africa, these guidelines have been written to assist project planning, financing, permitting, and implementation for both developers and regulators. The guideline is principally intended for use by the following stakeholder groups:

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

This guideline aims to ensure that all potential environmental issues pertaining to renewable energy projects are adequately and timeously assessed and addressed as necessary so as to ensure sustainable roll-out of these technologies by creating a better understanding of the environmental approval process for renewable energy projects.

The guidelines list the following possible environmental impacts associated with the development of solar energy facilities.

Table 2: Potential environmental impacts of solar energy projects (Adapted from DEA, 2015)

Impact Description	Relevant Legislation
Visual Impact – Specialist input attached in Annexure E7.	NEMA
Noise Impact (CSP) – Not applicable, as CSP is not considered as a technology alternative.	NEMA
Land Use Transformation (fuel growth and production) – Not Applicable to PV. Agricultural specialist input however attached in Appendix E2	NEMA, NEMPAA, NHRA
Impacts on Cultural Heritage – Integrated heritage input attached in Appendix E5.	NEMA, NHRA
Impacts on Biodiversity – Biodiversity specialist input attached in Appendix E1	NEMA, NEMBA, NEMPAA, NFA
Impacts on Water Resources – The project will obtain water directly from the local municipality. The municipality will provide confirmation of availability in	NEMA, NEMICMA, NWA, WSA

Impact Description	Relevant Legislation
this regard.	
Hazardous Waste Generation (CSP and PV) – The EMPr will make provision for damaged and defunct PV infrastructure for dismantling and re-use.	NEMA, NEMWA, HAS
Electromagnetic Interference – SKA has provided comment in this regard.	NEMA
Aircraft Interference – The SA CAA have been automatically registered as an interested and affected party on this environmental process.	NEMA, MSA
Loss of Agricultural Land – Agricultural specialist input is attached in Appendix E2	SALA
Sterilisation of mineral resources – The Department of Mineral resources has been registered as an I&AP on this environmental process.	MPRDA

Assuming an IPP project triggers the need for Basic Assessment (BA) or scoping environmental Impact Assessment (S&EIA) under the EIA regulations, included in the assessment process is the preparation of an environmental management programme (EMPr). Project-specific measures designed to mitigate negative impacts and enhance positive impacts should be informed by good industry practice and are to be included in the EMP. Potential mitigation measures for solar energy projects include but are not limited to:

- Conduct pre-disturbance surveys as appropriate to assess the presence of sensitive areas, fauna, flora and sensitive habitats;
- Plan visual impact reduction measures such as natural (vegetation and topography) and engineered (berms, fences, and shades, etc.) screens and buffers;
- Utilise existing roads and servitudes as much as possible to minimise project footprint;
- Site projects to avoid construction too near pristine natural areas and communities;
- Locate developments away from important habitat for faunal species, particularly species which are threatened or have restricted ranges, and are collision-prone or vulnerable to disturbance, displacement and/or habitat loss;
- Fence sites as appropriate to ensure safe restricted access;
- Ensure dust abatement measures are in place during and post construction;
- Develop and implement a storm water management plan;
- Develop and implement waste management plan; and
- Re-vegetation with appropriate indigenous species to prevent dust and erosion, as well as establishment of alien species.

The recommendations of these guidelines have been used to draft the Scoping Report, and will be incorporated into the Environmental Impact Report and the Environmental Management Programme.

2.17 Sustainability Imperative

The norm implicit to our environmental law is the notion of sustainable development ("SD"). SD and sustainable use and exploitation of natural resources are at the core of the protection of the environment. SD is generally accepted to mean development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. The evolving elements of the concept of SD *inter alia* include the right to develop; the pursuit of equity in the use and allocation of natural resources (the principle of intra-generational equity) and the need to preserve natural resources for the benefit of present and future generations. Economic development, social development and the protection of the environment are considered the pillars of SD (the triple bottom line).

"*Man-land relationships require a holistic perspective, an ability to appreciate the many aspects that make up the real problems. Sustainable planning has to confront the physical, social, environmental and economic challenges and conflicting aspirations of local communities. The imperative of sustainable planning translates into notions of striking a balance between the many competing interests in the ecological, economic and social fields in a planned manner. The 'triple bottom line' objectives of sustainable planning and development should be understood in terms of economic efficiency (employment and economic growth), social equity (human needs) and ecological integrity (ecological capital).*"

As was pointed out by the Constitutional Court, SD does not require the cessation of socio-economic development but seeks to regulate the manner in which it takes place. The idea that developmental and environmental protection must be reconciled is central to the concept of SD - it implies the accommodation, reconciliation and (in some instances) integration between economic development, social development and environmental protection. It is regarded as providing a "conceptual bridge" between the right to social and economic development, and the need to protect the environment.

Our Constitutional Court has pointed out that the requirement that environmental authorities must place people and their needs at the forefront of their concern so that environmental management can serve their developmental, cultural and social interests, can be achieved if a development is sustainable. "*The very idea of sustainability implies continuity. It reflects the concern for social and developmental equity between generations, a concern that must logically be extended to equity within each generation. This concern is reflected in the principles of inter-generational and intra-generational equity which are embodied in both section 24 of the Constitution and the principles of environmental management contained in NEMA.*" [Emphasis added.]

In terms of NEMA sustainable development requires the integration of the relevant factors, the purpose of which is *to ensure that development serves present and future generations.*[2]

It is believed that the proposed 75MW AMDA Alpha PV Facility supports the notion of sustainable development by presenting a reasonable and feasible alternative to the existing vacant land use type, which has limited agricultural potential due the lack of water and infrastructure.

Furthermore the proposed alternative energy project (reliant on a natural renewable resource – solar energy) is in line with the national and global goal of reducing reliance on fossil fuels, thereby providing long-term benefits to future generations in a sustainable manner.

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2 See definition of "sustainable development" in section 1 of NEMA.

3 ACTIVITY

The proposed photovoltaic (PV) SEF will have a net generating capacity of 75 MW_{AC} with an estimated maximum footprint of ± 250 ha. A preliminary study area of ± 900 ha was identified by the Project Developer with input from the EAP and Ecological Specialist. Following this, ecological, agricultural, visual and archaeological experts were appointed to undertake their baseline assessments and sensitivity analysis on the site. This sensitivity plan has been used to determine the exact layout / position of the proposed PV footprint.

The technology under consideration is photovoltaic (PV) modules mounted on either of fixed or tracking structures. Other infrastructure includes inverter stations, internal electrical reticulation, internal roads, an on-site switching station / substation, a 132 kV overhead (OH) transmission line, auxiliary buildings, construction laydown areas and perimeter fencing and security infrastructure. The on-site switching station / substation will locate the main power transformer/s that will step up the generated electricity to a suitable voltage level for transmission into the national electricity grid, via the OH line. Auxiliary buildings include, *inter alia*, a control building, offices, warehouses, visitors centre, staff lockers and ablution facilities and gate house and security offices.

Figure 4: Proposed Facility layout showing access road and evacuation line

An engineering layout report is attached in Appendix E6. Please refer to this report for further information regarding the proposed activity.

4 SITE SELECTION MATRIX

Please refer to the site selection process report as provided by AMDA Developments and attached in Annexure G7. The following is summarised from this document.

In choosing a site for the development of a solar PV project the developer, go through a process of evaluating a number of possible alternative sites in terms of the criteria that would make a viable site worth bidding in the competitive Department of Energy's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

The REIPPPP is a very competitive program and a site that is marginally less suitable from a solar resource or development cost perspective has less chance of securing a successful bid. Therefore the developers, put a lot of effort into evaluating and selecting the best available sites.

The Department of Environmental Affairs, together with other State Departments has gone through a Strategic Environmental Assessment process which has resulted in the creation of Renewable Energy Development Zones (REDZ). These REDZ's are a guideline as to where it is appropriate to develop renewable energy projects and the development of renewable energy projects is not restricted only to these areas. It is therefore still important to evaluate individual sites within or across these REDZ's and other areas to determine and select the most competitive sites.

The main criteria used in the evaluation of the alternative development sites are; a good solar resource, proximity to Eskom grid access, Eskom grid capacity, a flat open site, sufficient development space, no mountains nearby, low value land, low agricultural potential, low environmental sensitivity, availability of water and the land must be available for development.

A good solar resource. Most sites in or near the Kalahari have a very good solar resource and the resource reduces as you move away from this area. For example, the solar resource at Kenhardt in the Northern Cape is 8 – 10% better than at Beaufort Wet in the Western Cape. This difference makes it very difficult to do a competitive bid at Beaufort West.

A site should preferably be adjacent to or close by to a point where it can connect to the Eskom grid. Connection lines of up to a few kilometres can still be competitive.

The Eskom grid has to have the capacity at the grid connection point to evacuate the power from the project. If any extensive grid strengthening needs to be done to evacuate the power this grid upgrade is done at the cost of the project and thus the project is unlikely to be competitive.

Also at issue here is that the time taken to select, sign up, permit and bid a project is usually longer than the interval between successive REIPPPP bids. There is thus the risk that other projects might take up the available grid capacity in the time the project is being permitted and the project might have to be abandoned.

The project design and layout can be optimized on a flat open site as no special or expensive adjustments need to be made for shadow effects between the various components. The proximity of mountains can reduce the yield at a site. Land with a gentle northwards slope is also suitable.

Sufficient space allows for the optimization of the layout, but more importantly if there is sufficient space for multiple projects economies of scale can lead to very competitive bids.

Land with a high agricultural potential should not be used for the development of a solar PV project as food security outranks energy security.

A site with a low land value will allow a cost effective lease price and hence a more competitive bid.

Sites without any significant environmental sensitivities allow for development optimization without any costly layout constraints or design precautions. Environmental sensitivities include floral, faunal sensitivities as well as the existence or proximity to water courses or wetlands.

Water is needed for the construction and operational stages of a project. The solar PV projects use a low volume of water during the operational phase and so securing this water is usually not an issue. During the construction stage more water is needed and the water often needs to be obtained from distant sources and transported.

5 NEED AND DESIRABILITY

In keeping with the requirements of an integrated Environmental Impact process, the DEA&DP [3]*Guidelines on Need and Desirability (2010 & 2011)* were referenced to provide the following estimation of the activity in relation to the broader societal needs. The concept of need and desirability can be explained in terms of its two components, where *need* refers to *time* and *desirability* refers to *place*. Questions pertaining to these components are answered in the Sections below.

The section 1.1 above considers the overall need for alternative, so-called 'green energy' in light of the known environmental burdens associated with the impact of coal power generation through which most of our country's electricity is currently being generated. Associated aspects such as air pollution, water use and carbon tax are discussed in order to further explain the need and desirability for 'green energy' projects in general.

5.1.1 Feasibility consideration

The commercial feasibility for the proposed 75MW$_{AC}$ AMDA Alpha PV Energy Facility to be built on private land near Kenhardt, has been informed by its contextual location, and economic, social and environmental impacts and influence. The project has gathered sufficient information and commissioned various studies of the site and the region to make qualified and reliable assumptions on the project's various impacts.

5.1.2 Solar Resource & Energy Production

The arid climate experienced in the Northern Cape lends itself to the availability of high levels of solar energy. Considering the steady nature of the solar radiation at the AMDA Alpha site, the resource is sufficient to guarantee a positive return on investment.

5.1.3 Solar Farm & Grid Connection

Among the outstanding characteristics of the AMDA Alpha PV Energy Facility site is its exceptionally flat nature, sufficient non sensitive environments and accessible location, facilitating the delivery of bulky PV Panel infrastructure, and the construction and assembly process. The proximity of the site to the R27 decreases the impact on secondary roads and natural habitat from the traffic going to and from the solar facility during construction and operations. The proximity of the Niewehoop Sub Station also allows for connection via a relatively short transmission line. As the site is not used for intensive agricultural purposes, the solar facility will not interfere with the agricultural productivity of the area (an agricultural specialist has been commissioned to confirm this)

5.1.4 Social impact

The Northern Cape region is economically challenged due to its arid climate, challenging agricultural conditions, lack of water and limited natural resources (away from the Orange River). The Northern Cape is well-known for the large number of copper and zinc mines in the area, but since the early 1990's, many of these mines have closed down, leaving a devastating trail of unemployment behind. The local economy, mainly supported by limited agriculture, simply isn't enough to accommodate the high level of unemployment.

Private sector development is seen to offer opportunities to access Enterprise Development funds of the main mining groups. This can contribute to entrepreneurial activities linked to their supply

[3] The Western Cape Provincial guidelines on Need and Desirability were considered in the absence of National and Northern Cape Guidelines.

chain (Kai !Garib SDF, 2010). The same applies to the investment, in terms of employment opportunities and entrepreneurial activities, associated with renewable energy projects.

Power generation is one of the rare growth opportunities for the Northern Cape due to the high solar irradiation levels and its strategic position relative to the National Transmission Network. This setup creates unprecedented growth opportunities for the area and the establishment of a **renewable energy project is considered important to diversify and compliment the economic development of the region**.

5.1.5 Employment & Skills Transfer

The benefits of renewable energy facilities to local regions are not confined to the initial investment in the project. They also provide a reliable and on-going income for landowners and municipality, creating direct employment opportunities for locals, as well as flow-on employment for local businesses through provision of products and services to the project and its employees.

The AMDA Alpha PV Energy Facility will have a positive impact on local employment. During the estimated 18 month construction phase, the project will **employ approximately 40-50 people** of various qualifications. The majority will be provided by the local labour market. During operations, the solar facility is expected to have **6-10 permanent employees** ranging from security staff to administration and artisans. Due the fact that there is no skilled labour in the field of renewable energy as yet, the employment structure will consist of local and overseas capacity. To guarantee successful operations over the lifetime of the investment, the AMDA Alpha PV Energy Facility will use the skills of outside labour to **cross-train local specialists**. This cross training and skills development will take place especially in the area of technical maintenance and administration.

The economic impact of the proposed AMDA Alpha PV Energy Facility reflects expenditures related to the construction and operation. These activities will increase economic activity within the region and province.

5.1.6 need (time)

Is the land use considered within the timeframe intended by the existing approved Spatial Development Framework (SDF)? (I.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP?

Yes, 'the employment of renewable energy technology' / development has a spatial strategic place in the Kai !Garib Municipality SDF while the need for a policy on the development of sustainable solar energy farms has been identified as Key Development Priority / Project.

Should the development occur here at this point in time?

Yes, the proposed AMDA Alpha PV Energy Facility is to be located outside the Kenhardt urban edge, would provide a welcomed diversification to the local economy and perhaps serve as a catalyst for further expansion in the stream of sustainable renewable energy development (identified as a priority development strategy IDP & SDF).

Does the community / area need the activity and the associated land use concerned?

The Kai !Garib Municipality identified the opportunity for a renewable energy project through their SDF and IDP processes, which include public participation. The proposed renewable energy development will allow for a diversification of employment, skills and contribute to the potential development of small business associated with its construction, operation and maintenance activities.

From the location near Kenhardt the proposed solar farm will contribute electricity to the constrained Northern Cape and National electrical network, contributing to a provincial and national need. The AMDA Alpha PV Energy Facility has been designed to in such a way as to avoid or minimize potential negative impacts of the local environment while enhancing potential positive impacts, locally and regionally.

Are the necessary services with adequate capacity currently available?

Some existing, some new. The AMDA Alpha PV Energy Facility development requires the installation of a 132 kV overhead transmission line to connect to the Niewehoop Sub Station (feed into the national grid system), as well as an access road to the development site from the existing provincial gravel road via the R227. The cost of supplying the new infrastructure will be covered by the Applicant. The bird-friendly additions to the proposed new powerline will have a net benefit to the existing line, through minimizing bird collisions and electrocutions.

The water required for the construction and operation of the solar facility will be sourced from the Kai !Garib Municipality and will be supplemented by stored rainwater (The applicant is engaging directly with the municipality to confirm the municipalities water supply capacity and their capability of providing water for this development).

Construction waste will be disposed of at an existing landfill site. The applicant must engage with the municipality to identify an applicable licensed site that has sufficient capacity.

Is this development provided for in the infrastructure planning of the municipality?

Yes. Attracting private investment and the employment of renewable energy development are identified as priority strategies to create sustainable urban and rural settlements.

Is this project part of a national programme to address an issue of national concern or importance?

Yes. In order to meet the increasing power demand within South Africa, Eskom has set a target of 30% of all new power generation to be derived from independent power producers (IPPs). AMDA Alpha (Pty) Ltd. is one such IPP which intends to generate not exceeding 75MW (megawatts) of Alternating Current (AC) electricity from the proposed Solar Farm, for input into the national grid (via the Niewehoop Sub-Station).

5.1.7 Desirability (place)

Is the development the best practicable environmental option for this land / site?

The target property is outside the Kenhardt Urban Edge and as such may not be considered for an alternative land use such as urban development. The property has a poor agricultural potential due to the arid climate and soil conditions. These factors have rendered the property vacant with limited land use option alternatives. Since Photovoltaic solar facilities have a limited footprint, the physical impact on receiving environment would be low, while the remaining undeveloped areas may rehabilitate to their natural state in time and remain protected as such.

Would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?

No. According to the Kai !Garib Municipality IDP, attracting Renewable Energy Investment is seen as an IDP Strategy and economic driver to alleviate unemployment and poverty and “to ensure sustainable economic and social transformation in the District”. The performance of which would be reflected in the development of a Renewable Energy Strategy and Policy for the District by 2013 (IDP, 2012-2016).

Would the approval of this application compromise the integrity of the existing approved environmental management priorities for the area?

Unlikely. According to the national vegetation map (Mucina & Rutherford 2006), the solar development site lies entirely within a vegetation type that is classified as Least Threatened (Ecosystems that cover most of their original extent and which are mostly undamaged, healthy and functioning). Considering the extent of this relatively intact ecosystem type, and the fact that the site is not highly sensitive (there are no unique, threatened or otherwise unique habitats present which are not widely available in the wider landscape), it can withstand some loss of natural area through development.

Do location factors favour this land use at this place?

Yes. The Northern Cape region has been identified as being one of the most viable for Solar energy generation due to the following factors:

- Excellent solar radiation (compared to other regions).
- Close to existing main transport routes and access points.
- Close to connection points to the local and national electrical grid.
- Outside Critical Biodiversity areas.

The ecological sensitive areas on and surrounding the solar site have informed the optimal location and layout for the proposed solar project, with minimal impact to the receiving environment, subject to implementation of mitigation measures.

How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas?

The alternatives considered for the solar development have been iteratively designed and informed by various investigations and assessments that considered both the natural and cultural landscapes. The natural and cultural sensitive areas have been identified and where possible, avoided to prevent negative impacts on such areas.

How will the development impact on people's health and wellbeing?

The site is located outside of the Kenhardt urban edge and as a result is unlikely to impact negatively on the community's health and wellbeing.

Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?

Unlikely. The next best land use alternative to the solar facility is limited agriculture (the status-quo). However, the proposed solar development site does not have any significant agricultural value and has not been utilized for any intensive agricultural purposes. The site is too small to generate noteworthy financial benefit from agricultural activities. The development of the proposed solar facility would constitute the loss of less than 250ha of the overall property. The economic benefits and opportunities that the proposed solar development holds for the landowner and the local economy of the municipal area cannot be recovered from the current or potential agricultural activities.

The opportunity costs in terms of the water-use requirements of the solar facility are within acceptable bounds if one considers the confirmed capacity from the local authority and minimal demand on the resources.

Will the proposed land use result in unacceptable cumulative impacts?

Unlikely. Due to the fact that Northern Cape has been identified as an area with high potential for renewable energy generation: solar irradiation and availability of vast tracts of land with low sensitivity, there are a number of on-going applications in the region already. The potential for further, future solar developments in the area cannot be discounted (as a large number have already been approved or are in progress). However these will have synergistic benefits for the economy and growth of the area, while the contribution to cumulative habitat loss in the area associated with this and potential future solar development would be relatively small in relation to the land resources available, with low impacts restricted to the local area.

6 SOCIO ECONOMIC CONTEXT OF THE KAI !GARIB MUNICIPAL AREA

Information displayed in this section, unless otherwise indicated, was obtained from the 2013/14 Integrated Development Plan (IDP) of the Kai !Garib Municipality (Kai !Gabib IDP, 2013/14).

According to the Kai !Garib Municipal IDP, there are approximately 23 245 households in the Municipal area. The 2011 census conducted by Stats-SA reported that the total population of Kai !Garib is 93 494. The population of the Municipality has increased by 2.5% between 2002 and 2012. The IDP states that the increase in population figures from 78 393 in 2008 to 93 494 in 2011 is a result of an overall influx of people from other parts of South Africa and Africa. It is expected that with a further increase of 2.5% between 2012 and 2022, the population will be ±116 868. Currently the population constitute 49.3% male and 50.7% female.

According to the IDP 26.9% of the inhabitants are economically active and 14 486 households are subsidized by the services subsidy scheme. Approximately 23% of the labour force is unemployed and a large number of residents are dependent on government pensions, which mean that they earn less than R1 280 per month. This has a negative impact on payment of services.

The Kai !Garib Spatial Development Framework (SDF) of 2009 indicates the racial composition of the Municipal area to be as follows:

- 66.3% Coloured;
- 19.2% Black;
- 14.4% White; and
- 0.1% Indian.

The potentially economically active population of Kai !Garib comprises approximately 67% of the total population. The fastest growing economic sectors which can be exploited for future job creation in the Municipal area are:

- Agriculture;
- Electricity and Water; and
- Mining.

The table below shows the employment status of the potentially economically active population of Kai !Garib:

Table 3: Employment statistics for the Kai !Garib Municipal area (IDP)

Total Potential Economically Active Population (Ages 15- 64)	**67 127**
Employed	45%
Unemployed	16%
Not working / other	39%

Total economically active population	**40 894**
Employed	75%
Unemployed	25%

The following service backlogs are indicated in the Kai !Garib IDP (2013/14):

- ±5% of households does not have services for sewerage and sanitation;
- 3% of households are not serviced for water; and
- 4% of households do not have waste removal

The housing statistics for Kai !Garib are as follows:

Table 4: Housing statistics for Kai !Garib Municipal Area

Number of Households	
Formal Structures	17 479 (72%)
Informal Structures	6 182 (35%)
Informal Back Yard	718 (3%)

According to the Kai !Garib IDP (2013/14) there are no houses within the 14 Wards of the Municipal area that are not serviced for electricity.

Various solar development opportunities have been identified for the Kai !Garib Municipal area, which the Municipality identified as Anchor economic activities. The Upington area is regarded to be one of the most ideal areas for solar energy generation and by utilising these opportunities the Municipality would be able to create substantial job opportunities for local communities.

7 CONSIDERATION OF ALTERNATIVES

The proposed AMDA Aplha PV Energy Facility is to consist of solar photovoltaic (PV) technology with fixed, single or double axis tracking mounting structures, with a net generation (contracted) capacity of 75MW_{AC} (MegaWatts - Alternating Current) (and up to 90MW_{DC} Direct Current installed/nameplate capacity), as well as associated infrastructure, which will include:

- On-site switching-station / substation;
- Auxiliary buildings (gate-house and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.);
- Inverter-stations, transformers and internal electrical reticulation (underground cabling);
- Access and internal road network;
- Laydown area;
- Overhead electrical transmission line / grid connection (connect to the proposed Sekgame substation);
- Rainwater tanks; and
- Perimeter fencing.

During the pre-application stage a number of project footprints and configurations were considered by the applicant and optimised with input from ecological specialists.

7.1 PRELIMINARY DEVELOPMENT ZONE

In July 2015 the applicant defined a preliminary development zone for the proposed development. This took into account the terrain and other technical requirements for the development, with limited ecological impact.

Figure 5: Preliminary Development Zone

7.2 AMENDED DEVELOPMENT ZONE

Mr Simon Todd of then undertook a site visit to determine the ecologically preferable areas on the site for the Development of the facility.

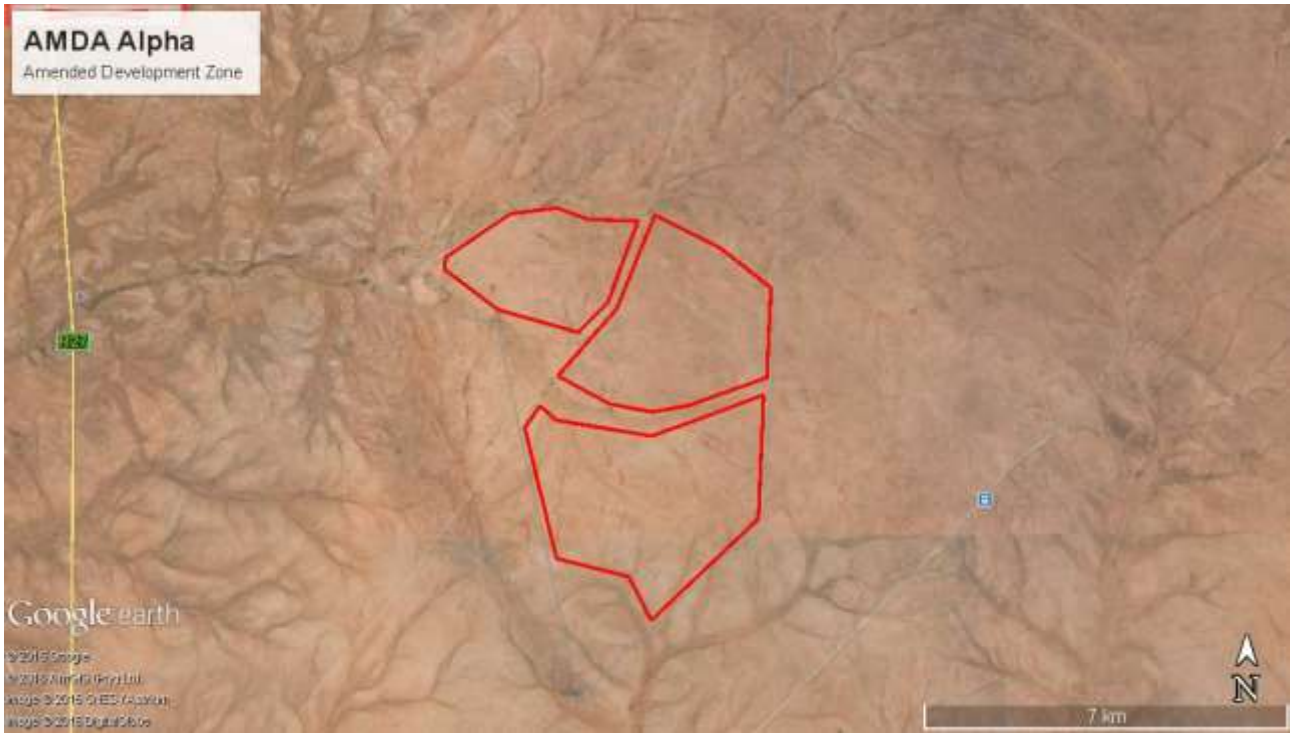


Figure 6: Amended development Zones as defined by ecological specialist

7.3 PREFERRED PROJECT FOOTPRINT

Based on the amended development zones defined by the specialist, the preferred project footprint was developed to fall within the Development zone as defined by the ecological specialist.

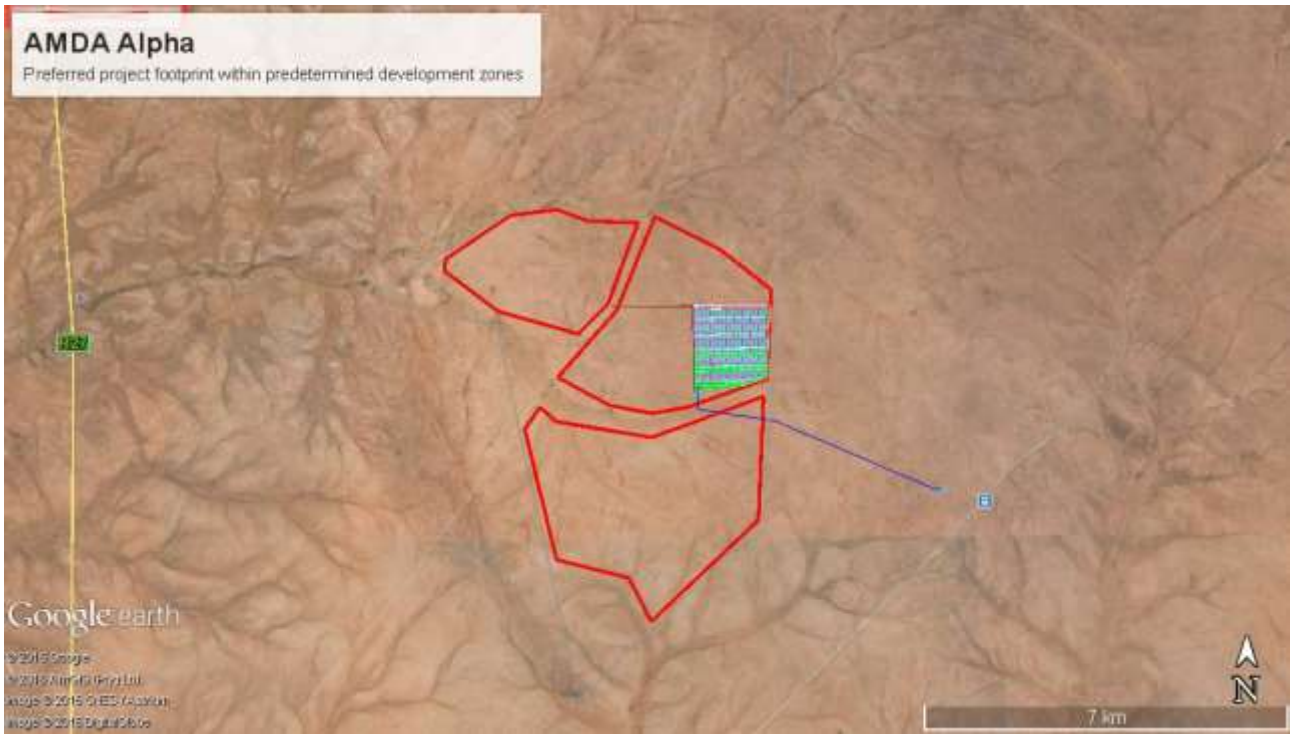


Figure 7: Preferred project footprint within ecologically defined development zone

7.4 MITIGATED PROJECT FOOTPRINT

During the EIR stage, a mitigated project footprint will be developed to avoid any other sensitive features identified by the specialists. These are limited to certain exclusion areas identified by the archaeologist. The design team are busy incorporating these into the design process and this will be presented and assessed in the Draft Environmental Impact Report.

7.5 THE NO-GO ALTERNATIVE

The Status Quo Alternative proposes that the AMDA Alpha PV Energy Facility not go ahead and that the area in proximity to the Niewehoop substation remain undeveloped as it is currently. The land on which the proposed project is proposed is currently vacant. It is currently used for limited cattle grazing activities, however due to a combination of poor soil quality, water scarcity and extreme climatic conditions, it has no potential for irrigated crop cultivation. The area in question is also considered too small to generate noteworthy financial benefit from agricultural activities due to its low carrying capacity.

The solar-power generation potential of the Northern Cape area, particularly in proximity to the existing and proposed substations, is significant and will persist should the no-go option be taken.

The 'No-go/Status Quo' alternative will limit the potential associated with the land and the area as a whole for ensuring energy security locally, as well as the meeting of renewable energy targets on a provincial and national scale. Should the 'do-nothing' alternative be considered, the positive impacts associated with the solar facility (increased revenue for the farmer, economic investment, local employment and generation of electricity from a renewable resource) will not be realised.

The no-go alternative is thus not considered a favourable option in light of the benefits associated with the proposed solar facility, however it will be used as a baseline from which to determine the

level and significance of potential impacts associated with the proposed solar development during the Impact Assessment phase of the on-going environmental process.

8 TECHNICAL OVERVIEW

AMDA developments have prepared Engineering Layout report that is attached in Appendix E6. The following is summarised from this report.

The proposed PV plant will convert the incident solar energy into direct current (DC) electricity by means of photovoltaic modules. The electricity is transferred to DC/AC inverters to convert it to alternating current (AC). The inverters are matched to the selected PV module technology, and in turn are connected to a step-up transformer in order to raise the voltage up to the grid requirements.

The Engineering, Procurement and Construction (EPC) will be carried out by an EPC Contractor in accordance with good engineering practice, with due diligence, care and professionalism. The design of the facility and the selection of equipment will be tailored for the specific site conditions, such as solar resource and climate etc.

Photovoltaic power plants have a wide range of technologies that can be considered for incorporation into the plant. During the EIA and bid process the developer will put out a Request for Offers (RFO) from credible EPC Contractors who will make proposals with respect to the technology to be used and possible equipment suppliers for the PV plant. These include the PV module manufacturer, the type and capacity of the modules, the support structure or tracker type, and manufacturer, the inverter type, etc. Some of these alternatives are discussed in more detail below.

The solar PV industry is a rapidly developing industry and the advances in the general efficiencies of the technology and also the reduction of production costs are such that it would not be feasible to commit to specific technologies and manufacturers at this stage. The average bid price for solar PV projects decreased from R2.75/kWh to about R0.75/kWh between Round 1 in October 2011 and Round 4 in 2015 respectively.

8.1 GENERAL LAYOUT DESIGN CRITERIA

The choice of the technology or more specifically, the PV module and tracker or rack structure is the chief determinant in the layout of the PV plant. Fixed rack structures, single and two axis trackers all have different spatial requirements.

An optimised layout or spatial arrangement of the solar field is prepared based on the performance criteria and spatial requirements of the preferred equipment choices above taking into account the further design criteria listed below.

- 16 m from the centre of any power lines, either they are single power lines or double power lines
- 95 m from the centre of provincial roads (a relaxation to a lesser distance can be sought)
- 16 m to any Telkom line
- A minimum distance of 10 m to the perimeter fence to prevent theft and avoid shadows cast by the fence
- Internal and perimeter service roads of 3m surface width and 5 m reserve width
- A main access road with a 10 m reserve width

8.2 FOUNDATIONS

A geotechnical study will be carried out in order to provide data for the selection of the foundation. Depending on the structure or tracker that is selected, the following foundation options may be considered.

- Mass concrete block foundation
- Ground screw foundation
- Ground bolt foundation
- Concrete pile foundation
- Vibratory driven steel pile foundation

For fixed or rack structures, either driven steel piles or small concrete footings are cast in the ground for the foundations. These concrete foundations are typically of the same size as for small buildings.

The preferred technology for trackers is the vibratory driven steel pile foundation, however given the hard ground conditions expected on the site, a steel pile in concrete in a pre-drilled hole is the more likely foundation solution. A concrete pile may be used.

8.3 STRUCTURES

In order to support the PV modules, a steel structure must be used. There are different options which will be considered: a fixed or rack structure, a 1-axis tracker (horizontal, vertical or polar axis) and a 2-axis tracker. The current trend is towards rack structures or horizontal single axis trackers because of the superior production rates and cost effectiveness.

There are numerous rack and tracker manufacturers in the market, many with proprietary technology and the system chosen will depend on the proposals by the EPC Contractors.

The materials commonly used in support and tracker structures are:

- Galvanized steel
- Stainless steel
- Anodized aluminium

8.3.1 Fixed or rack structures

A typical rack or fixed structure will usually have two rows of 20 modules (2 strings). The modules are placed in portrait arrangement. The foundation technology is usually a direct-driven (rammed) installation, with a ramming depth subject to the soil characteristics.

The design of the fittings for fixing the modules to the rack structures will enable thermal expansion of the metal without transferring mechanical loads that could affect the integrity of the modules. The structure will probably have anti-theft bolts.

8.3.2 Single-axis trackers

With a typical horizontal single-axis tracker the PV modules are attached to beams on the rotating structure. A number of these beams are placed adjacent and parallel to each other and driven by a common rotation mechanism. This allows for a modular design with each tracker module having a single central motor and a number of tracker arms. This simplifies design and allows for an extremely efficient use of space.

The system produces more output than rack structures yet still has extremely low energy consumption.

Precision electronics with GPS input and proprietary positioning algorithms ensure that the PV modules are positioned at an optimum angle to the sun at all times.

8.4 PV MODULES

There are various types of PV modules defined according to the materials and technology used:

- Si-Monocrystalline
- Si-Polycrystalline
- Thin Film
- High Concentrated

There are also a wide range of PV module manufacturers in the market. Currently the trend for utility scale facilities such as this is towards polycrystalline module technology.

In the REIPPPP an important bid criteria is local content and the use of locally manufactured or assembled PV modules to help the local economy, local job creation and the local communities.

The EPC Contractor establishes rigorous quality control procedures for the PV modules suppliers. These procedures are applied from the source of the supply, as well as during the entire supply chain.

Since the environmental impact of the various PV module alternatives will be the same, for the purpose of the EIA, all of the abovementioned film technology alternatives are under investigation.

8.5 INVERTERS

There are various types of inverters defined according to their technology. The inverter will be selected on the basis of making the most of its rated power according to the manufacturer specifications and the power to be installed in each site. The choice of inverter depends on the performance of the PV module chosen (type and model) and the size (capacity).

The number of inverters to be used is determined in a design optimisation process where there is a trade-off between fewer large capacity inverters or more lower capacity inverters widely distributed across the solar field. Typically there would be about 2250 inverters used in a 75MW PV project.

8.6 CONCENTRATOR BOXES

The concentrator boxes are outdoor switchgear boxes or cabinets where the electrical wires from the tracker or rack group are collected. The concentrator boxes are designed for outdoor conditions and are mounted on a concrete base.

8.7 TRANSFORMATION CENTRE

The transformation centre will be a concrete or steel prefabricated structure built to house the transformer and the associated protection devices. In the transformer, voltage level will be transformed from 0.38 kV to 132 kV. This might be done in a single step or in multiple steps, for example from 0.38 kV to 11 kV and then from 11 kV to 132 kV .

The number of transformers to be used is determined in a design optimisation process where there is a trade-off between fewer large capacity transformers or more lower capacity transformers widely distributed across the solar field. Typically there would be about 75 transformers used in a 75MW PV project.

8.8 DISTRIBUTION CENTRE

The distribution centre is where all the medium voltage lines coming from the various transformers are collected. The distribution centre also houses the meters used to measure the electricity produced and exported to the grid. The distribution centre is housed in a pre-fabricated or a steel structure and a MV line runs from here to the collector sub-station and from there to the Eskom substation.

8.9 ELECTRICAL RETICULATION

The electrical reticulation within the PV plant, from the trackers or racks through to the distribution centre will all be underground.

The electrical reticulation will comprise of a Direct Current (DC) component from the PV modules to the inverters and an Alternating Current (AC) component from the inverters to the Eskom connection.

Typically the DC cabling is based on pre-assembled harnesses from each string-end connection up to the concentrator boxes. The harnesses incorporate a first-level over-current protection by means of properly sized line- fuses. The DC cable will be in full compliance with IEC and SANS standards, with single layer of XLP insulation, 90º temperature rating (wet or dry), suited for direct burial installation, rated for 1kV and UV resistant.

Typically, the cables will be sized to ensure a maximum 1.5% voltage drop between PV

modules and inverters.

Typically the AC-MV cable will be in full compliance with IEC, SANS and NRS Standards, with stranded aluminium conductor, triple extruded insulation system and high dielectric strength 22kV insulation. The MV cables will be suited for direct burial, for operation at 105°C continuous, 140°C in emergency and 250°C in short-circuit.

8.10 EVACUATION LINE

The electricity from the PV power plant will be evacuated via a 132kV overhead line to the new collector sub-station on the site and from there to the Eskom grid at their Nieuwehoop sub-station. The connection point for the evacuation line will be determined by the Eskom grid connection requirements and the line will be designed and built to Eskom's standards.

The alignment of the evacuation line will be determined by the proposed grid connection point and any environmental sensitivities between the PV power plant and the grid connection point. The EIA will assess the evacuation line as a corridor, rather than a static line.

8.11 LIGHTINING PROTECTION SYSTEM

To protect the PV plant, equipment and personnel from lightning strikes a lightning protection system composed of masts and surges arresters will be installed. This system will be designed by a specialist and will comply with the South African laws and standards.

Although current lightening protection designs only allow for low height protection on the individual structures, provision has been made in the applications for 15m high conductor masts.

8.12 AUXILARY POWER SUPPLY

The PV plant requires a continuous power supply for the operation of the plant. This is for the plant monitoring and control systems, the perimeter and security systems, lights and air-

conditioning etc for the buildings. Also if trackers are used, a small supply is required for the operation for the trackers.

The most cost effective and efficient source is for the auxiliary power supply is usually directly from the Eskom sub-station. AN 11kV supply line will be brought from the Eskom sub-station back to the project site.

8.13 EMERGENCY POWER SUPPLY

In order to ensure the continuous operation of the monitoring system and security a backup diesel generator system, with at least 2 hours of autonomy, is usually installed.

8.14 MONITORING & CONTROL SYSTEMS

A SCADA (Supervisory Control And Data Acquisition) system will be installed. The primary purpose of SCADA is to monitor, control and alarm plant or regional operating systems from a central location. While override control is possible, it is infrequently utilized.

There are three main elements to a SCADA system, various RTU's (Remote Telemetry Units), communications and an HMI (Human Machine Interface).

Each RTU effectively collects information at a site, such as from the inverters or met station, while communications bring that information from the various plant or regional RTU sites to a central location, and occasionally returns instructions to the RTU.

The HMI displays this information in an easily understood graphics form, archives the data received, transmits alarms and permits operator control as required. The HMI is essentially a PC system running powerful graphic and alarm software programs.

Communication within a plant will be by data cable, wire or fibre-optic, while regional systems most commonly utilize radio or the internet. The real time information can be monitored remotely, typically by the O&M company and the plant owners etc.

8.15 MET STATIONS

There will be a number of meteorological stations installed on the site in order provide adequate meteorological data to evaluate the PV plant performance. The typical meteorological station will include all or some of the following items:

- Lattice structure 3m high for the support of the systems
- pyranometer for tilted radiation
- horizontal pyranometer for global radiation
- ambient temperature sensor with natural ventilation antiradiant shield
- anemometer at 5m height
- a vane to measure the wind direction
- module temperature sensor
- humidity sensor
- data logger
- GSM/GPRS modem
- UPS or non-stop power supply system

8.16 SITE PREPARATION

Owing to the relatively open or expansive nature of the PV plant and hence the construction process, no specific service or haul roads are envisaged. The site will be sufficiently cleared to

allow access for the excavation equipment and the rough terrain vehicles that will deliver the site assembled PV rack or trackers structures to their positions.

Vegetative ground cover reduces dust which influences the PV panel efficiency. The re-growth of the ground cover or rehabilitation is thus important to the PV plant. It thus makes sense to minimise the disruption of the existing vegetative ground cover.

The portions of the site needed will be cleared, grubbed and graded by means of the necessary cuts and fills in order to condition the terrain to the maximum slopes allowed for buildings, roads and racks. Given the flat nature of the site there is very little cut and fill envisaged.

8.17 TRENCHES

Depending on the number of cables that run in each trench and the voltage level, the dimensions of the trenches can vary. The typical width is 0.6 m and depth is from 0.6m to 1.10 m. The cable or cables are laid in a suitable bedding material, usually sand. If the in-situ material is not suitable for bedding, then bedding material will be sourced from local commercial sources. The trenches are then backfilled using suitable material that came from the trench excavations.

Trenches are usually excavated by a TLB or an excavator if the ground is hard, but given the quantity of trenching within the PV plant specialist trenching machines might be used.

8.18 ACCESS AND INTERNAL ROADS

The proposal is that access to the site will be via a new road from the existing Kenhardt - Louisvale District Road. This gravel road will serve as the access point for the proposed cluster of solar PV developments.

The access off the District Road will be designed and built to the Road Authority's standards. The Road Authority's consent will be sought during the permitting process and construction will only commence once the detail design and specifications have been approved by the Road Authority.

Sufficient space will be allowed at the access points to ensure that the vehicles do not stack up on the District Road while being processed through security. Also the road alignment and layout will take into account the necessary safety precautions.

The common access and internal roads shall be constructed as all-weather type, the common access road will be 6m wide and the internal roads 3m wide, all with wide, open side drains forming part of the drainage system.

Passing bays will be provided at strategic points on the access road to allow the circulation of two trucks in opposite directions at the same time during the construction and operational phases.

The roads will be built with a minimum of 400mm depth of sub-grade preparation and an aggregate base layer of up to 150mm thick compacted to the 95% Proctor (AASHTO). The base layer will either be of material obtained from the excavations on site or aggregate from a commercial source.

The road layout will be designed in order to ensure ease of access to every rack or tracker structure and the horizontal geometry will be designed to enable the turning of trucks and construction vehicles.

The design process will investigate surfacing some of the roads to minimise dust.

During the operational phase access around the site is generally only required for security and routine inspection. Access for cleaning operations or maintenance is very infrequent, thus the internal service roads need only be gravel tracks.

8.19 DRAINAGE

The stormwater drainage system proposed will be a surface management system based on not collecting and concentrating the storm-water but rather spreading or distributing it over the site to soak away or drain slowly. This avoids the soil erosion and downstream flooding problems normally associated with the concentrated flows.

The design should allow the flows to be similar to the normal pre-development flows.

A Stormwater, Washwater and Erosion Management Plan will be developed and will form part of the Environmental Management Plan for the facility.

The detail drainage and stormwater surface management design will be done during the detail planning stage.

8.20 BUILDINGS & SERVICES

The buildings and facilities needed to service a PV plant are; a control room (20m^2), a small office (30 m^2), a meeting room (30 m^2), ablution facilities and kitchen area (20 m^2), a small workshop (40 m^2) and a store of 300 to 400 m^2. There will also be facilities for the security personnel on the site. There is space allocated in the PV plant layout for the buildings near the entrance to the site.

One option is to build a farm type shed of approximately 500 m^2 (40m x 12,5m) with the control room and offices etc inside the building. However, given that the electricity generating license has a 20 year term the trend is to provide temporary buildings such as Park-Homes or containers.

Services for the buildings are provided as follows.

- Electricity will come from the Eskom sub-station.
- The control room and the office will have air-conditioning
- Enviro-loo toilets will be used. These toilets are used in a number of National Parks and Nature Reserves. The toilets do not require a water supply and operate by separating the solid and water waste and then drying the waste by evaporation. The dry solids are removed and can safely be spread as compost in the field.
- Alternatively a conventional waterborne sewerage system could be installed draining to a conservancy tank. The effluent would be routinely collected and transported to the Local Authority's waste water treatment works for processing.
- The source for the small amount of potable water required for use by the site personnel will need to be determined during the planning process. See below.

Should the available water need treatment then the appropriate plant and equipment will established on site and used.

8.21 PARKING AREA

There will be small a hardstand parking / lay-down area near the buildings, to be used for the operational phase.

8.22 PERIMETER FENCING

Given the high material values and risk of theft associated with PV panels and electrical cabling it is imperative that the perimeter fences and security systems get installed and commissioned as soon as is practical. This is especially so before the electrical reticulation is operational when the materials are easier to steal.

The process will be to first fence off a delivery, storage and processing area within the site as a start and then to erect the perimeter fence and security. This will allow the initial construction start up activities to begin earlier.

The proposed perimeter fence is 2.4 m weld-mesh or wire and netting fence which is electrified or a 2.4m high electric fences with only electric strands. The electrification will be non-lethal and non-electrified outlier wires will be placed to each side of the fence to prevent small animals getting stuck under the electric fence.

A single 6m automated sliding gate will be provided for vehicular access as well as a single 1m wide gate for pedestrians.

8.23 SECURITY SYSTEM

The perimeter, access points and general site will be monitored by CCTV cameras infrared / night vision technology and passive intrusion detection systems. There will be security lighting which will be linked to the passive intrusion detection systems so will not be on all night.

8.24 OPEN SPACE AND FIRE MANAGEMENT

A firebreak of the appropriate width will be established and maintained both inside and outside of the perimeter fence. The internal perimeter road will form part of the firebreak.

An open space and veld fire management plan will be drafted and included in the Environmental Management Programme for the project. This management plan will need to be aligned with the erosion and the invasive alien plant management plans as they are inextricably linked.

8.25 WATER USAGE DURING CONSTRUCTION PHASE

The temporary water requirement for the construction stage of the PV plant is mainly for the production of concrete for the structure and tracker foundations, for road construction and for general construction processes and dust control etc.

About 9Ml would be needed for the construction stage of a 75MW solar PV plant. This equates to an average draw down rate of about 80kl per day during the construction period.

Possible sources for this water are to be investigated and the relevant authorities will be approached during the EIA process.

8.26 WATER USAGE DURING OPERATIONAL PHASE

A PV Plant does not require much water for operation. The main requirements are water for the domestic needs of the security and operational personnel and for the cleaning of the PV panels.

Possible sources for this water are to be investigated and the relevant authorities will be approached during the planning stage, concurrent to the EIA process. Noting that the majority of the water is required for cleaning, the water could be obtained from the Local Authority and brought to site by a vehicle equipped especially for the cleaning operation. The water for the “domestic” use could similarly be transported to site.

Based on the metered water usages at our existing facilities near Douglas in the Northern Cape, a 75MW PV plant would require about 1600kl per annum for general and office use during the operational phase and a further 525kl for washing the PV modules. This is for two washes per year at 3,5kl per MW capacity per wash. A total of about 2225kl per year is needed.

Note that the amount of potable water required during the operational phase usually does not trigger a Water Use License, however if the water is not sourced from a Registered Water Service Provider the water use will need to be registered.

8.27 PHASES OF THE PROJECT

The following key phases of the project are envisioned.

8.27.1 CONSTRUCTION PHASE

The construction phase includes all the varied activities and operations needed to develop a fully operational PV power plant. As an example, but not limited to, the following activities will occur on site in the construction phase:

- Temporary fencing of the construction yard site
- Installation of perimeter fence
- Site clearing as needed – to be kept to a minimum to avoid dust
- Delivery of construction materials and equipment
- Foundation excavation
- Installation of foundation piles
- Installation of electrical reticulation
- Installation of lightning protection system
- Assembly of trackers or racks
- Moving of the assembled trackers or racks to their final position
- Installation and set-up of electrical equipment
- Construction of buildings
- Installation of security system
- Commissioning of the systems
- Commissioning tests

The following areas will be indicated on the concept Site Development Plan. These areas are based on the typical requirements for a PV facility and the final position and exact shape of these areas will be determined during detail planning and design optimisation and can also be affected by site conditions.

- Lay down area
- Assembly area
- Spoil heaps and borrow pit area
- Construction traffic

8.27.1.1 LAYDOWN AREAS

It is an area needed for the reception of different materials such as PV modules, rack or tracker components, motors, gears, electrical devices, conduiting for wires, transformers, switchgears, prefabricated structures etc.

8.27.1.2 ASSEMBLY AREAS

It is an area proposed for a safe and fast assembly of the racks or trackers. There, needed materials are laid within the assembly area in order to streamline the assembly process. Once the rack or tracker is preassembled, a rough terrain vehicle will transport the tracker to its final position for the installation process (erection on the foundations, wiring connection, gear mounting… etc).

8.27.1.3 SPOIL HEAPS AND BORROW PIT AREAS

To the extent that it is possible a balanced cut, borrow, fill and spoil approach will be followed. Thus any material needed in the construction process, be it earthworks, road-works, building foundations or trench backfilling etc. will be sourced from within the development footprint of the site.

Suitable material will thus be sourced from cuts and trenches or any part of the development footprint and the un-suitable material will be spoiled into non-engineered landscaped areas.

Given the relatively small amount of earthworks in the construction process the only spoil envisaged would be material unsuitable to be used in road-works or as backfilling that comes from road-bed, trenches or pile holes. This should be relatively insignificant volumes and can be spread on site.

Should the spoil volume be larger, then landscaped features such as screening berms around the sub-station and PV power plant can be created from the spoil. These would be dressed with suitable soil and planted.

8.27.1.4 CONSTRUCTION TRAFFIC

During the construction phase the traffic will peak at about 10 large delivery vehicles and 40 to 50 concrete trucks per day while the footings are being cast and then drop to about 20 to 30 large delivery vehicles per day while the electrical reticulation is being installed and the trackers are being erected.

A transportation and Traffic Management Plan will form part of the Environmental Management Programme for the Facility.

8.27.2 OPERATIONAL PHASE

The operational phase includes all operations needed to be carried out to maintain the PV power plant in a full operational mode producing as much electricity as possible and feeding it into the Eskom distribution network.

As an example, but not limited to, the following activities occur in operation phase:

- Checking and verifying of the electricity production
- Maintaining and monitoring a weather station
- Routine inspection of all equipment and systems
- Periodic maintenance
- Periodic cleaning of PV modules
- 24hour security operations

The traffic generated by the PV plant during operation phase once the plant is generating electricity is negligible and will be of the order of four or five vehicles per day.

There will be no residential or overnight accommodation on the site.

8.27.3 DECOMMISSIONING OR UPGRADING PHASE

After the 20 years of operation, the PV plant will either continue to operate or be upgraded if a new license is granted, or the plant will be decommissioned.

Given the degradation of performance of PV modules with time, the plant will function at a lesser export capacity over the new license period.

Upgrading the PV power plant will consist of replacing old PV modules for new ones, increasing the total peak power of the plant (a process called “Repowering”) or increasing the power of the plant by adding new elements such as trackers, PV modules or transformers.

If the plant is to be decommissioned then the site should be returned to close to its original state. Other than the concrete all of the components of a PV plant have an intrinsic value either for re-use or recycling. This intrinsic or scrap value will cover the cost of decommissioning the plant and rehabilitating the site.

- The PV panels will be removed from the trackers and sent to special recycling facilities without further disassembly at the site. The better, functional PV panels can be re-used in less stringent environments.
- The transformers and electrical control devices would either be removed for reuse, with or without re-conditioning, or sold as scrap after removal of the fluids.
- The electrical power management and conditioning equipment would be recycled or disposed of as scrap.
- The underground cable runs could be abandoned in place, or they could be pulled out. The cable has a very high scrap value so the latter is more likely.
- The steel in the fixed rack or tracker structures has high scrap value so these structures will be dismantled and removed for scrap.
- The steel tracker piles can be removed and sold as scrap. Alternatively the steel or the concrete piles can be cut off just below ground level and abandoned.
- The gravel or aggregate in the access road, on-site service roads, in the electrical substations, transformer pads, and building foundations could be removed and recycled for use in other fill operations if not abandoned.
- The buildings can be taken over by the farmer for his operations or all the re-usable material can be removed and the shell demolished and the rubble taken away to a commercial dump site. Temporary buildings can be removed or relocated.

Disturbed land areas can be rehabilitated, the rubble removed, the soil scarified and reseeded or replanted with indigenous vegetation.

Part of the decommissioning and rehabilitation process would be the inspection for and documentation of the presence of industrial wastes in the soil from minor spills or leaks, and decontamination as necessary. If deemed necessary soil testing would be conducted after decommissioning.

Transportation activities during site decommissioning would be similar to but less than those during site development and construction.

9 ECONOMIC CONTEXT

AMDA developments will include a cost/benefit overview as part of the Engineering layout report that will form part of the impact assessment phase of the Environmental process.

10 PROJECT PROGRAMME AND TIMELINES

As mentioned previously the AMDA Alpha PV Facility is intended to be lodged under the IPP procurement programme. The programme has definite and stringent timelines, which the project should meet. Note that the Department of Energy has not yet released the exact dates for the 5th and 6th bidding submissions.

NOTE: The AMDA Alpha PV Energy Facility intends submitting their bid during the 5th bidding window or thereafter if unsuccessful in immediate bidding rounds.

11 SITE DESCRIPTION AND ATTRIBUTES

The ecological and agricultural specialists have provided a detailed account of the site in terms of the following aspects:

11.1 GEOLOGY

The general geological description is that of Namaqualand Natal Province metamorphic complex

It consists dominantly of sedimentary rocks and sub dominant Gneiss. Rocks included in the Namaqualand Metamorphic Complex are migmatite, gneiss and granite; with occasional small outcrops of ultrametamorphic rocks, forming small hills.

11.2 CLIMATE

The region is classified as an arid zone with desert climate. The following specific parameters are applicable:

Table 5: Climate data

Rainfall		Evaporation	Temperature	
Month	**Precipitation monthly**	**Daily**	**Season**	**Temperature**
January	22m	7.3mm	Summer Max	33.1-35°C
February	33mm	6.6mm	Summer Min	29.3-31°C
March	39mm	5.2mm	Winter Max	13.4-15.2°C
April	18mm	4.0mm	Winter Min	4 to -5.5°C
May	13mm	2.8mm		
June	3mm	2.3mm		
July	2mm	2.6mm		
August	3mm	3.6mm		
September	3mm	4.6mm		
October	7mm	5.7mm		
November	9mm	6.6mm		
December	12mm	7.4mm		

11.3 SOILS

Considering the geology and climate associated with the investigated area, typical soil characteristics will include soils with minimal development, usually shallow on hard or weathering rock, with or without intermittent diverse soils.

- Lime is generally present in part or most of the landscape.
- Red and yellow well-drained sandy soil with high base status may occur.
- Freely drained, structureless soils may occur.
- Soils may have favourable physical properties.
- Soils may also have restricted depth, excessive drainage, high erodibility and low natural fertility.

11.4 BROAD-SCALE VEGETATION PATTERNS

According to the national vegetation map (Mucina & Rutherford 2006), the site falls entirely within a single vegetation type, Bushmanland Arid Grassland. Bushmanland Arid Grassland is the second most extensive vegetation type in South Africa and occupies an area of 45 478 km^2 and extends from around Aggeneys in the west to Prieska in the east. It is associated largely with red-yellow

apedal (without structure), freely drained soils, with a high base status and mostly less than 300 mm deep. Due the arid nature of the unit which receives between 70 and 200 mm annual rainfall, it has not been significantly impacted by intensive agriculture and more than 99% of the original extent of the vegetation type is still intact and its' conservation status is classified as Least Threatened. Mucina & Rutherford (2006) list 6 endemic species for the vegetation type which is relatively few given the extensive nature of the vegetation type.

The site consists of stony plains with occasional areas on deeper soils in lower-lying areas and run-on sites. Despite being classified as Bushmanland Arid Grassland, the site is largely dominated by woody shrubs, which is typical on stony soils of the area. Typical species include *Zygophyllum lichtensteinianum*, *Lycium cinereum*, *Hermannia spinosa*, *Pteronia sordid*a, *Pteronia inflexa*, *Osteospermum armatum* and *Aristida adscensionis*. On deeper soils *Phaeoptilum spinosum*, *Lycium horridum*, *Pentzia incana*, *Ruschia spinosa*, *Aptosimum marlothii*, *Rosenia humilis*, *Pegolettia retrofracta*, *Stipgrostis obtusa*, *Enneapogon desvauxii*, *Stipagrostis ciliata* and *Eragrostis lehmanianna.*

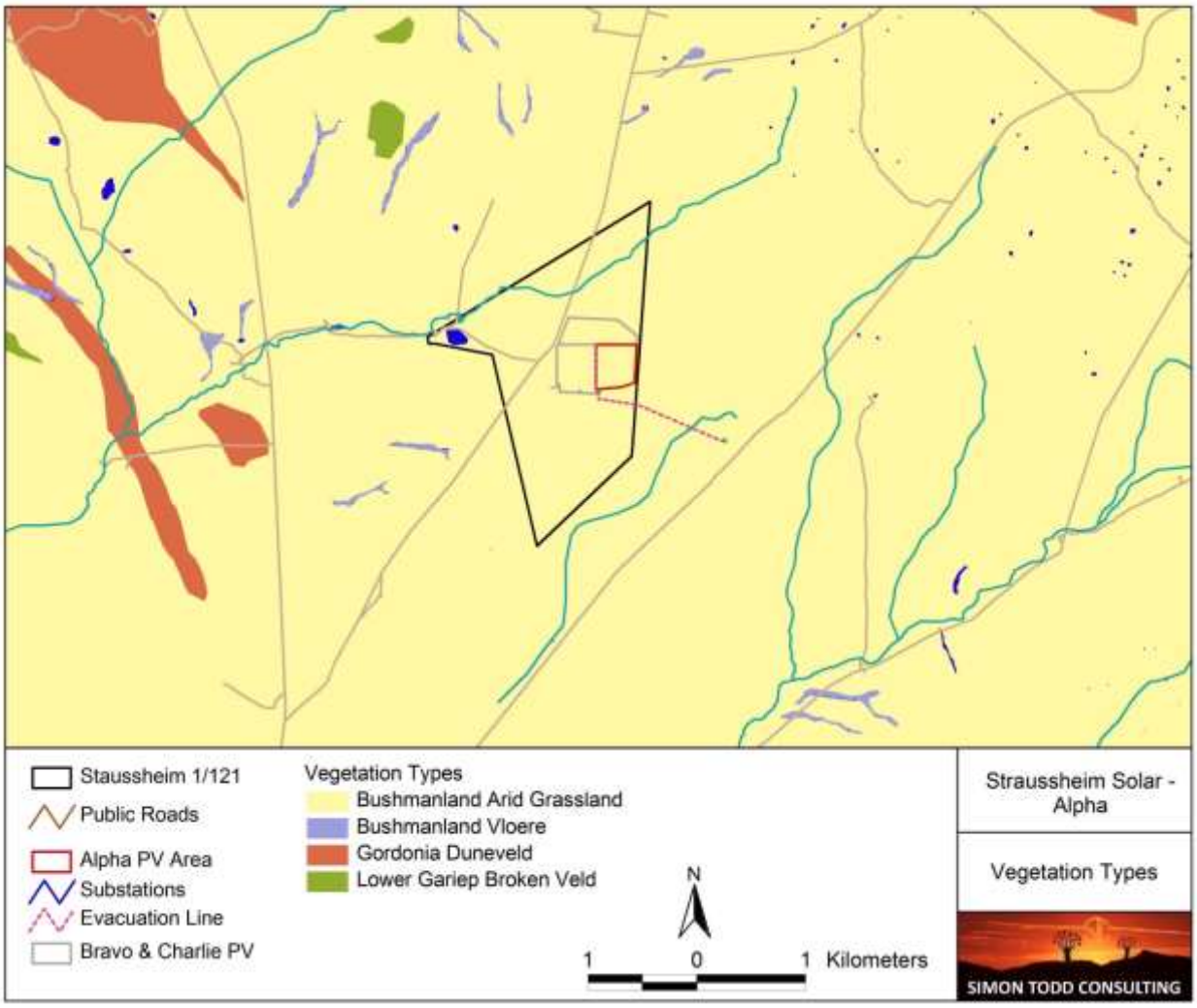


Figure 8 :Broad-scale overview of the vegetation in and around the Straussheim site. The vegetation map is an extract of the national vegetation map as produced by Mucina & Rutherford (2006), and also includes rivers and wetlands delineated by the National Freshwater Ecosystem Priority Areas assessment (Nel et al. 2011).

Figure 9: Typical open plains habitat at Straussheim, showing the general lack of features at the site and broadly homogenous nature of the vegetation

Figure 10: Example of a run-on area at the Straussheim site, with a higher density of vegetation than the surrounding area. Typical species in these areas include *Phaeoptilum spinosum*, *Lycium pumilum*, *Salsola tuberculata*, *Aristida congesta*, *Stipagrostis obtusa* and *S.ciliata*.

11.5 CRITICAL BIODIVERSITY AREAS & BROAD-SCALE PROCESSES

No fine-scale conservation planning has been conducted for the region and as a result, no Critical Biodiversity Areas have been defined for the study area. In terms of other broad-scale planning studies, the site does not fall within a National Protected Areas Expansion Strategy Focus Area (NPAES), indicating that the area has not been identified as an area of exceptional biodiversity or of significance for the long-term maintenance of broad-scale ecological processes and climate change buffering within the region.

As there are a number of other renewable energy developments in the wider area, it is important to consider the potential for cumulative impact on the area. A map of all the DEA-registered renewable energy developments in the area is depicted in Figure 6 below and illustrates that there is currently not a lot of the renewable energy development in the area. As a result, the potential for cumulative impact in the area is still relatively low and a significant impact on broad-scale ecological processes is not likely.

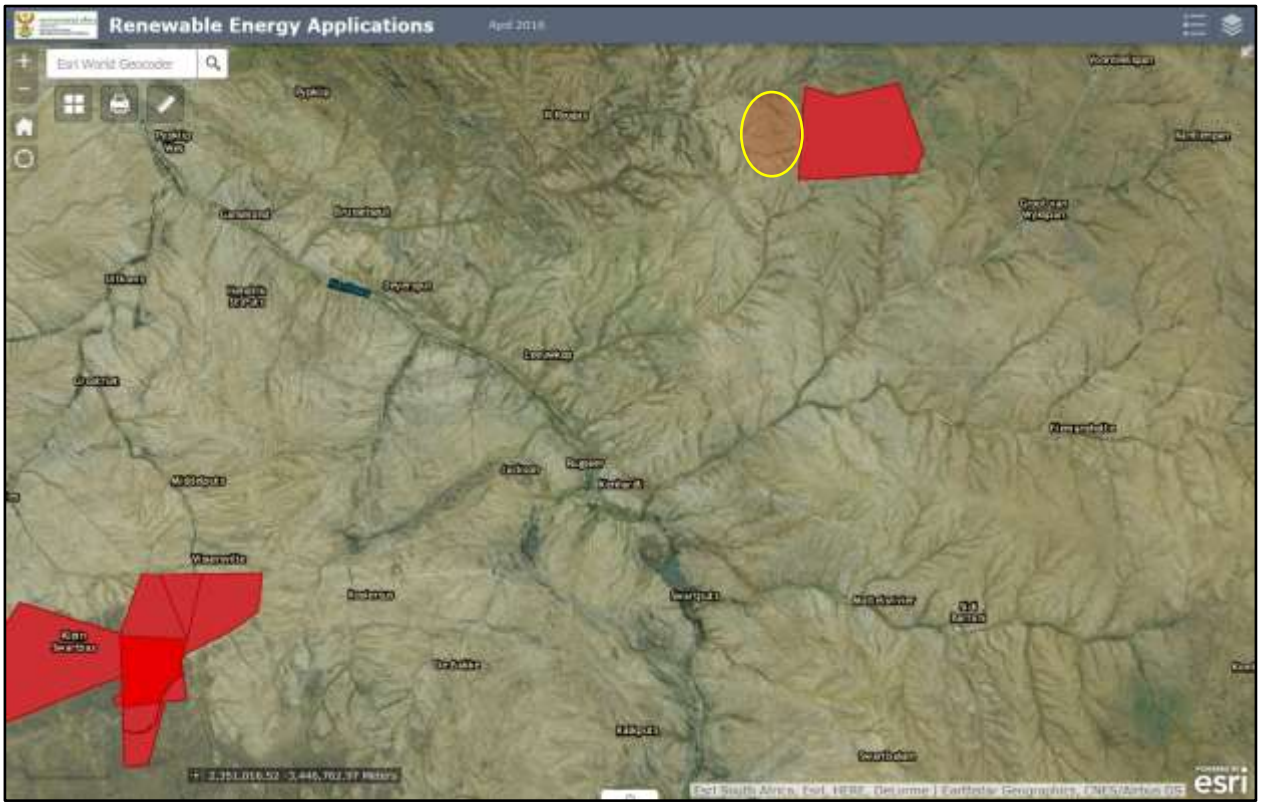


Figure 11: Map of DEA-registered renewable energy projects around the Straussheim site indicated by the yellow circle, showing other renewable energy developments in the area around Kenhardt.

11.6 FAUNAL COMMUNITIES

11.6.1 Mammals

According to the MammalMap database approximately 31 terrestrial mammals are known from the area. Listed species which may occur in the area include the Black-footed cat *Felis nigripes* (VU) Brown Hyaena *Hyaena brunnea* (NT) and Littledale's Whistling Rat *Parotomys littledalei* (NT). All of these species have a wide distribution in South Africa and the loss of about 240 ha of habitat would not result in significant habitat loss for these species.

The diversity of habitats at the site is low and consists largely of open low shrubland on shallow stony soils, with no rocky outcrops or large drainage lines. As a result, the species present would be those that are associated with open plains and includes species such as Cape Porcupine *Hystrix africaeaustralis*, Steenbok *Raphicerus campestris*, Springbok *Antidorcas marsupialis*, Aardvark *Orycteropus afer*, Cape Hare *Lepus capensis*, South African Ground Squirrel *Xerus inauris*, Black-backed Jackal *Canis mesomelas*, Bat-eared Fox *Otocyon megalotis* and African Wild Cat *Felis silvestris*.

Potential impacts on mammals are likely to be restricted largely to disturbance during the construction phase and habitat loss during the operational phase. Given the largely intact nature

of the area, cumulative impacts are likely to be relatively low and overall impacts on fauna are likely to be low and local in nature.

11.6.2 Reptiles

The site lies in or near the distribution range of approximately 40 reptile species but given the low habitat diversity at the site, the actual reptile diversity present is likely to be significantly lower. Species either observed or likely to be present confirmed at the site include the Namaqua Sand Lizard *Pedioplanis namaquensis*, Ground Agama *Agama aculeata* and Cape Skink *Mabuya capensis*. No species which may occur in the area are listed as endangered, but the Bushmanland Tent Tortoise is protected under provincial ordinance and is also listed under Appendix II of Cites which regulates trade in these species.

In terms of the likely impact of the development on reptiles, habitat loss is likely to be of local significance only due to the relatively low footprint of the development and the relatively low reptile diversity of the site. Furthermore, many species would be able to use the vegetation under the panels and some species would take advantage of the buildings and structures present. Some transient disturbance of reptiles during construction is likely due to disturbance and vegetation clearing. Overall, as there are few range-restricted or listed reptile species at the site, impacts on reptiles from the development is likely to be local in nature and not of broader significance.

11.6.3 Amphibians

Although the site lies within or near the range of nine amphibian species, several of these require more or less permanent water and would not occur at the site. In practice, probably only toad species which are able to tolerate extended dry periods such as the Karoo Toad *Vandijkophrynus gariepensis* occur at the site. There is no breeding habitat for frogs at the site and any frogs at the site would be likely to breed at man-made features present in the wider area. Given the low likely abundance of frogs at the site, impacts on frogs are likely to be low and apart from disturbance, pollution is highlighted as potential impact source for frogs.

11.7 AVIAN MICROHABITATS

While broad-scale vegetation patterns influence the distribution and abundance of bird species holistically, it is the fine-scale vegetation patterns and various avian microhabitats in an area that determine local avifauna populations.

A number of different avian microhabitats were identified at the site and these formed the basis of the avian site sensitivity map. These units include:

- *Karoo grassland/shrubland:* This habitat unit represents the majority of the vegetation in the study area (Bushmanland Arid Grassland) and is largely made up of extensive plains of white grasses and low shrubs. Although this habitat unit does not support the highest diversity and abundance of species, it does support numerous species of conservation concern (Kori Bustard *Ardeotis kori,* Ludwig's Bustard *Neotis ludwigii* and Karoo Korhaan *Eupodotis vigorsii*) as well as endemic and near-endemic passerine species.
- *Tall Shrubland:* Small patches of *taller shrubland* are scattered across the wider study area. This habitat unit supports a woodier component to the vegetation, with the small trees such as *Aloe dichotoma* and *Acacia mellifera* providing nesting and roosting sites for endemic passerines in the study area.
- *Washes & Drainage lines:* A number of small drainage lines bisect the study area and although many of these will seldom contain surface water, they are important for ecosystem functioning. The slightly deeper soils support a marginally higher biomass including woody

species and provide a structural and compositional variation in the vegetation to the surrounding shrublands.

It should however be noted, that the study area has already been subject to varying degrees of disturbance and degradation caused by past and present land-use practises. Evidence of high stocking rates and grazing pressure is apparent. There is also a network of minor farm roads throughout.

Figure 12: Karoo grassland/shrubland (Bushmanland Arid Grassland) habitat unit, which forms the majority of the site as well as the majority of the development area.

Figure 13: Tall Shrubland habit unit with small trees such as *Aloe dichotoma* and *Acacia mellifera*. This habitat does not occur within the current proposed development footprint.

Figure 14: Washes and drainage lines habitat unit with marginally higher biomass, dominated mostly *by Phaeoptilum spinosum*.

11.8 AVIFAUNA

According to the SABAP 1 and SABAP 2 databases, only 93 bird species have been recorded within the study area and broader impact zone of the development (Appendix 1). This total is

limited by the number of SABAP cards recorded, with more species expected to occur. Of the species known to occur in the study area, 10 are red-listed or threatened (Table 1), 31 are endemic and 20 are near-endemic. A total of 22 species were recorded during the site visit, most notable of which being the sightings of a pair of Karoo Korhaans and a Lanner Falcon *Falco biarmicus*.

The birds of greatest potential relevance and importance in terms of the possible impacts of the SEF and its associated power infrastructure are likely to be local populations of threatened or endemic passerines (Karoo Long-billed Lark *Certhilauda subcoronata*, Sclater's Lark *Spizocorys sclateri* and Black-eared Sparrowlark *Eremopterix australis*), shy ground-nesting species (Burchell's Courser *Cursorius rufus* and Double-banded Courser *Rhinoptilus africanus*), resident or visiting large terrestrial birds (Karoo Korhaan, Ludwig's Bustard, Kori Bustard and Secretarybird *Sagittarius serpentarius*) and resident or passing raptors (Lanner Falcon, Martial Eagle *Polemaetus bellicosus* and Verreaux's Eagle *Aquila verreauxii*).

In general, at the time of the site visit (24-26 February 2016), bird diversity and abundance was relatively low throughout the study area, with no particular avian microhabitat boosting a higher diversity or abundance than the other.

On the basis of the observations recorded during the field visit, and in combination with already documented information on the avifauna of the study area, 10 priority species are considered central in this avifaunal impact study (Table 1). These are mostly threatened species which are known to occur, or could occur, in relatively high numbers in the study area and the broader impact zone of the development and which are likely to be, or could be, negatively affected by the SEF. Two species, Karoo Korhaan and Lanner Falcon, were recorded within the study area.

Overall, the avifauna of the study area and the broader impact zone of the SEF is not considered unique and is typical of what occurs across large areas of the Nama Karoo Biome, which therefore suggests that the sensitivity of the site, from an avian perspective, will not be of any great significance.

Table 6: Priority species list considered central to the avifaunal impact study for the proposed Straussheim Alpha, Bravo and Charlie Power Plants, selected on the basis of conservation status (Taylor *et al.*, 2015).

Common name	Scientific name	Conservation status	Regional endemism	Estimated importance of local population	Preferred habitat	Likelihood of occurring in study area	Susceptible to
Bustard, Kori	*Ardeotis kori*	Near-threatened	-	Moderate	Dry open savanna woodland, dwarf shrubland and occasionally grassland	High	Collision
Bustard, Ludwig's	*Neotis ludwigii*	Endangered	Near-endemic	Low	Semi-arid dwarf shrubland, also in arid savanna and fynbos	Moderate	Collision
Courser, Burchell's	*Cursorius rufus*	Vulnerable	Near-endemic	Low	Sparsely vegetated arid regions	Low	Disturbance
Eagle, Martial	*Polemaetus bellicosus*	Endangered	-	Moderate	Open savanna and woodland on plains, also semi-arid shrublands	Low	Collision, electrocution

Common name	Scientific name	Conservation status	Regional endemism	Estimated importance of local population	Preferred habitat	Likelihood of occurring in study area	Susceptible to
Eagle, Verreaux's	*Aquila verreauxii*	Vulnerable	-	Low	Mountainous regions and rocky areas with cliffs	Low	Collision
Falcon, Lanner	*Falco biarmicus*	Vulnerable	-	Low	Open grassland or woodland near cliff or electircity pylons	High	Collision, disturbance
Harrier, Black	*Circus maurus*	Near-threatened	-	Low	Fynbos, shrubland, dry grassland and croplands	Low	Collision, disturbance
Korhaan, Karoo	*Eupodotis vigorsii*	Near-threatened	Endemic	Moderate	Shrublands	High	Collision, disturbance
Lark, Sclater's	*Spizocorys sclateri*	Near-threatened	Endemic	Moderate	Arid to semi-arid sparsley vegetated stony plains	High	Disturbance
Secretarybird	*Sagittarius serpentarius*	Vulnerable	-	Moderate	Open grassland with scattered trees and shrubs	Moderate	Collision

12 PLANNING CONTEXT

A Planning specialist, Macroplan has provided input into this environmental process. A planning statement is attached in **Appendix E9**. The following key requirements will need to take place in terms of the planning process:

- The property is currently zoned as Agricultural Zone I in terms of the Kai !Garib Scheme Regulations. In order to allow for the development of a renewable energy facility thereon, the applicable portion of the property will have to be rezoned to an appropriate zoning.
- There is no default zoning in the Kai !Garib Scheme Regulations allowing for renewable energy development and a Special Zone will have to be proposed. The Special Zone is custom-defined to the exact needs of the developer.
- The application for land use change will be compiled and submitted in terms of the Spatial Planning and Land Use Management Act, Act 16 of 2013 (SPLUMA).

The planning specialist will furthermore likely engage with the following authorities as part of the planning process. Where relevant, these authorities will also be engaged with as part of the Environmental Process and will be given an opportunity to provide input and comment on this scoping report.

- **Kai Garib Municipality** for approval in terms of the relevant Zoning Scheme;
- **Northern Cape Department of Agriculture** as well as the **National Department of Agriculture, Forestry & Fisheries** (DAFF) for approval in terms of Act 70 of 70 (SALA) and Act 43 of 83(CARA);
- **District Roads Engineer** for comment on the land use application;
- **Department of Water and Sanitation** (DWS) for comment in terms of the National Water Act and the land use application;

- **Department of Mineral Resources** for approval in terms of Section 53 of Act 28 of 2002;
- **Department of Transport & Public Works** for comment on the land use application;
- **South African Heritage Resource** (SAHRA) Agency for comment on the land use application;
- **Civil Aviation Authority** for comment on the land use application;
- **Eskom** Northern Cape for comment on the land use application; and
- **Northern Cape Nature** Conservation for comment on the land use application.

13 AGRICULTURAL POTENTIAL OF THE STUDY SITE

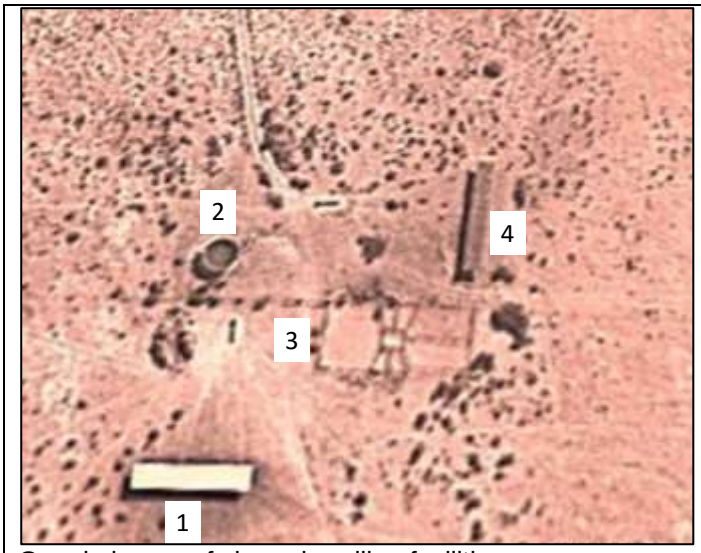
Mr Christo Lubbe, an agricultural specialist, has undertook an Agricultural potential study of the proposed AMDA Alpha PV Facility. This study is attached in Annexure E2.

13.1 STUDY FINDINGS

The site inspection was undertaken by the specialist in February 2016.

13.1.1 Past and Current Agricultural Activities on Site

Extensive sheep farming is practised. The farm is sub-divided into grazing camps with very effective work stations for the handling of sheep. One of these stations fall in the confinement of the proposed PV Field as seen in the figure below.



Google image of sheep handling facilities


2. Solar pump and reservoir


3. Sheep working area with specialised designed to carry out all necessary handling activities


1. and 4. Shade area

Figure 15: Sheep handling facilities on site

13.1.2 Soil Classification

An augering survey was carried out. At each Augering point (indicated by numbers on the figure below), an observation record was completed.

The soil observation records in the table below are representative of the two dominant soil forms found on the site. These are further described below each observation record.

The soils were then grouped in two utilization polygons, using effective rooting depth as yardstick.

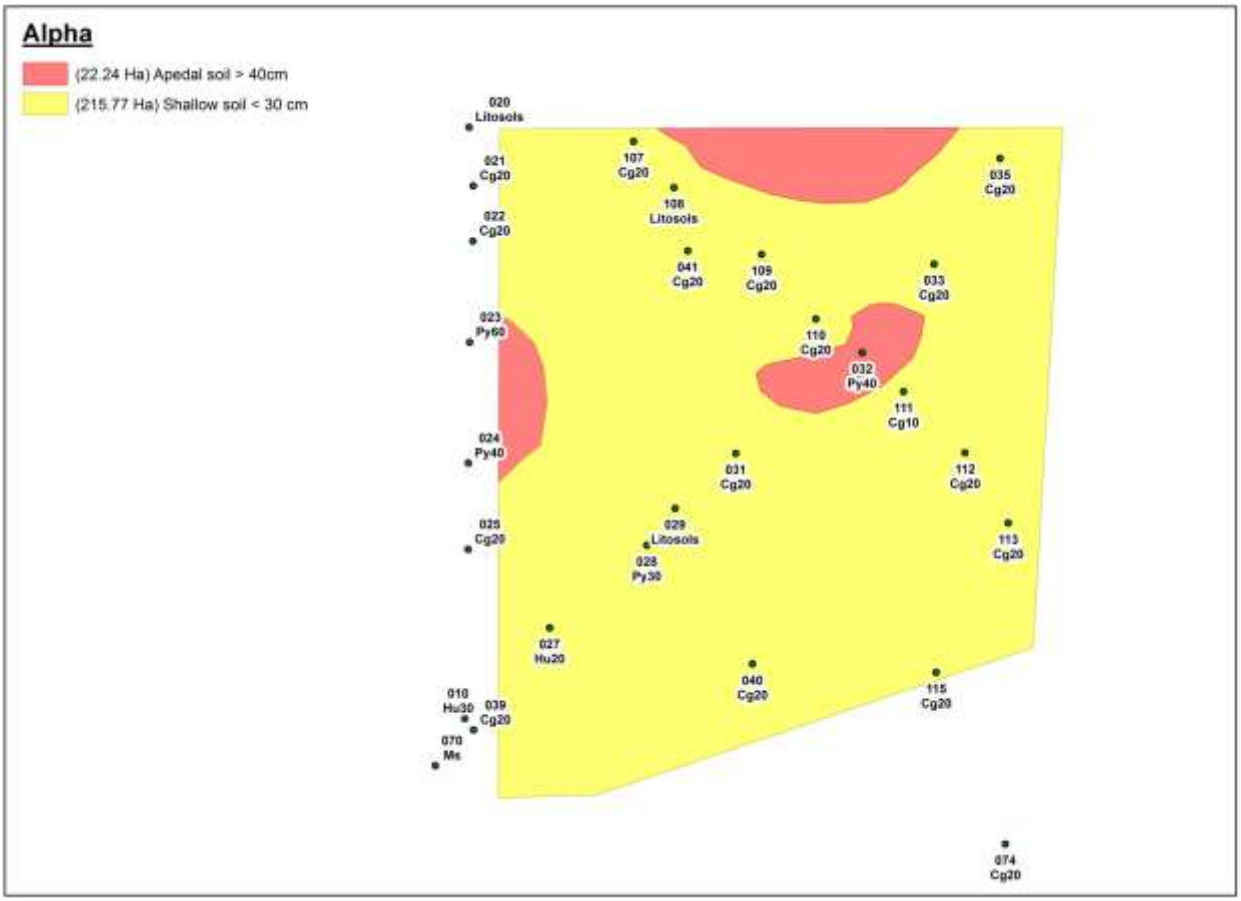


Figure 16: Observation points on soil map

13.1.2.1 Effective rooting depth

The larger part (91% - 216 ha) of the area surveyed has an effective depth of less than 30cm. The restriction is rock and hard carbonates sub-surface layers. The top surface is also rough with a high level of surface rock. Cultivation is not possible because of these mechanical restrictions.

The rest of the area (22ha) has an average depth of 40 cm. The root development area is restricted by carbonate hard setting or rock. The stony nature reduces available soil for root development and water retention, and creates a high mechanical risk for agricultural machinery.

13.1.2.2 Texture

The clay content of the top horizon is 6% and the sub-horizon is 6% with medium sand grade. The texture class is sand.

The sand grade of top soil influences the stability and erodibility potential.

Low clay percentage results in low water holding capacity and low nutrient availability, which leads to low soil fertility.

13.1.2.3 Depth limiting layer

The hard setting layer (Hard carbonate horizon) and/or Carbonate rock results in:

- Mechanical limitations for cultivation (stoniness)
- Prevention of root development
- Limited water holding capacity

13.1.3 Veld Condition Assessment

Typical Nama Karoo vegetation of the Bushmanland region covers the surface, eg. dwarf woody shrubs and *Stipagrostis* grass species. The cover is very sparse with bare areas or areas where rocks surface.

Figure 17: Veld condition on the Straussheim property (Lubbe, 2016)

Higher shrubs, such as *Rhigozum* species tend to become invasive. Trees are absent, except for the Quiver tree Aloe.

Moderate wind erosion is noticed.

13.1.4 Land Capability and Suitability for agriculture

The land surveyed falls in capability class VI, generally not suited for cultivation. Very severe limitations restrict land use to grazing, woodlands or wildlife.

Table 7: Land Capability and Suitability Assessment for Crop Production (Lubbe, 2016)

Land capability class	Suitability Rating	Major Limitation to Crop Production	Area (ha)	% of Local Study Area
Class VI Cg/Lithosols	Very low	Low water holding capacity Shallow rooting zone Severe climate Severe erosion hazard	216 ha	91
Class IV Py>40cm	Low	Low water holding capacity Severe climate	22 ha	9

Table 8: Land Capability and Suitability Assessment for Grazing (Lubbe 2016)

Area Description	Suitability Rating	Major Limitation to Grazing	Area (ha)	% of Local Study Area
Cattle	Medium -	Very shallow rooting depth on carbonate hard	238 ha	100

		setting layer. Low clay content Low rainfall Carrying capacity of 32ha /LSU		

13.1.5 Water Availability/Provision

Water is provided to livestock from a borehole pumped to a reservoirs and troughs.

13.1.6 Assessment of connecting lines

The PV field is to be connected to the National grid via an overhead line to the Niewehoop MTS sub-station near Kenhardt - see Figure 18.

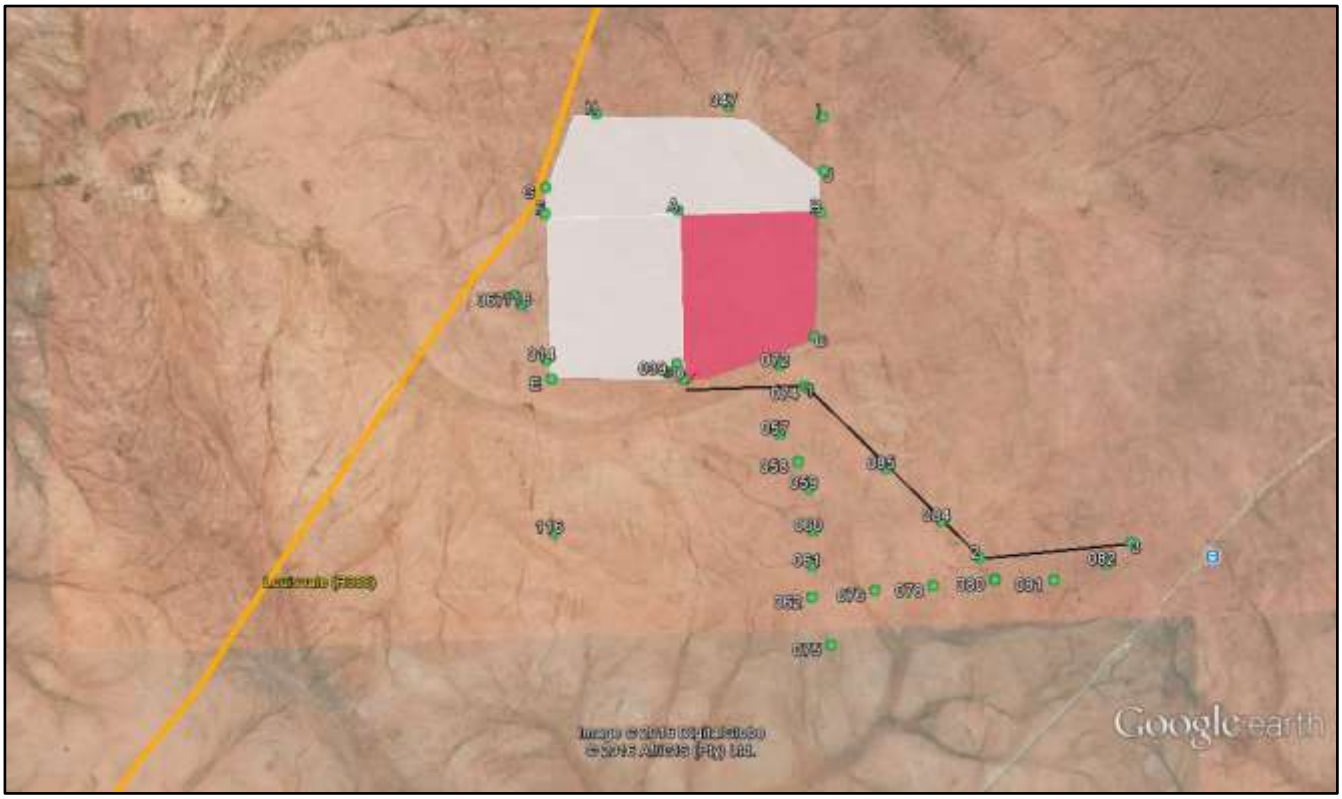


Figure 18: Showing soil sample points undertaken along the proposed overhead powerline to the Niewehoop powerstation.

The Overhead connecting line will follow the route as shown in in the figure above from point 39 to 74 it will be in the premises of the applicant then to point 2 from where it will follow the same alignment as the Eskom line (in construction at the moment).

The soil and vegetation cover is of the same characteristics as the proposed site.

Figure 19: Photos along the route of the proposed connecting line (Lubbe,2016)

13.1.7 Summary of findings

The site is largely unsuitable for cultivation due to the following limiting factors:

- Extremely low annual rainfall, high evaporation and extreme temperatures restrict dry land cultivation.
- The very shallow soil depth with its limited water holding capacity restricts root development
- The soils have carbonate-rich B-horizons. The use of Calcic soils is limited by climate (low rainfall and high evaporation), shallow soil depth, high pH, low plant available P and trace elements (especially Fe), toxic levels of extractable B and stoniness. All calcic soils are highly susceptible to water erosion.
- The sand grade of top soil influences the stability and increases erodibility potential.
- Low clay percentage results in low water holding capacity and low nutrient availability, resulting in low soil fertility.

Although the grazing potential is very low, the area could be utilised for grazing.

13.2 POSSIBLE IMPACTS ON AGRICULTURAL RESOURCES

The following possible impacts should be considered:

- Loss of agricultural land.
- Placement of spoil material generated from construction related excavations, which can cover agricultural land and thereby render it unsuitable for future agriculture.
- Land surface disturbance and alteration of its run-off.

13.3 CUMMULATIVE IMPACT ON AGRICULTURAL RESOURCES

The figure below shows the various farms on which similar developments are constructed / planned. In combination with this proposed AMDA ALPHA facility, they may have a cumulative effect on the agricultural region.

To assess the cumulative effect that the various developments may have on agriculture, the following situations will have to be addressed:

- Changes in hydrological regimes
- Decreases in quantity and quality of soils
- Loss of natural habitat or historic character through industrial development
- Loss of biological diversity

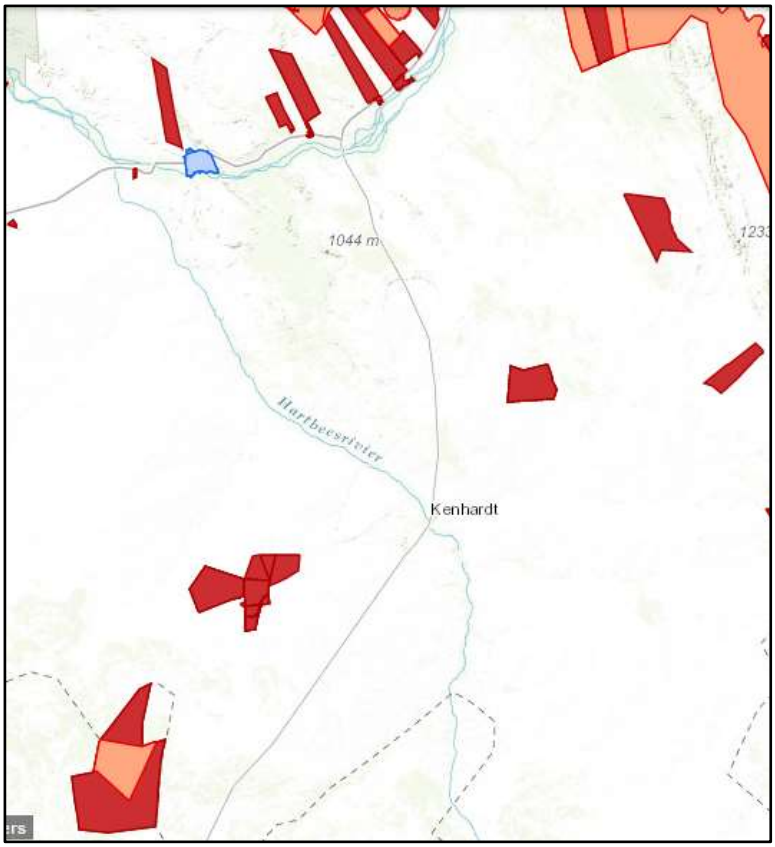


Figure 20: Renewable Energy Farms in the Kenhardt area *(DEA)*

13.4 CONCLUSION

The findings of this study indicate that the site's agricultural potential is low. Due to poor soil properties and extreme climatic conditions. Farming activities consist of grazing for sheep.

The proposed power facility will have minimal impacts on agriculture, locally and on site, and will have very little influence on the current commercial farming.

14 ECOLOGICAL CONSIDERATIONS AND SENSITIVITY OF THE STUDY SITE

Mr. Simon Todd, of Simon Todd Consulting, undertook and Ecological Sensitivity Analysis and Ecological Scoping Study of the proposed AMDA Alpha PV Energy Facility. Please see report attached in Appendix E1.

14.1 SITE SENSITIVITY ASSESSMENT

The sensitivity map for the proposed development area of the Straussheim Alpha PV plant site is illustrated below. There are no highly sensitive features identified within the site that would be affected by the development. The site is homogenous and there are no rocky hills or large drainage systems of higher sensitivity status. There are not many trees on the site, which suggests that it is unlikely that the development will impact more than a handful of any protected trees species, of which *Aloe dichtoma* would be of greatest significance. In terms of other listed or protected species, it is not likely that there many such species present at the site and overall impacts on such species would be low. There are no areas of specific importance identified for terrestrial fauna within the study area as it is generally homogenous

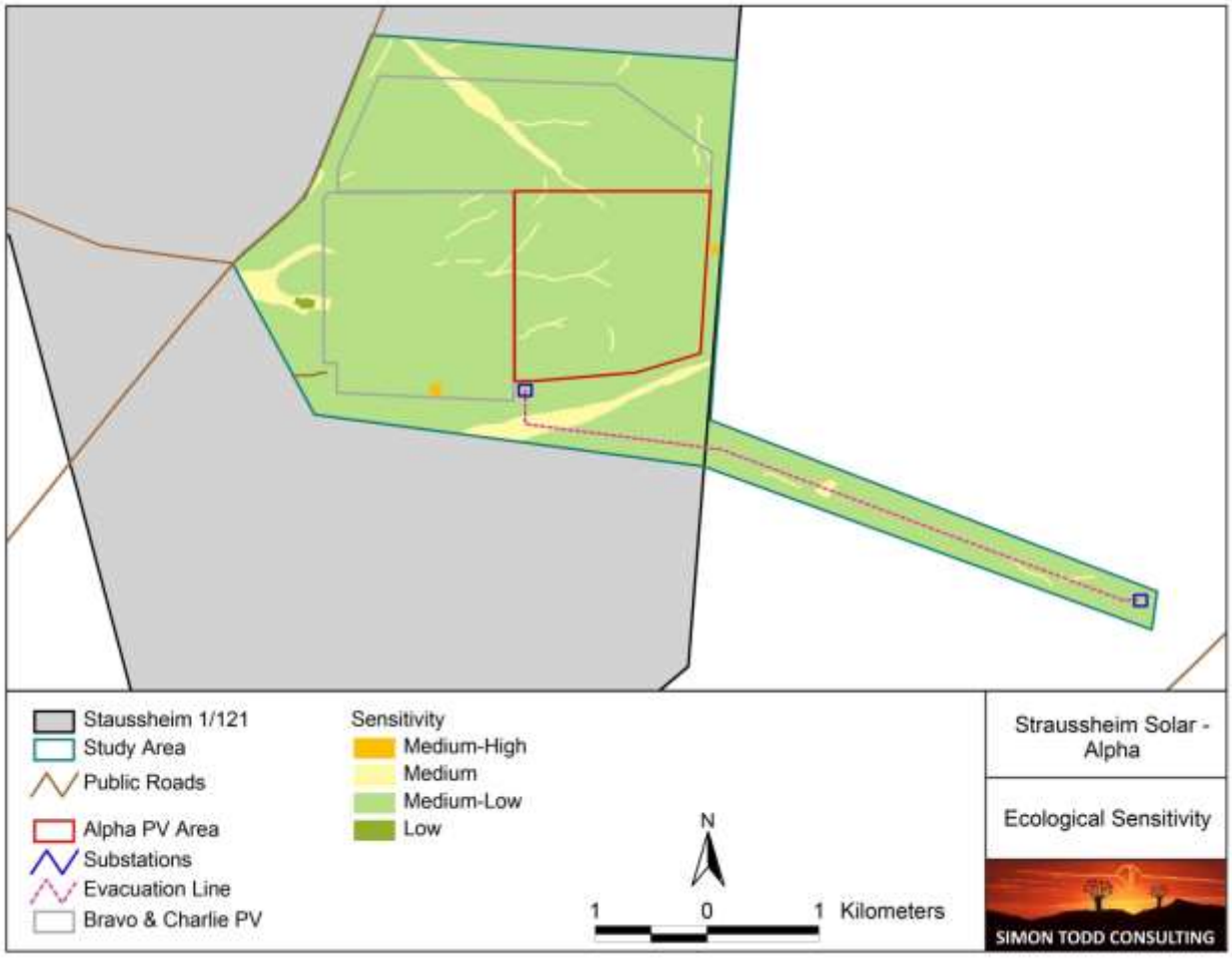


Figure 21: Ecological sensitivity map of the Straussheim Alpha PV Plant, showing that the majority of the site consists of the natural vegetation of low sensitivity.

14.1.1.1 Identification & Nature of Impacts

In this section, the potential impacts and associated risk factors that may be generated by the development are identified. In order to ensure that the impacts identified are broadly applicable and inclusive, all the likely or potential impacts that may be associated with the development are listed. The relevance and applicability of each potential impact to the current situation are then examined in more detail in the next section.

14.1.2 Identification of Potential Impacts and Damaging Activities

Potential ecological impacts resulting from the development of the Straussheim Alpha PV Power Plant would stem from a variety of different activities and risk factors associated with the preconstruction, construction and operational phases of the project including the following:

14.1.2.1 Preconstruction Phase

- Human presence and uncontrolled access to the site may result in negative impacts on fauna and flora through poaching of fauna and uncontrolled collection of plants for traditional medicine or other purpose.
- Site clearing & exploration activities for site establishment would have a negative impact on biodiversity if this was not conducted in a sensitive manner.

14.1.2.2 Construction Phase

- Vegetation clearing for the reflector field, access roads, site fencing etc could impact listed plant species as well as high-biodiversity plant communities. Vegetation clearing will also lead to habitat loss for fauna and potentially the loss of sensitive faunal species, habitats and ecosystems.
- Increased erosion risk would occur due to the loss of plant cover and soil disturbance created during the construction phase. This may impact downstream riparian and wetland habitats if a lot of silt enters the drainage systems.
- Presence and operation of construction machinery on site. This will create a physical impact as well as generate noise, pollution and other forms of disturbance at the site.
- Increased human presence can lead to poaching, illegal plant harvesting and other forms of disturbance such as fire.

14.1.2.3 Operational Phase

- The operation of the facility will generate noise and disturbance which may deter some fauna from the area.
- The areas inside the facility will requirement management and if this is not done appropriately, it could impact adjacent intact areas through impacts such as erosion, alien plant invasion and contamination from pollutants, herbicides or pesticides.
- The associated overhead power lines will pose a risk to avifauna susceptible to collisions and electrocution with power line infrastructure.

14.1.2.4 Cumulative Impacts

- The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the country's ability to meet its conservation targets.
- Transformation of intact habitat would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

14.1.3 Identification of Impacts to be Assessed in the EIA Phase

In this section each of the potential impacts identified above is explored in more detail with reference to the features and characteristics of the site and the likelihood that each impact would occur given the characteristics of the site and the extent and nature of the development.

14.1.3.1 Impacts on vegetation and protected plant species

Although their density would be low, there may be some protected species within the site that would be impacted by the development. Vegetation clearing during construction will lead to the loss of currently intact habitat within the development footprint and is an unavoidable consequence of the development. As this impact is certain to occur it will be assessed for the construction phase for the facility.

14.1.3.2 Soil erosion and associated degradation of ecosystems

The large amount of disturbance created during construction would potentially leave the site vulnerable to soil erosion, from both wind and water. Vegetation clearing, the panel arrays and access roads will all result in increased levels of runoff which will need to be managed

and which would pose an erosion risk. Soil erosion is therefore considered a likely potential impact and will be assessed for the construction phase and operational phase.

14.1.3.3 Direct faunal impacts

Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some impact on fauna is highly likely to occur during construction as well as operation and this impact will therefore be assessed for the construction phase and operational phase.

14.1.3.4 Alien Plant Invasion

The disturbance created during construction is highly likely to encourage the invasion of the disturbed areas by alien species. Although there were not a lot of alien species present in the area, problem species such as *Prosopis* are present in the area and it is possible that species will colonise the disturbed areas if given the opportunity. This impact is deemed highly likely to occur and will be assessed as a likely impact associated with the development.

14.1.3.5 Reduced ability to meet conservation obligations & targets

The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets. The receiving vegetation type in the study area is classified as Least Threatened and is still more than 99% intact. As this is one of the most widespread and extensive vegetation types and there is no indication that there are any rare or restricted habitats within the development footprint, this is not likely to be a significant impact and will not be assessed unless the site visit suggests that this may be a potential problem.

14.1.3.6 Impact on broad-scale ecological processes

Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. Due to the presence of a number of other renewable energy developments in the area, this is a potential cumulative impact of the development that will be assessed during the EIA.

14.1.4 Potential Significance of Impacts

A preliminary assessment of the likely extent and significance of each impact identified above is made below.

14.1.4.1 Impacts on vegetation and listed plant species

Nature: Site preparation and construction will result in a lot of disturbance which would impact indigenous vegetation and possibly listed species as well. For some species translocation may partially mitigate the impact, but most woody species cannot be translocated and would be lost from the development footprint.

Extent: The total extent of the development is relatively low and the solar energy facility will result in a concentrated local impact up to a few hundred hectares. Within this area, the

impact is likely to be relatively high, but if appropriate areas within the site are used, then it is not likely that the development would have an impact on flora beyond the local on-site scale.

Potential Significance: The vegetation within the site is considered relatively low sensitivity with few species or habitats of concern present. With suitable avoidance and mitigation, the significance of this impact is likely to be of moderate to low significance.

14.1.4.2 Soil Erosion

Nature: Disturbance at the site during construction would leave the site vulnerable to soil erosion. Erosion would impact drainage systems as well as biodiversity through topsoil loss as well as through loss of ecological function (resource capture), resilience and decreased hydrological functional.

Extent: The extent of this impact would most likely be restricted to local area around the PV arrays, but could impact drainage systems which receive a large amount of silt or eroded material.

Potential Significance: The site is nearly flat and so the risk of erosion is likely to be fairly low and manageable with mitigation. The significance of this impact is likely to be low.

14.1.4.3 Direct Faunal Impacts

Nature: Increased levels of noise, pollution, disturbance and human presence will be detrimental to fauna. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present. Some mammals and reptiles such as tortoises would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present.

Extent: The extent of the impact would be largely restricted to the local area.

Potential Significance: Disturbance during the construction is likely to be high as a result of vegetation clearing, noise and human presence. However, during the operational phase impacts are likely to be of relatively low significance, given the low activity levels which will occur at this time.

14.1.4.4 Alien Plant Invasion

Nature: Disturbance at the site during construction would leave the site vulnerable to alien plant invasion. If such infestation is not controlled it may affect adjacent intact areas resulting in an impact on biodiversity or ecosystem function.

Extent: The extent of this impact would most likely be restricted to local area around the PV arrays, but could impact a wider area if severe infestations occur.

Potential Significance: Although this impact has potential significance, it can be reduced to a low level through clearing and alien plant management. Woody species would generate the most significant impacts, but these would be likely to be focussed on the drainage areas and invasion of these areas is unlikely to occur if they are suitably buffered from impact.

14.1.4.5 Impacts on Broad-Scale Ecological Processes

Nature: The development of the site will contribute towards the cumulative disruption of landscape connectivity as it will represent a hostile environment to many species which will be prevented from passing through the area.

Extent: The extent of the impact would be restricted to the local region.

Potential Significance: The significance of this impact is likely to be relatively low as the affected habitat is not likely to be of particular importance for avifauna. This is impact is likely to be of moderate to low significance.

14.2 ASSESSMENT METHODOLOGY

Direct, indirect and cumulative impacts of the issues identified above, will assessed during the Impact Assessment phase of the project according to the following standard methodology:

- The **nature** which shall include a description of what causes the effect what will be affected and how it will be affected.

- The **extent** wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):

- The **duration** wherein it will be indicated whether:

    - the lifetime of the impact will be of a very short duration (0- 1 years).
    - the lifetime of the impact will be of a short duration (2-5 years).
    - medium-term (5-15 years).
    - long term (> 15 years); or
    - permanent

- The **magnitude** quantified as small and will have no effect on the environment, minor and will not result in an impact on processes, low and will cause a slight impact on processes, moderate and will result in processes continuing but in a modified way, high (processes are altered to the extent that they temporarily cease) and very high and results in complete destruction of patterns and permanent cessation of processes.

- The **probability** of occurrence, which shall describe the (likelihood of the impact actually occurring. Probability will be estimated as very improbable (probably will not happen), improbable (some possibility, but of low likelihood), probable (distinct possibility), highly probable (most likely) and definite (impact will occur regardless of any prevention measures).

The **significance** which shall be determined through a synthesis of the characteristics described above and will be assessed as follows:

- **No significance**: the impacts do not influence the proposed development and/or environment in any way.

- **Low significance**: the impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.
- **Moderate significance**: the impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.
- **High significance**: the impacts will have a major influence on the proposed development and/or environment and will result in the "no-go" option on the development or portions of the development regardless of any mitigation measures that could be implemented. This level of significance must be well motivated.

and;

the status, which will be described as either positive, negative or neutral.

the degree to which the impact can be reversed.

the degree to which the impact may cause irreplaceable loss of resources.

the degree to which the impact can be mitigated.

14.3 PROPOSED ACTIVITIES FOR THE EIA PHASE

The current study is the result of a desktop study as well as a preliminary site visit. This significantly reduces the uncertainty associated with the study site and the potential impacts of the development. However, the specific development area for the Alpha PV Power Plant has not been investigated in detail and as a result, the number of listed and protected species within the footprint would need to be clarified. In addition, the following activities will be carried out in the EIA phase to characterise the site and assess the impact of the development on the receiving environment:

- Characterise the vegetation and plant communities present within the site in greater detail. On-site surveys will be conducted to generate a species list for the site as well as identify and where necessary map different plant communities present at the site if they are associated with different sensitivity classes.
- Locate, identify and map the location of significant populations of species of conservation concern, so that the final development footprint can be adjusted so as to avoid and reduce the impact on such species. Some species of concern may be widespread and others localised and the distribution of such species will be established during the site visit.
- Evaluate the likely presence of listed faunal species at the site and identify associated habitats that should be avoided to prevent impact to such species.
- Evaluate, based on the site attributes, what the most applicable mitigation measures to reduce the impact of the development on the site would be and if there are any areas where specific precautions or mitigation measures should be implemented.
- Assess the impacts identified above in light of the site-specific findings and the final layout to be provided by the developer.

14.4 CONCLUSION & RECOMMENDATIONS

No features of very high sensitivity have been identified within the AMDA Alpha Power Plant site. The majority of the site consists of low shrubland of medium-low sensitivity with few species or habitats of conservation present. Similarly, faunal diversity at the site is relatively low, largely as a

result of the low diversity of habitats present and there are few listed species present and the development would not impact significantly on listed fauna. In addition, the site is not within a CBA or NPAES Focus area and impacts on broad-scale ecological processes are likely to be low, even though there are 3 facilities planned at the site.

The major impacts associated with the development of the AMDA Alpha Power Plant, would be local habitat loss, and potentially the disruption of landscape connectivity. Although the number of renewable energy facilities in the area is relatively low, there may be additional facilities present in the area that are not yet registered on the DEA database and so the potential for cumulative impact may be greater than currently estimated. This will be investigated as part of the EIA phase. Overall, there do not appear to be any impacts that are likely to be associated with the development of the AMDA Alpha Power Plant that cannot be mitigated to a low level and most impacts are likely to be of moderate to low significance and of local extent. As such, the site is considered a favourable site for the development of the PV plant.

15 AVIFAUNAL CONSIDERATIONS

Mr Simon Todd and Mr Blair Zogbhy of Simoin Todd consulting have undertaken an Avifaunal Impact Assessment of the proposed AMDA Alpha PV Development. Note that due to the nature of potential avifaunal impacts, the Avifaunal assessment considers all 3 projects proposed on this portion of land.

15.1 AVIAN MICROHABITATS

While broad-scale vegetation patterns influence the distribution and abundance of bird species holistically, it is the fine-scale vegetation patterns and various avian microhabitats in an area that determine local avifauna populations.

A number of different avian microhabitats were identified at the site and these formed the basis of the avian site sensitivity map. These units include:

- *Karoo grassland/shrubland:* This habitat unit represents the majority of the vegetation in the study area (Bushmanland Arid Grassland) and is largely made up of extensive plains of white grasses and low shrubs. Although this habitat unit does not support the highest diversity and abundance of species, it does support numerous species of conservation concern (Kori Bustard *Ardeotis kori,* Ludwig's Bustard *Neotis ludwigii* and Karoo Korhaan *Eupodotis vigorsii*) as well as endemic and near-endemic passerine species.
- *Tall Shrubland:* Small patches of *taller shrubland* are scattered across the wider study area. This habitat unit supports a woodier component to the vegetation, with the small trees such as *Aloe dichotoma* and *Acacia mellifera* providing nesting and roosting sites for endemic passerines in the study area.
- *Washes & Drainage lines:* A number of small drainage lines bisect the study area and although many of these will seldom contain surface water, they are important for ecosystem functioning. The slightly deeper soils support a marginally higher biomass including woody species and provide a structural and compositional variation in the vegetation to the surrounding shrublands.

It should however be noted, that the study area has already been subject to varying degrees of disturbance and degradation caused by past and present land-use practises. Evidence of high stocking rates and grazing pressure is apparent. There is also a network of minor farm roads throughout.

Figure 22: Karoo grassland/shrubland (Bushmanland Arid Grassland) habitat unit, which forms the majority of the site as well as the majority of the development area.

Figure 23: Tall Shrubland habit unit with small trees such as *Aloe dichotoma* and *Acacia mellifera*. This habitat does not occur within the current proposed development footprint.

Figure 24: Washes and drainage lines habitat unit with marginally higher biomass, dominated mostly *by Phaeoptilum spinosum*.

15.2 AVIFAUNAL OCCURANCES

According to the SABAP 1 and SABAP 2 databases, only 93 bird species have been recorded within the study area and broader impact zone of the development. This total is limited by the number of SABAP cards recorded, with more species expected to occur. Of the species known to occur in the study area, 10 are red-listed or threatened, 31 are endemic and 20 are near-endemic. A total of 22 species were recorded during the site visit, most notable of which being the sightings of a pair of Karoo Korhaans and a Lanner Falcon *Falco biarmicus*.

The birds of greatest potential relevance and importance in terms of the possible impacts of the SEF and its associated power infrastructure are likely to be local populations of threatened or endemic passerines (Karoo Long-billed Lark *Certhilauda subcoronata*, Sclater's Lark *Spizocorys sclateri* and Black-eared Sparrowlark *Eremopterix australis*), shy ground-nesting species (Burchell's Courser *Cursorius rufus* and Double-banded Courser *Rhinoptilus africanus*), resident or visiting large terrestrial birds (Karoo Korhaan, Ludwig's Bustard, Kori Bustard and Secretarybird *Sagittarius serpentarius*) and resident or passing raptors (Lanner Falcon, Martial Eagle *Polemaetus bellicosus* and Verreaux's Eagle *Aquila verreauxii*).

In general, at the time of the site visit (24-26 February 2016), bird diversity and abundance was relatively low throughout the study area, with no particular avian microhabitat boosting a higher diversity or abundance than the other.

On the basis of the observations recorded during the field visit, and in combination with already documented information on the avifauna of the study area, 10 priority species are considered central in this avifaunal impact study. These are mostly threatened species which are known to occur, or could occur, in relatively high numbers in the study area and the broader impact zone of the development and which are likely to be, or could be, negatively affected by the SEF. Two species, Karoo Korhaan and Lanner Falcon, were recorded within the study area.

Overall, the avifauna of the study area and the broader impact zone of the SEF is not considered unique and is typical of what occurs across large areas of the Nama Karoo Biome, which therefore suggests that the sensitivity of the site, from an avian perspective, will not be of any great significance.

Table 9: Priority species list considered central to the avifaunal impact study for the proposed Straussheim Alpha, Bravo and Charlie Power Plants, selected on the basis of conservation status (Taylor *et al.*, 2015).

Common name	Scientific name	Conservation status	Regional endemism	Estimated importance of local population	Preferred habitat	Likelihood of occurring in study area	Susceptible to
Bustard, Kori	*Ardeotis kori*	Near-threatened	-	Moderate	Dry open savanna woodland, dwarf shrubland and occasionally grassland	High	Collision
Bustard, Ludwig's	*Neotis ludwigii*	Endangered	Near-endemic	Low	Semi-arid dwarf shrubland, also in arid savanna and fynbos	Moderate	Collision
Courser, Burchell's	*Cursorius rufus*	Vulnerable	Near-endemic	Low	Sparsely vegetated arid regions	Low	Disturbance
Eagle, Martial	*Polemaetus bellicosus*	Endangered	-	Moderate	Open savanna and woodland on plains, also semi-arid shrublands	Low	Collision, electrocution

Common name	Scientific name	Conservation status	Regional endemism	Estimated importance of local population	Preferred habitat	Likelihood of occurring in study area	Susceptible to
Eagle, Verreaux's	*Aquila verreauxii*	Vulnerable	-	Low	Mountainous regions and rocky areas with cliffs	Low	Collision
Falcon, Lanner	*Falco biarmicus*	Vulnerable	-	Low	Open grassland or woodland near cliff or electircity pylons	High	Collision, disturbance
Harrier, Black	*Circus maurus*	Near-threatened	-	Low	Fynbos, shrubland, dry grassland and croplands	Low	Collision, disturbance
Korhaan, Karoo	*Eupodotis vigorsii*	Near-threatened	Endemic	Moderate	Shrublands	High	Collision, disturbance
Lark, Sclater's	*Spizocorys sclateri*	Near-threatened	Endemic	Moderate	Arid to semi-arid sparsley vegetated stony plains	High	Disturbance
Secretarybird	*Sagittarius serpentarius*	Vulnerable	-	Moderate	Open grassland with scattered trees and shrubs	Moderate	Collision

15.3 AVIAN SITE SENSITIVITY MAP

The avian site sensitivity map was generated by integrating avian microhabitats present on site and avifaunal information collected during the site visit. It is important to delineate sensitive avian microhabitats within the study area in order to ensure the development does not have a long term negative impact on these habitats. Important avian microhabitats in the developable area play an integral role within the landscape, providing nesting, foraging and reproductive benefits to the local avifauna.

A series of *Medium-High* avian sensitivity areas have been identified in the study area - these were associated with the *Washes and Drainage lines* habitat unit. Well developed *Drainage lines* are considered to have a *High* sensitivity due to the fact that they support a higher biomass and provide structural and compositional variation in the vegetation, which therefore supports a higher diversity and abundance of bird species. However, within the affected portions of the site, no well-developed drainage lines are present and the vegetation in the washes of study area is not markedly different to that of the surrounding *Karoo grassland/shrubland* and therefore did not support a high diversity and abundance of bird species and is not considered high sensitivity as a result.

The remainder of the study area was assessed as being of *Medium* avian sensitivity. The vegetation in these areas is associated with the *Karoo grassland/shrubland* habitat unit which is fairly homogenous across the study area. This habitat unit lacks structural and composition variation and therefore does not support a high diversity or abundance of bird species.

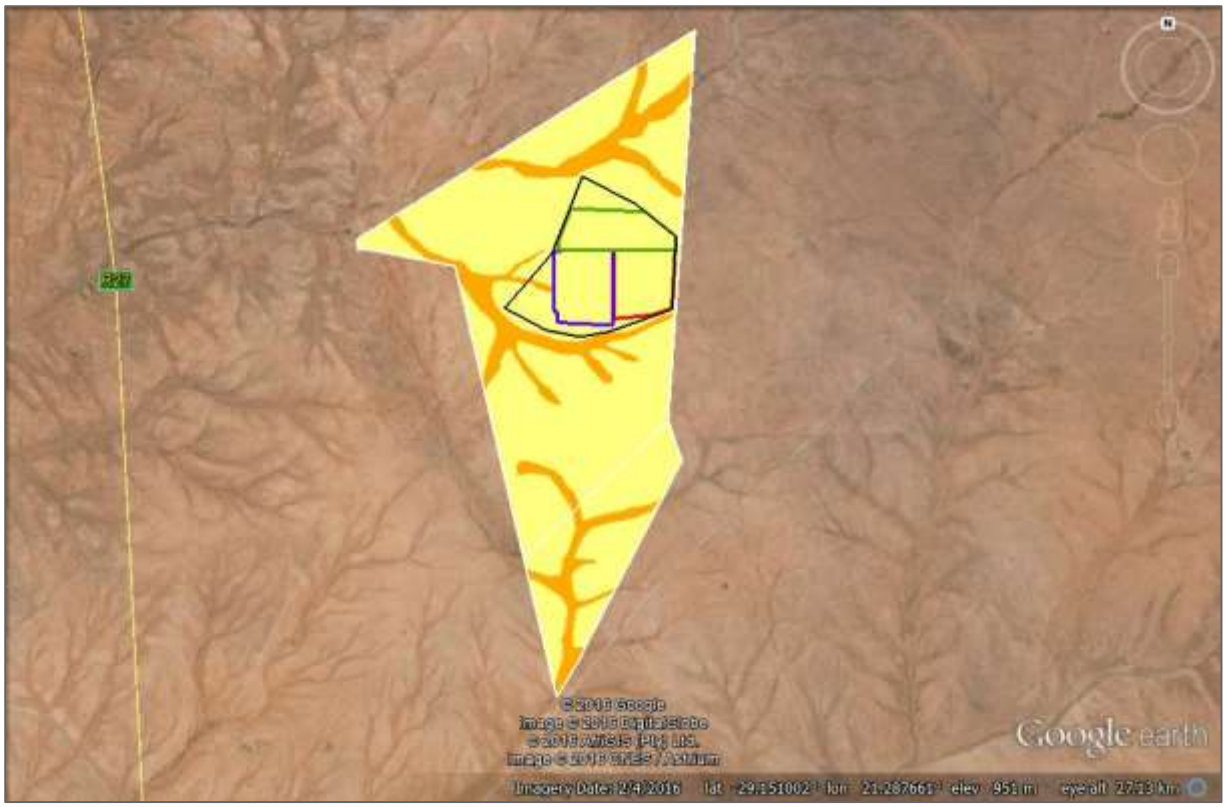


Figure 25: Avian site sensitivity map of the Straussheim SEF illustrating the property boundaries (white), study area (black) and preferred site layouts (Alpha = Red, Bravo = Blue and Charlie = Green).

15.4 SCOPING-LEVEL ASSESSMENT OF IMPACTS

Specific impacts of the proposed Straussheim SEF are most likely to be manifested in the following ways:

- Disturbance and displacement of local endemic passerines – Karoo Long-billed Lark, Sclater's Lark and Black-eared Sparrowlark – and shy ground-nesting species – Burchell's Courser and Double-banded Courser – from nesting and/or foraging areas by construction and/or operation and/or decommissioning of the SEF.
- Disturbance and displacement of resident or visiting large terrestrial species –Karoo Korhaan, Ludwig's Bustard, Kori Bustard and Secretarybird– from nesting and/or foraging areas by construction and/or operation and/or decommissioning of the SEF, and/or mortality of these species in collisions with new power lines whilst flying *en route* to distant resource areas.
- Disturbance and displacement of resident or visiting raptors – Lanner Falcon, Martial Eagle and Verreaux's Eagle – from foraging areas by construction and/or operation and/or decommissioning of the SEF, and/or mortality of these species in collisions with new power lines or by electrocutions when perched on power infrastructure.

Generally, however, the anticipated impacts on avifauna of the proposed development are not considered to be of any great significance if mitigation measures are applied. There will be some habitat loss for endemic passerines, some species – endemic passerines, large terrestrial species and raptors – may be displaced from a broader area either temporarily by construction and maintenance activities, or more permanently by the disruptive, reflective properties of the solar panels and ongoing activities at the operational development, and some species (large terrestrials and raptors) may be killed in interactions (collisions and electrocutions) with the new power lines and power infrastructure, but numbers affected are likely to be low.

15.5 LIKELY SIGNIFICANCE OF IDENTIFIED IMPACTS OF THE AMDA ALPHA SOLAR PV FACILITY

15.5.1.1 Habitat loss due to construction and maintenance activities

Nature: All construction and maintenance activities would result in a loss of vegetation and habitat affecting endemic passerines, large terrestrial species and raptors through site clearance for solar panels and power infrastructure, the construction of internal roads and the establishment of auxiliary buildings.

Extent: The total extent of the development is relatively low and would result in a concentrated local impact on avifauna up to a few hundred hectares. Within this area, the impact is likely to be relatively high, but if appropriate areas within the site are used, then it is not likely that the developments would have an impact on avifauna beyond the local on-site scale.

Potential significance: Habitat loss is likely to have a **low** impact due to the relatively small spatial extent of the proposed development and the already degraded nature of the study area.

15.5.1.2 Disturbance during construction and maintenance activities

Nature: All construction and maintenance activities would result in a disturbance impact affecting endemic passerines, large terrestrial species and raptors through vegetation clearing and the noise and movement of equipment and personnel.

Extent: The extent of this impact would largely be restricted to the local on-site scale, but may also impact bird species within a nearby radius of the development area.

Potential Significance: Disturbance and displacement during the construction phase is likely to be **medium** as a result of vegetation clearing, noise and human presence. However, during the operational phase, impacts are likely to be of **low** significance given the low activity levels which will occur at this time.

15.5.1.3 Collisions with power line infrastructure and solar panels

Nature: Collisions are the single biggest threat posed by power lines in South Africa (van Rooyen, 2004). Avian species most susceptible and impacted upon are bustards, storks, korhaans and certain raptors. Similarly so, but less of a threat, avifauna can be disorientated by the reflected light and confuse solar arrays for large bodies of water and attempt to land on them and injure/kill themselves in the process.

Extent: The extent of this impact would be local-regional, as transient birds may be affected as well.

Potential Significance: Collisions with power lines are likely to have a **medium** impact, as even with mitigation, it is envisaged that mortalities will still occur.

15.5.1.4 Avian electrocutions on power infrastructure

Nature: Avian electrocutions occur when a bird perches or attempts to perch on an electrical structure and causes an electrical short circuit by physically bridging the gap between live components and/or live and earthed components (van Rooyen, 2004b; Lehman *et al.,* 2007). Electrocutions of birds on associated power infrastructure results in injuries or death and could potentially affect large, perching species in the area such as raptors and storks.

Extent: The extent of this impact would be local-regional, as transient birds may be affected as well.

Potential Significance: Avian electrocutions are likely to have a **low** impact, as mitigation measures are usually effective in greatly reducing this impact.

15.6 COMPARISON OF SITE ALTERNATIVES

No site alternatives are being considered for the Alpha, Bravo and Charlie Power Plants. This is because the location of the sites followed an early-stage site visit to the area by the ecological specialist to eliminate sensitive area from the development footprint and identify the most favourable areas at the site for development. The results of this study support this result and no highly sensitive avifaunal features are within the development footprint. The following is a description of the site layout options in terms of their avian sensitivity.

The preferred site layout options of the proposed development falls within *Medium* sensitivity areas, associated with the *Karoo grassland/shrubland* habitat unit. The layout options avoid the *Medium-High* sensitivity *Drainage lines* and because all three developments are concentrated in one section of the developable area, it will reduce the overall footprint and contain impacts to that particular area. Bird species diversity and abundance was relatively low and as such, in terms of the potential impacts to avifauna, is considered to have acceptable levels of impact.

15.7 CONCLUSION

The study area and more specifically the proposed development area are not considered unique habitats in the landscape and are already subject to varying degrees of transformation and degradation. Although two threatened and/or priority species were recorded on-site – Karoo Korhaan and Lanner Falcon – the area is not considered critical for their conservation and the extent of habitat loss for these species would be considered low.

The proposed AMDA Alpha, Plant and their associated power infrastructure has been assessed as having a **medium-low** impact on priority species and general avifauna occurring in the study area and broader impact zone of the development. The development will pose several impacts to avifauna, including: a **low** displacement impact caused by disturbance and habitat destruction associated with construction and maintenance activities of the proposed SEF and its associated power infrastructure; a **low** impact of electrocutions of birds on power infrastructure, with the implementation of mitigation measures; and a **medium** impact of avian collisions with power line infrastructure and solar panels. Overall, from an avifaunal perspective the site is considered favourable for the establishment of the solar power plants.

16 VISUAL CONSIDERATIONS

Mr Stephen Stead of Visual Resource Management Africa has undertaken a Visual Impact Assessment of the proposed AMDA Alpha PV Energy Facility. Please refer to Appendix E7 from which the following is drawn.

The baseline section of the study serves to provide an understanding of the extent of the influence of the proposed landscape change, the degree of the change that will take place to the landscape, and the expected intensity by which the proposed landscape change is likely to be experienced by people around the site making use of the common landscape.

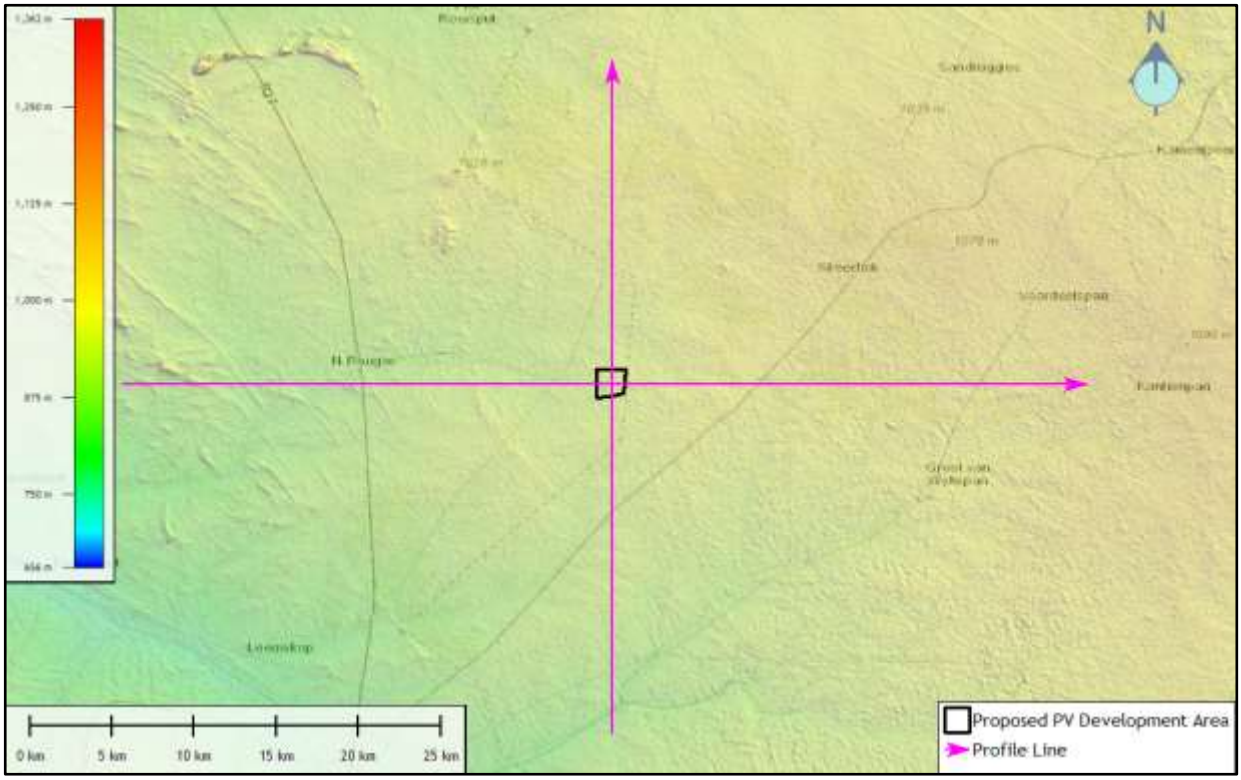


Figure 26: Regional topographic and profile locality map.

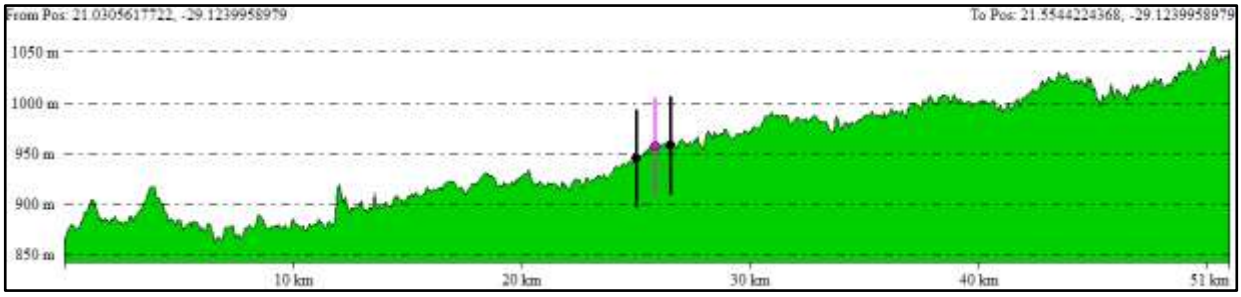


Figure 27: West to East topographic profile.

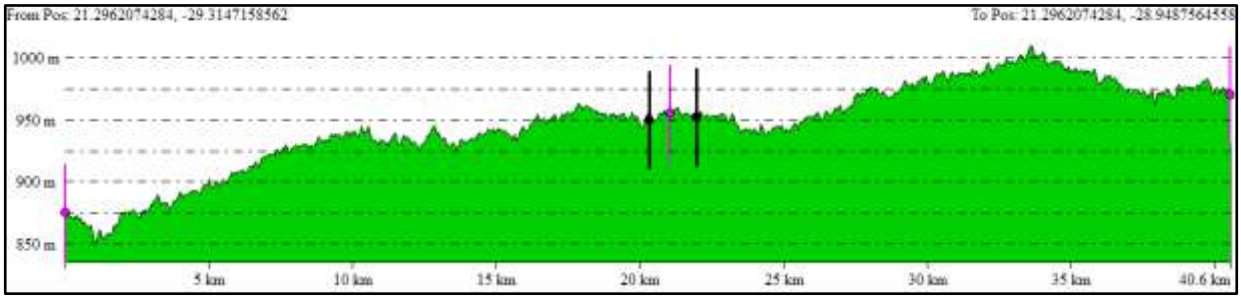


Figure 28: South to North topographic profile.

The terrain in which the proposed project is located is predominantly flat and typical of the Northern Cape Bushmanland landscape. Some hill features are located to the northwest of the proposed site but at a distance of approximately 25km and outside of the proposed project landscape context. As depicted in the West to East profile, the elevation fall is to the west with a total drop in elevation of 150m over a distance of 50km. The south to north profile depicts some variation with higher ground to the north, draining to the south. The total elevation fall across this profile is also similar to the West to East profile.

16.1 PROJECT VISIBILITY AND EXPOSURE

The visible extent, or viewshed, is 'the outer boundary defining a view catchment area, usually along crests and ridgelines' (Oberholzer, 2005). In order to define the extent of the possible influence of the proposed project, a viewshed analysis is undertaken from the proposed sites at a specified height above ground level as indicated in the below table making use of open source NASA ASTER Digital Elevation Model data (NASA, 2009). The extent of the viewshed analysis was restricted to a defined distance that represents the approximate zone of visual influence (ZVI) of the proposed activities, which takes the scale, and size of the proposed projects into consideration in relation to the natural visual absorption capacity of the receiving environment. The maps are informative only as visibility tends to diminish exponentially with distance, which is well recognised in visual analysis literature (Hull & Bishop, 1988).

Figure 29: Proposed Project Heights and Viewshed Constraints Table

Project Phase	Proposed Activity	Approx. Max. Height (m)	Approx. ZVI (km)
Construction	PV	5	12
Operation	Monopoles	25	6

As depicted below, the (4) viewsheds generated for the proposed PV structures have a constrained regional extent and as such is rated ***Medium***. The 2km buffer distance area depicts a full viewshed coverage, with fragmentation of views starting within the medium to high distance zone, where the viewshed is restricted to the southeast. Beyond the 6km distance, larger fragmentation takes place but only to the north. Beyond 12km, partial views could take place to the west but only on higher ground locations.

As depicted below, the (3) viewsheds generated along the proposed power line routing have a local extent and as such is rated ***Low***. The 2km high exposure area depicts full coverage, but views start to fragment in the 2km to 6km distance zone, limiting visual extent to the southeast areas. The 6km to 12km distance zone depicts fragmented views mainly from the north and a small section from the south.

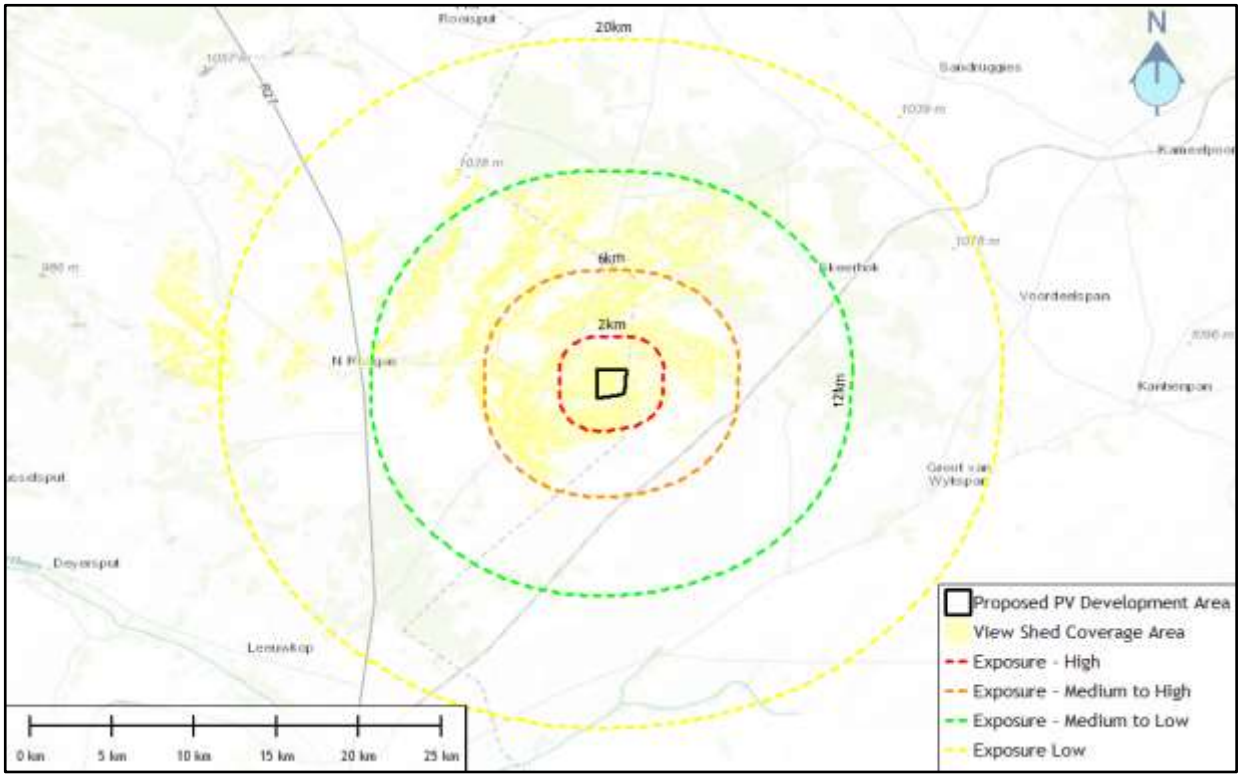


Figure 30: Viewshed for the PV structures at the high points generated from a 5m offset overlaid onto OS terrain Image.

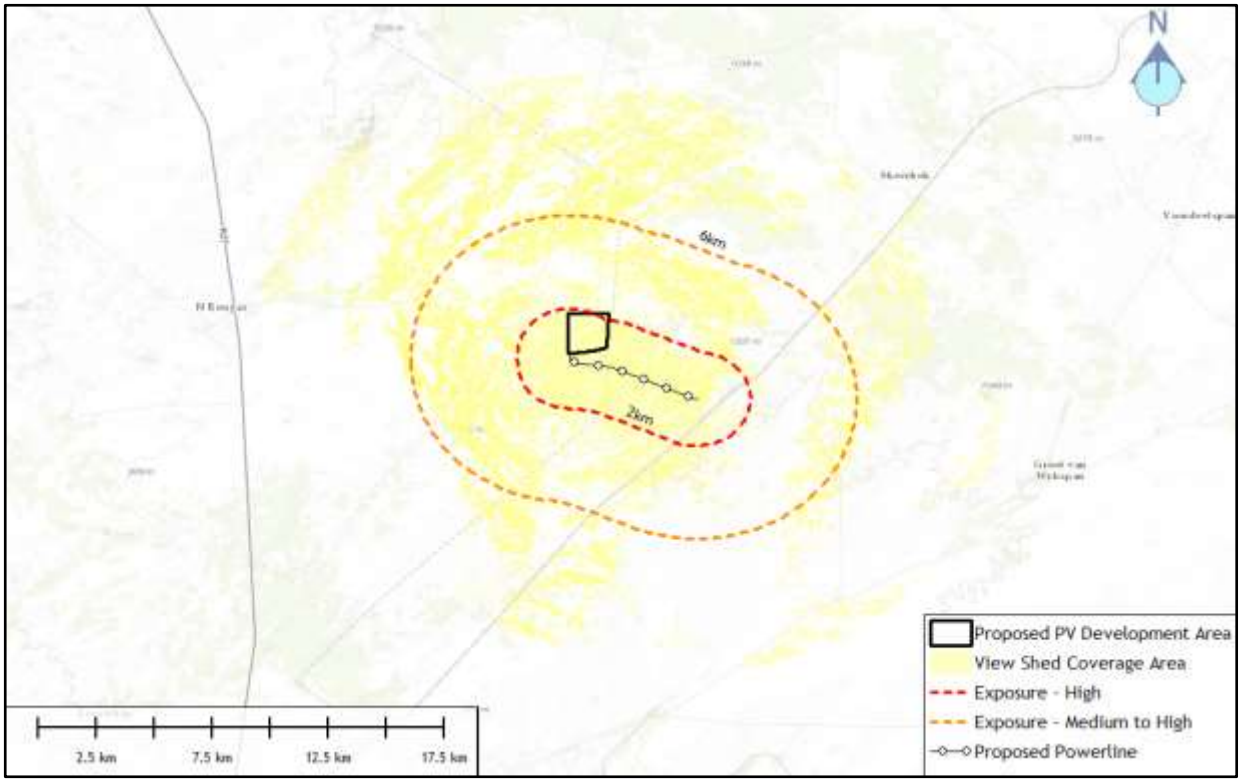


Figure 31: Viewshed for the power line structures at the high points generated from a 25m offset overlaid onto OS terrain Image.

Receptors and key landmarks located within the viewshed include:

<u>High Exposure</u>

- Kenhardt – Louisvale district road;
- Railway line.

Medium Exposure

- Isolated farmsteads.

The overall visual exposure of the proposed landscape modification to the surrounding receptors is defined as ***medium***. Although the Kenhardt – Louisvale road is located within the 2km high exposure distance zone, the area is very remote and the road predominantly services isolated farms in the areas, and as such moderates receptor exposure.

16.2 REGIONAL LANDSCAPE CHARACTER

Landscape character is defined by the U.K. Institute of Environmental Management and Assessment (IEMA) as the 'distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement'. It creates the specific sense of place or essential character and 'spirit of the place'. (IEMA, 2002)

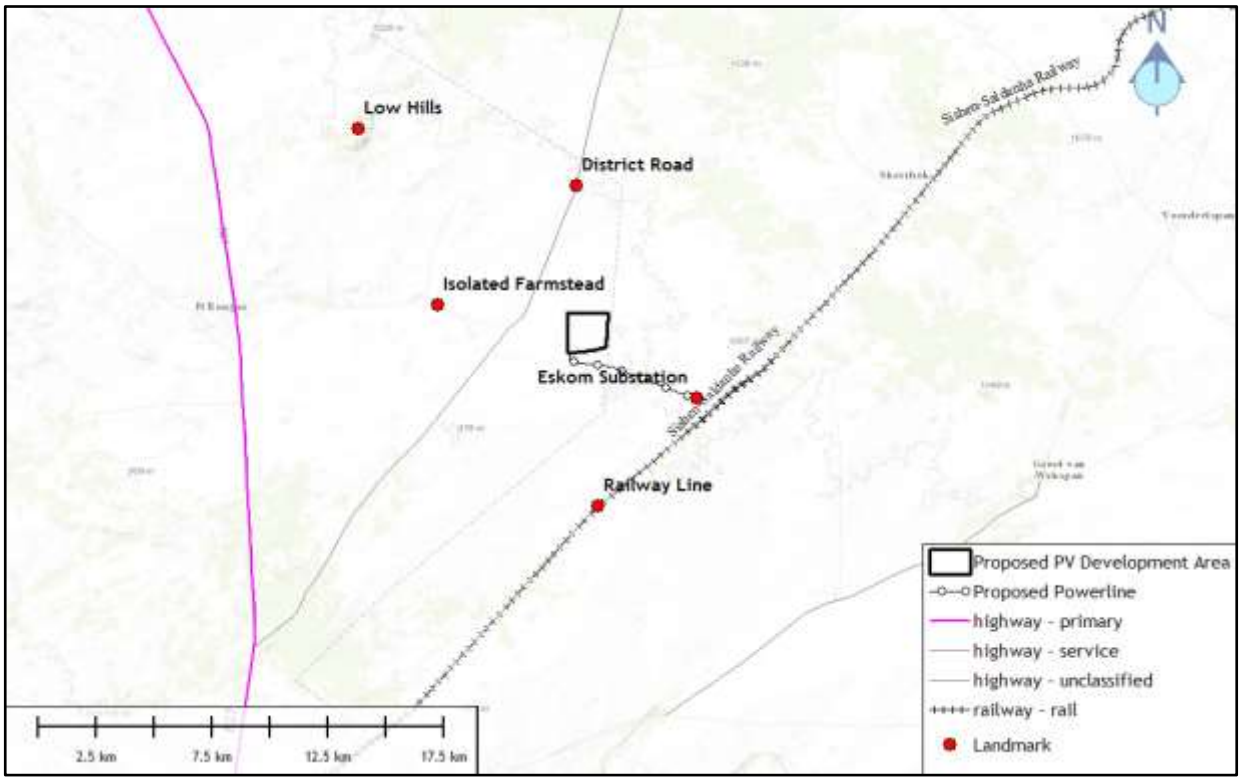


Figure 32: Surrounding landmark photograph location point and profile lines map.

Figure 33: Photograph looking south from the proposed power line route towards the Eskom Nieuwehoop substation.

Figure 34: Photograph looking south of Eskom power line corridor that links to the Nieuwehoop substation.

Figure 35: Photograph looking west towards the Straussheim farmstead cluster of buildings and low hills in the background.

Figure 36: Photograph looking north from the Kenhardt – Louisvale district road with telephone poles routed on the eastern side.

16.2.1 Vegetation

According to Mucina & Rutherford and as confirmed by the Botanical Specialist the broad vegetation is described as Bushmanland Arid Grasslands, which forms a part of the Nama-Karoo Biome. The Plantzafrica website, the Nama Karoo Biome occurs on the central plateau of the western half of South Africa, at altitudes between 500 and 2000m, with most of the biome falling between 1000 and 1400m. “The geology underlying the biome is varied, as the distribution of this biome is determined primarily by rainfall. The rain falls in summer, and varies between 100 and 520mm per year. This also determines the predominant soil type - over 80% of the area is covered

by a lime-rich, weakly developed soil over rock. Although less than 5% of rain reaches the rivers, the high erodibility of soils poses a major problem where overgrazing occurs. The dominant vegetation is a grassy, dwarf shrubland. Grasses tend to be more common in depressions and on sandy soils, and less abundant on clayey soils." (Plantzafrica)

16.2.2 Other Projects

As depicted below, due to the location of the proposed site in the Northern Cape within the Renewable Energy Development Zones (REDZs) Area 7, other renewable projects are also located within the vicinity. Located due east of the proposed project site is a Mulilo PV project that is currently in EIA process. The location of many renewable projects around the Eskom substation is likely to create a strong cumulative change to the landscape character.

Figure 37: Google Earth map depicting the Department of Environmental Affairs Renewable Energy projects.

16.2.3 Infrastructure

Three main linear infrastructure elements were identified within the surrounding areas: Sishen – Saldanha Railway Line, the Eskom power line corridors and the Kenhardt – Louisvale district road. The railway line is low in profile and offers a limited visual footprint and does not carry any passengers. The Eskom power line currently comprises a single 400kV power line which links to the Nieuwehoop substation located approximately 4km to the southeast of the proposed site. A second parallel line is currently being constructed. The large size of the 400kV power line do create a strong visual presence and dominate the landscape character within the foreground / middle ground distance zones. The Kenhardt – Louisvale district road is gravel and links the small agricultural towns of Kenhardt in the south, to Loiusvale in the north (on the Orange River). The road is scenic in its setting, but is not an important tourist route due to the almost 60km length of the gravel road.

16.2.4 Landuses

The predominant land use in the area is dryland agriculture, with all properties zoned agricultural. ue to the low carrying capacity of this dryland area, the farms are large in scale.

16.2.5 Tourism

No tourism activities were identified during the field survey or making use of a Google Earth tourism search.

16.3 SITE LANDSCAPE CHARACTER

Topographic statistics indicate that the site comprises an area of 2.4 sq. km. The minimum elevation is 939 mamsl and the maximum elevation is 966 mamsl, with the average elevation set as 953 mamsl. The maximum slope percentage indicated 10 degrees and the average slope is a gradual 3.2 degrees. The dominant aspect is to the west. Following the north-south extent of the site is a drainage line that drains to the north. The vegetation is mainly comprised of Bushmanland Arid Grasslands and shallow washes.

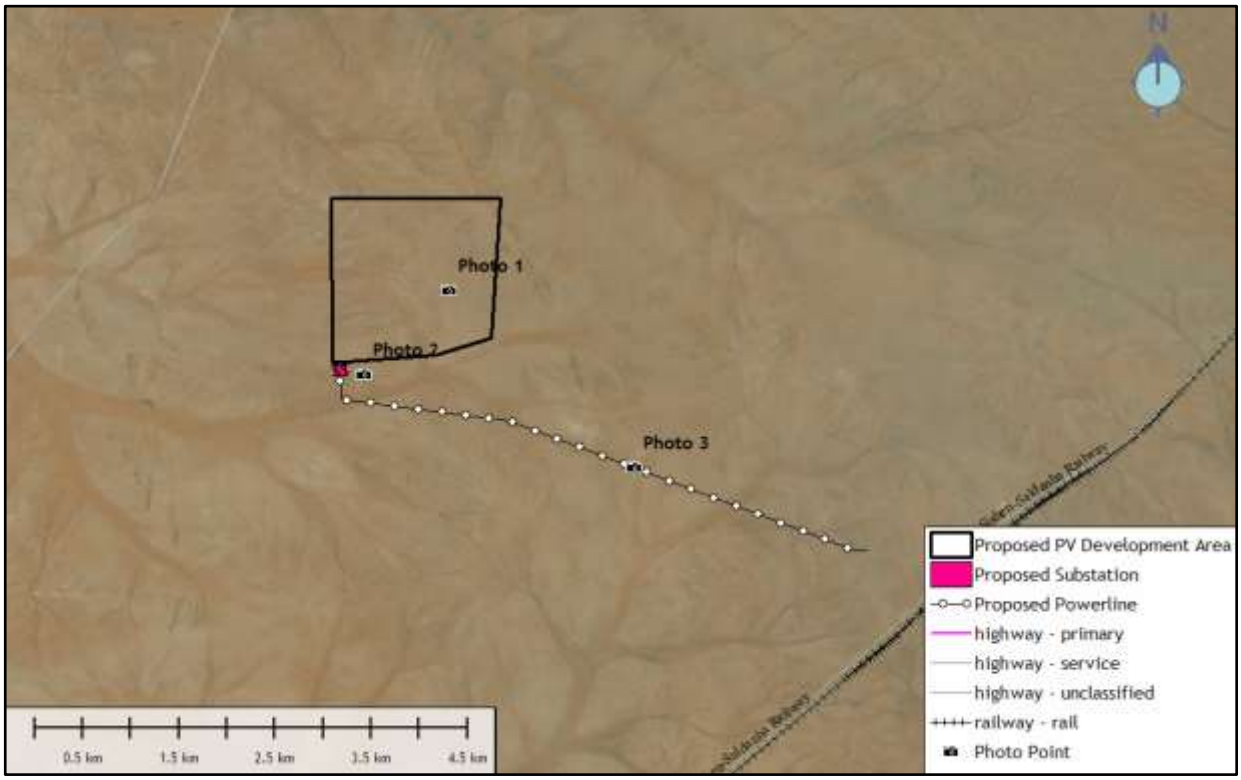


Figure 38: Site photograph locality overlay only OS satellite image map.

Figure 39: Photograph in a south-easterly direction showing the isolated quiver trees (Aloe dichotoma) with the substation and cell phone tower in the background.

Figure 40: Photograph in a westerly direction towards the proposed substation site with low hills visible in the background.

Figure 41: Photograph taken in a south-easterly direction along the proposed power line routing towards the existing Eskom substation, power lines and the cell tower.

16.4 VISUAL RESOURCE MANAGEMENT (VRM) CLASSES

In terms of the VRM methodology, landscape character is derived from a combination of scenic quality, receptor sensitivity to landscape change, and distance of the proposed landscape modification from key receptor points. These three criteria are rated in terms of the VRM scenic quality and receptor sensitivity questionnaires that are appended to the addendum. The Classes are not prescriptive and are utilised as a guideline to determine the carrying capacity of a visually preferred landscape that is utilised to assess the suitability of the landscape change associated with the proposed project. Due to the uniformity of the site, only a single landscape was defined for the Bushmanland Arid Grassland area.

16.4.1 Scenic Quality

The scenic quality is determined making use of the VRM scenic quality questionnaire (refer to addendum). Seven scenic quality criteria area scored on a 1 (low) to 5 (high) scale. The scores are totalled and assigned a A (High), B (Moderate) or C (low) based on the following split:

A= scenic quality rating of ≥19;

B = rating of 12 – 18,

C= rating of ≤11

Table 10: Landscape Scenic Quality rating table.

Landscape	Bushmanland Grasslands
Landform	1
Vegetation	3
Water	2
Colour	2
Adjacent scenery	4
Scarcity	1
Cultural modifications	0
Score	13
Category	B

(A= scenic quality rating of ≥19; B = rating of 12 – 18, C= rating of ≤11)

16.4.2 Receptor Sensitivity

Sensitivity levels are a measure of public concern for scenic quality. Receptor sensitivity to landscape change is determined by rating the following factors in terms of Low to High:

Table 11: Landscape Receptor Sensitivity rating table.

Landscape	Bushmanland Grasses
Type of user	L
Amount of use	L
Public interest	L
Adjacent land users	M
Special areas	L
Score	L

(H = High, M = Moderate, L = Low sensitivity)

16.4.3 VRM Class Objectives

The BLM has defined four Classes that represent the relative value of the visual resources of an area and are defined making use of the VRM Matrix below:

i. **Classes I and II** are the most valued
ii. **Class III** represent a moderate value
iii. **Class IV** is of least value

Table 12: VRM Class Matrix Table

		VISUAL SENSITIVITY LEVELS								
		High			Medium			Low		
SCENIC QUALITY	A (High)	II	II	II	II	II	II	II	II	II
	B (Medium)	II	III	III/ IV *	III	IV	IV	IV	IV	IV
	C (Low)	III	IV	IV	IV	IV	IV	IV	IV	IV
DISTANCE ZONES		Fore/middle ground	Background	Seldom seen	Fore/middle ground	Background	Seldom seen	Fore/middle ground	Background	Seldom seen

* If adjacent areas are **Class III** or lower, assign **Class III**, if higher, assign **Class IV**

Table 13: VRM Class Summary Table

Landscape Area	ZVI	Scenic Quality	Receptor sensitivity	Visual Inventory	Visual Resource Management
Drainage Lines	NA				Class I
Bushmanland Grasslands	FG/MG	B	Low	Class IV	Class III

(Key: FG = Foreground, MG = Middle ground, BG = Background)

Class I

Class I is assigned when legislation restricts development in certain areas. The visual objective is to preserve the existing character of the landscape, the level of change to the characteristic landscape should be very low, and must not attract attention. A Class I visual objective was assigned to the following features within the proposed development area due to their protected status within the South African legislation:

- Any river / streams and associated flood lines buffers identified as significant in terms of the WULA process.
- Any wetlands identified as significant in terms of the WULA process.
- Any ecological areas (or plant species) identified as having a high significance.

Class II

Class II visual objectives were assigned to the following features:

- No Class II landscape were defined.

Class III

Class III visual objectives were assigned to the following landscapes:

- Bushmanland Grasslands.

Based on the VRM matrix, the inventory landscape was rated Class IV due to the medium scenic quality and the low receptor sensitivity. However, due to the current agricultural zoning of the site and the surrounding areas, the inventory class was changed to Class III to protect the surrounding agricultural sense of place. The Class III visual objective is to partially retain the existing character of these rural landscapes, where the level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer, and changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV

Class IV visual objectives were assigned to the following features:

- No Class IV landscape were defined.

16.5 KEY OBSERVATION POINTS

Key Observation Points (KOPs) are defined by the Bureau of Land Management as the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed. These locations are important in terms of the VRM methodology, which requires that the degree of contrast that the proposed landscape modifications will make to the existing landscape be measured from these most critical locations, or receptors, surrounding the property.

The main receptors for this site, where clear views of the proposed project could result in a change to local visual resources, are:

- Kenhardt – Louisvale district road northbound.
- Kenhardt – Louisvale district road southbound.

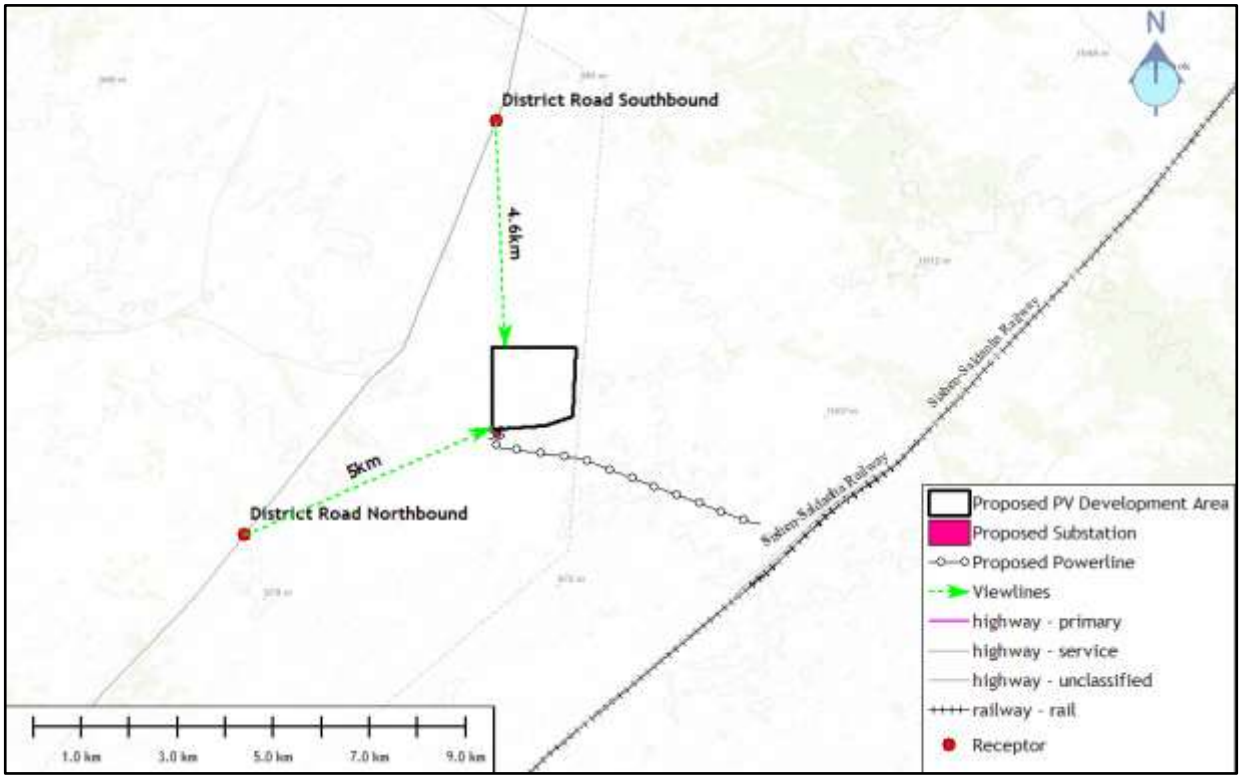


Figure 42 : Map depicting the main receptor locations associated with the proposed study area.

Figure 43: Photograph taken from the district road northbound depicting the approximate location of the site.

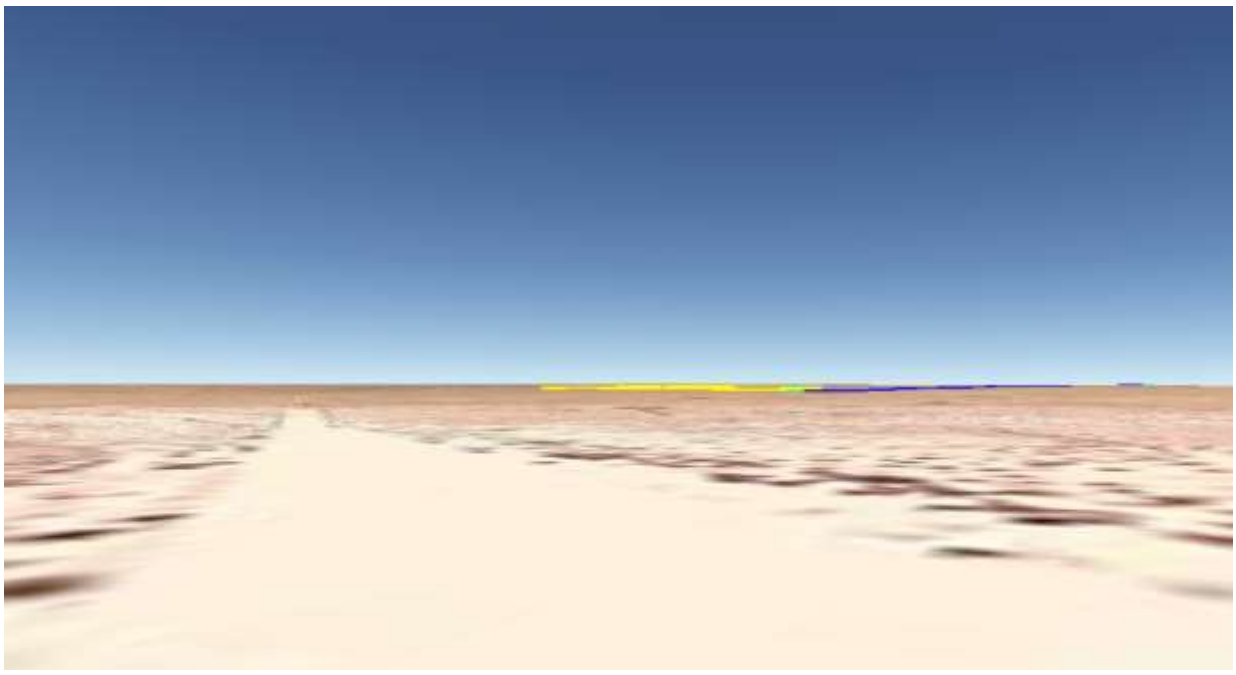


Figure 44: Google Earth 3D perspective view from similar northbound location (Yellow = Alpha PV, Green = Substation, Blue = Power Line).

Figure 45: Photograph taken from the district road southbound depicting the approximate location of the site.

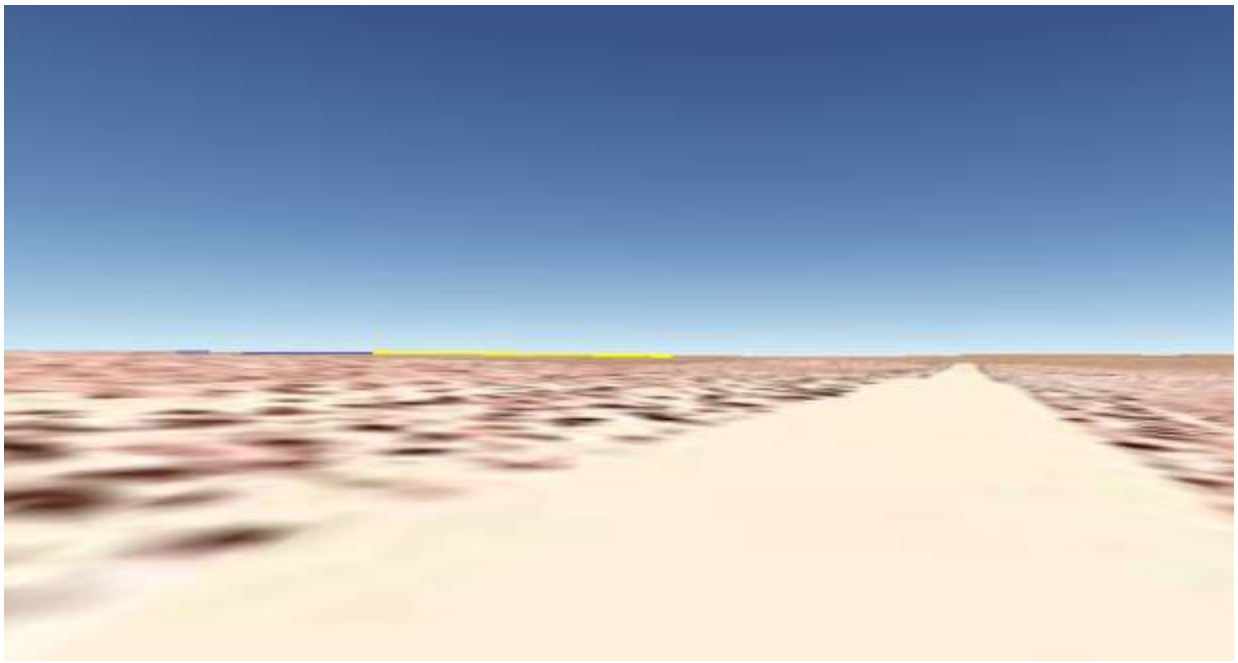


Figure 46: Google Earth 3D perspective view from similar northbound location (yellow = Alpha PV, Green = Substation, Blue = Power Line).

16.6 FINDINGS

16.6.1 Visual Absorption Capacity

The VAC of the site is rated ***low***. This is due to the very flat nature of the terrain with limited vegetation or built environment, within the Bushmanland Arid Grassland landscape. The existing Eskom substation and power lines do generate some visual contrast, however, these features are located approximately 4 km to the south of the site and as such do not significantly increase the capacity of the site to visually absorb the proposed PV landscape modifications.

16.6.2 Project Visibility

The viewshed generated from 4 corner points of the proposed project area is defined as ***local*** in extent. The 2km buffer distance area depicts a full coverage, with fragmentation of views starting in the medium to high distance where the viewshed is restricted to the southeast. Beyond the 6km distance, larger fragmentation takes place but only to the north. Beyond the 12km distance, partial views could take place from the west but only on higher ground locations.

16.6.3 Project Exposure

The receptor exposure to the proposed landscape modification is defined as ***medium***. Although the Kenhardt – Louisvale road is located within the 2km high exposure distance zone, the area is very remote as the road predominantly services isolated farms in the areas, and as such moderates the exposure.

16.6.4 Scenic Quality

The Scenic Quality rating for the Bushmanland landscape is rated ***Medium to Low***. Landform is rated *low* as it has few interesting landscape features. Vegetation is rated *medium,* as some Quiver Trees (Aloe dichotoma) were located on site that are a protected plant species (subject to Botanical Specialist findings). Water was absent but evident in the few shallow washes found on the site. Colours are grey-browns from the vegetation with the sandy soils being a lighter brown in colour. The subtle colour variations of the browns added some value to the site landscape. Adjacent scenery was rated *medium to high* due to the open and wide views of the Bushmanland Arid Grassland landscape. The routing is moderated by the adjacent scenery with the Eskom substation and power lines located within the foreground / middle ground area. Scarcity was rated *low* as, although interesting in its setting, the landscape is fairly common within the region. Cultural modifications include farm tracks and fences, and agricultural reservoirs that neither added nor detracted from the site sense of place.

16.6.5 Receptor Sensitivity

Receptor Sensitivity to landscape change was rated ***Low***. The types of users are predominately agricultural with no evidence of tourism, and as such are rated *low*. The Amount of Use and Public Interest is rated *low* as the location is remote and results in very little public usage. Adjacent users are mainly agricultural who will continue with their existing landuses. The area is not defined as a Special Area and as such is rated *low*.

16.7 CONCLUSION

It is the recommendation of the visual assessment that the proposed Straussheim Alpha PV development should be authorised. Without mitigation the Visual Significance for all phases of development is likely to be medium. With mitigation, the Visual Significance for all phases is likely to be low.

Although the VAC level of the Bushmanland Arid Grassland landscape is low, the location is remote and receptor sensitivity to landscape change is likely to be low. The flat terrain of the surrounding areas does increase the viewshed, but the limited height of the PV structures, and small visual footprint of the monopoles, is likely to contain the zone of visual influence to within a local level. The site scenic quality is rated medium, but does not comprise a significant feature in the overall landscape. Cumulative Effects could arise from the combined visual massing of all the proposed PV power lines converging on the Eskom Nieuwehoop substation. If not effectively integrated by the different projects, congestion could take place. However, due to the remoteness

of the locality, the visual significance of the cumulative effects across all phases without mitigation is rated Low, which can be reduced to Very-Low with mitigation.

17 HERITAGE CONSIDERATIONS

Mr Stefan de Kock of Perception heritage consultants has undertaken an integrated heritage assessment of the proposed AMDA Alpha PV Energy facility. The integrated specialist study encompasses three studies (undertaken by separate specialists) that will be collated into a single study. The key disciplines in this study include:

- **Built Environment** and **Landscape considerations** – Mr Stephan de Kock (Perception Heritage Consultants) – Annexure E5
- **Archaeology** – Dr Peter Nilssen – Annexure E3
- **Palaeontology** – Dr John Almond (Natura viva) – Annexure E4

The integrated heritage study will be provided to the competent heritage authority, SAHRA, to inform their decision making process.

17.1 ARCHAEOLOGICAL BACKGROUND

17.1.1 Study Area

A detailed description of the receiving environment will be given in the future AIA report following the archaeological foot survey. This will include topography, vegetation cover, geological sediments, archaeological visibility, exposed and disturbed surfaces and existing recent disturbances to the landscape. Nevertheless, Google Earth imagery suggests that vegetation cover is sparse and open, and therefore, archaeological visibility will be good and adequate for an assessment. Several small - likely intermittent - drainage lines are visible in Google Earth imagery, and therefore, it is anticipated that archaeological resources may occur in association with such existing and/or ancient water sources. It is also noted that a few recent disturbances occur within the study area including dams and possible structures of recent origin as well as single vehicle tracks. No major disturbances to surface sediments is evident. The topography appears mostly flat to slightly undulating.

17.1.2 Overview of Previous Studies

To the best of my knowledge, no archaeological or heritage related study has been undertaken on the affected property. Most of the information concerning the history and archaeology of the surroundings was obtained through heritage and archaeological studies associated with environmental impact assessments for a variety of development activities. More recently, the bulk of these assessments are associated with the development of alternative energy facilities and particularly solar energy facilities and associated infrastructure.

The Northern Cape Province has a rich and long archaeological record that spans the entire Stone Age, includes a few potential remnants of Iron Age sites further to the east, rock art sites with both engraved and painted rock surfaces, traces of the Anglo-Boer war, indigenous and colonial contact sites and more recent historic occupation and development of the region. A detailed and general account of the history, heritage resources and associated hominin and human behaviours in this portion of South Africa has already been written and is not repeated here (e.g. Küsel and Küsel 2015). Of relevance here is the nature of the archaeological record in the surroundings of the present study area, which give an indication of the type of heritage resources that are expected to occur in the proposed development site.

Overall, there is a widespread, but ephemeral scatter of Stone Age stone artefacts across the landscape that are of low heritage value due to their temporally mixed nature and the absence of faunal and other cultural remains. Higher density scatters of stone artefacts are commonly associated with pans, drainage lines and rocky outcrops or ridges. The entire range of the Stone Age sequence is found in varying proportions of representation, but includes Early Stone Age (ESA), Middle Stone Age (MSA) and Later Stone Age (LSA) materials. MSA and ESA artefacts are more common that materials of LSA origin, Stone artefact scatters are usually located in areas with exposed gravels, and are less common to absent in areas with sandy surface sediments (Kaplan 2011a, 2011b, 2012a & 2012b, Nilssen 2015, Orton 2011a, 2011b, 2014a & 2014b, Orton & Webley 2013a, Pelser 2011 and Webley & Halkett 2010 & 2012). Archaeological resources are particularly rare in the surroundings of Kenhardt. A study along the Hartebeest River near Kenhardt, a setting where such resources are expected to be more common, found very few archaeological traces (Morris 2009). This pattern of very low hominin and human occupation of the surrounding environment is almost certainly due to the lack of predictable water sources. Although rock art has been documented in the region, there are no known rock art sites in the immediate surroundings of Kenhardt (Morris 1988, Morris & Beaumont 1994, Orton 2013, Orton & Webley 2012a and Rudner & Rudner 1968).

As in prehistoric times, historic occupation of the surroundings is very scanty, and very large farms result in farmsteads being widely separated in the landscape. The bulk of the farmsteads, as well as the majority of structures in the town of Kenhardt, are of recent 20th century origin (Orton 2014a). The only proclaimed heritage site in the surroundings of the present study area is a pioneer house, one of the oldest buildings in Kenhardt, built in 1897, which is a registered Provincial Heritage Site (Orton 2014a).

"The Anglo-Boer War played an important role in the central parts of South Africa leaving many traces of its events. Block houses, battlefields and graves litter the region. Kenhardt only saw a small amount of action. On 25th February 1900 Koos Jooste and Andries de Wet occupied Kenhardt with 12 men. They fired on the town guard when ordered to halt, but eventually took over the town and locked the town officials in jail for a few days before ordering them to leave town. On 1 March 1900, 200 recruits joined the Boer forces in Kenhardt. They were addressed by Commandant Lucas Steenkamp, after which they went into training. On hearing of the British approach, a group of 130 men under Field Cornet Borrius moved to Rietfontein, 2 km south of Kenhardt, to defend the town from British forces who were on their way to the lower Orange River Valley to suppress the Boers in the area. However, before the arrival of the British, the forces at Kenhardt decided to surrender due to a decision made by a Boer war council in Upington on 20th March to disband the rebel force. By the end of March the 6 week uprising of the Cape Afrikaners in the region had ended. On 31st March the British reoccupied Kenhardt, stationing a small garrison in the town. After a failed Boer uprising in the North Western Cape, many rebels were detained by the British and, with the jail in Upington totally full by April 1900, more than 100 rebel Boers where detained in a camp outside Kenhardt. As part of a string of executions across the Cape, two Boer rebels, H.L. Jacobs and A.C. Jooste, were executed in Kenhardt by the British on 24 July 1901, on accusations of treason. In January 1902 a British force of about 800 men began gathering at Kenhardt. They left on 10 January to quell the Boer force in Kakamas. On 11 January the battle of Kakamas began and ended with a victory for the Boers when the British departed on 13 January" (Orton 2014a, pages 9 & 10).

Heritage related finds made during heritage and archaeological impact assessments in the surroundings of the present study area include the following (arranged alphabetically by report authors): cultural materials of Stone Age and historic origin were identified in certain parts of the studied area, but none were located in the development footprints, due to the potential presence of

significant heritage resources it is recommended that the selected development areas undergo a detailed ground truthing investigation prior to commencement of construction, Gaigher noted that most studies in the area reported a general scarcity of heritage resources in the surrounding environment and that scatters of Stone Age implements are the most common (Gaigher 2013); very low density scatters of Stone Age implements mainly in quartz that are considered to be of low significance, quartz outcrops with evidence of flaking for the procurement of raw materials to make stone artefacts, the best archaeological resources are stone artefact scatters of mainly LSA origin and that are associated with pans (water sources), some of these scatters included ostrich eggshell fragments and a few pieces of bone, a single ESA hand axe was identified, one historical, rock lined stock post including a few pieces of historic material culture such as metal, ceramics and glass, a possible grave, the LSA sites around pans are considered to be of medium significance and would require mitigation in the event that they will be impacted by development (Orton 2014a); very low density scatters of Stone Age implements mainly in quartz, but also in quartzite and other raw materials, that are considered to be of low significance, most of these artefacts appear to be of MSA origin, due to their low significance it is recommended that no mitigation is required, a few quartz outcrops with evidence of flaking for the procurement of raw materials to make stone artefacts, a pan lying outside the study area was fringed by four probably LSA stone artefact scatters in quartz including a lower grindstone, due to the absence of fauna or other cultural remains these scatters were considered to be of low significance, the larger of two rocky hills on the property contained heritage resources in the form of quartz stone artefact scatters, a historical stock post, and a small rock shelter contained a few stone artefacts, fragments of bottle glass and a piece of metal, items of historic age, mainly glass, were found elsewhere in the study area (Orton 2014b); very low densities of MSA artefacts identified at quartz outcrops, flake and blade technology suggests MSA age and the dominant artefact type are irregular scrapers, due to their very low densities these finds are considered to be of low significance and it is recommended that they can be disturbed without a permit from SAHRA (van Ryneveld 2007); a few stone tools were observed but do not constitute any major sites (Williams 2014).

Overall, a pattern emerges showing that archaeological resources are most commonly clustered around existing and ancient drainage lines, pans, and ridges with rocky outcrops, and that heritage resources are generally absent from flatlands that are some distance from existing or ancient water sources. Further, Stone Age occurrences are more common among gravels as opposed to sandy surface sediments. Based on the findings of the above impact assessments, it is likely to find mainly Stone Age materials in the affected area with lesser potential for the occurrence of historic heritage resources.

17.1.3 Potential Impacts on Archaeological Resources

Because tangible heritage resources are non-renewable and each archaeological occurrence is unique, it is important that areas affected by development are assessed for the presence and sensitivity of such resources prior to development. The proposed development will involve both area and linear developments that could have a permanent negative impact on archaeological resources if they were to occur in the affected areas. This scoping study has shown that archaeological resources do occur in the surrounding environment. The purpose of the broader EIA process is to assess the sensitivity of environmental resources in the affected area, to determine the potential impacts on such resources, and to avoid and/or minimize such impacts by means of management and/or mitigation measures. The future AIA will serve the same purpose concerning archaeological resources.

Because the planning and design phase of the development is being informed by the broader EIA, any direct negative impacts on significant environmental resources can be avoided or minimized by

altering the design and layout plans accordingly. A construction phase Environmental Management Plan (EMP) will further avoid or minimize direct negative impacts.

Potential direct negative impacts on archaeological and tangible heritage resources will occur during the construction and installation phase of the proposed development. Indirect and cumulative impacts may occur during the operational phase, but these can be avoided or minimized by means of an EMP that should be implemented during the operational phase of the development.

Previous studies, as detailed above, have shown that archaeological resources occur in the surrounding environment and that they are most commonly associated with existing and/or ancient water sources such as pans, drainage lines, rivers and river valleys, as well as ridges with rocky outcrops. Since existing and ancient water sources occur in the study area, it is anticipated that Stone Age materials will occur with a lower likelihood of significant historic materials being present. Google Earth imagery indicates that, apart from modern dams and vehicle tracks, historic occupation is absent. This, however, can only be confirmed through ground truthing.

17.1.4 Methodology for the Archaeological Impact Assessment

The purpose of an AIA is to conduct survey of the affected areas in order to identify, record and rate the significance of archaeological resources, to assess the impact of the proposed area and linear developments on such resources, and to recommend mitigation measures where necessary.

To assess the nature and significance of the archaeological record in the affected areas, it is necessary to conduct a comprehensive foot survey. The latter will cover the entire affected property, proposed access road location and alignment, as well as the power line route from the on-site sub-station to the Eskom Nieuwehoop MTS sub-station (Figure 2).

The potential for different landforms, sediments or landscape features to contain archaeological traces is assessed according to type, such as rocky surfaces, sandy surfaces, cultivated areas, previously developed or disturbed areas, rock shelters, and so on. Overall, the significance of archaeological occurrences or sites are evaluated in terms of their content and context. Attributes to be considered in determining significance include artefact and/or ecofact types, rarity of finds, exceptional items, organic preservation, aesthetic appeal, potential for future research, density of finds and the context in which archaeological traces occur.

Based on previous work conducted in the immediate surroundings, it is likely that open vegetation and large expanses of exposed ground surfaces will provide good archaeological visibility that will allow for a good understanding of the archaeological record in the area. Initially, the field work will focus on existing and potential ancient water sources and thereafter survey walk tracks will be spaced about 200m apart. In the event that archaeological sources are common or unpredictable in the study area, the distance between survey walk tracks will be narrowed to about 50m or less apart.

Walk tracks will be fixed with a hand held GPS to record the search area. The position of archaeological occurrences, observations and photo localities will also be fixed by GPS. Digital audio notes of observations and a comprehensive, high quality digital photographic record will also be made.

Once archaeological traces have been identified, recorded and assessed in terms of their significance, the aim of the AIA is to assess the potential negative impacts of the proposed developments on such resources and to make recommendations in mitigation. The end product of the AIA is a report that forms part of the broader Integrated Heritage Impact Assessment

undertaken by Perception Planning and that meets standards required by the South African Heritage Resources Agency (SAHRA) in terms of the National Heritage Resources Act, No. 25 of 1999. The AIA report will give detailed results from fieldwork, will assess potential negative impacts associated with the proposed development, and will make recommendations in mitigation where necessary.

17.2 PALAEONTOLOGICAL CONSIDERATIONS

Dr John Almond of Natura viva undertook a Palaeontological desktop assessment of the proposed AMDA Alpha PV Development. This report is attached in Annexure E4, and the following is drawn from this.

17.2.1 GEOLOGICAL BACKGROUND

The study area for the proposed AMDA Alpha Solar PV Development project on Portion 1 of N'Rougas Zuid No 121 near Kenhardt is situated in flat-lying terrain within the semi-arid Bushmanland region at elevations between *c.* 930 to 950 m amsl. It is drained by a dendritic network of shallow, westerly-flowing tributary streams of the Hartbeesrivier. The geology of the study area is shown on 1: 250 000 geology sheet 2920 Kenhardt (Council for Geoscience, Pretoria) (Figure 3) (See also Almond 2016). The entire area – including the proposed short 132 kV transmission line corridor between the solar project area and the existing Nieuwehoop Substation to the southeast - is underlain by a Precambrian basement rocks that are *c*. 2 billion years old and are assigned to the **Namaqua-Natal Province**. These ancient igneous and high-grade metamorphic rocks - mainly gneisses - crop out at surface as small patches and are entirely unfossiliferous. The basement rock units represented in the study area are assigned to the **Jacomyns Pan Group** and comprise gneisses of the **Sandnoute Formation**. These rock units are described in the Kenhardt 1: 250 000 sheet explanation by Slabbert *et al.* (1999) and placed in the context of the Namaqua-Natal Province by Cornell *et al.* (2006).

A large proportion of the basement rocks in the proposed project area are mantled by a range of superficial sediments of Late Caenozoic age. These predominantly thin, unconsolidated deposits include small patches of calcretes (soil limestones), gravelly to sandy river alluvium, pan sediments along certain watercourses, surface gravels, colluvium (scree) as well as – especially – Quaternary to Recent aeolian (wind-blown) sands of the **Gordonia Formation** (**Kalahari Group**) (Partridge *et al.* 2006).

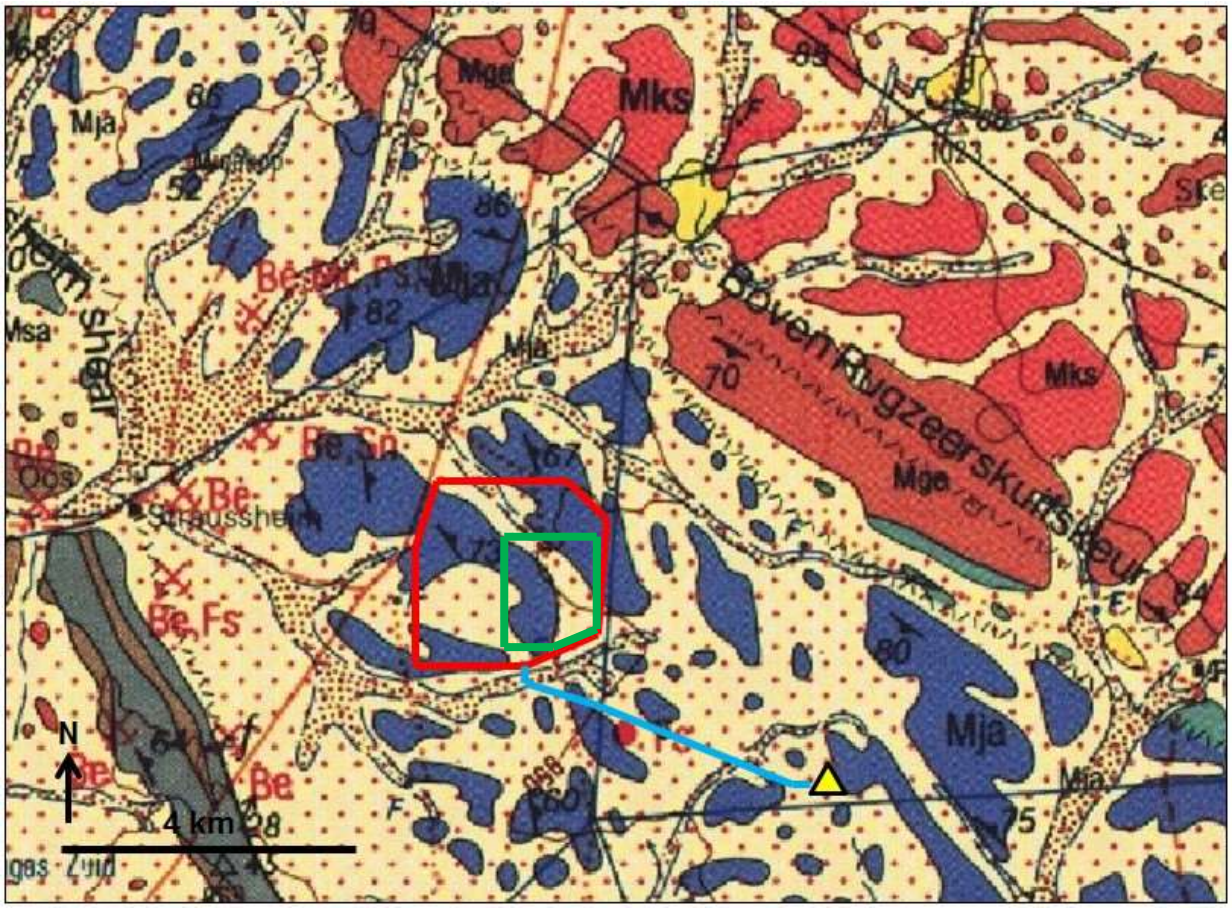


Figure 47: Extract from 1: 250 000 scale geological map sheet 2920 Kenhardt (Council for Geoscience, Pretoria) showing the geology of the AMDA Alpha Solar PV Development study area (green polygon) on Portion 1 of N'Rougas Zuid No 121, *c*. 30 km northeast of Kenhardt, Northern Cape. The pale blue line shows the proposed route of the 132 kV transmission line connection to the Nieuwehoop MTS Substation on Gemsbok Bult 120 (yellow triangle). The study area is underlain by Precambrian bedrocks of the Sandnoute Formation (Jacomyns Pan Group) (Mja, blue). The bedrocks are overlain in many areas by aeolian sands of the Gordonia Formation (Kalahari Group) (Qg, pale yellow with sparse red stipple) and Late Caenozoic alluvium (sands & gravels) (pale yellow with dense stipple).

17.2.2 PALAEONTOLOGICAL HERITAGE

The Precambrian basement rocks represented within the study area are high grade metamorphic rocks that were last metamorphosed some 1 billion years ago and are entirely unfossiliferous.

The fossil record of the Kalahari Group as a whole is generally sparse and low in diversity; no fossils are recorded here in the Kenhardt geology sheet explanation by Slabbert *et al.* (1999). The Gordonia Formation dune sands were mainly active during cold, drier intervals of the Pleistocene Epoch that were inimical to most forms of life, apart from hardy, desert-adapted species. Porous dune sands are not generally conducive to fossil preservation. However, mummification of soft tissues may play a role here and migrating lime-rich groundwaters derived from underlying lime-rich bedrocks may lead to the rapid calcretisation of organic structures such as burrows and root casts. Occasional terrestrial fossil remains that might be expected within this unit include calcretized rhizoliths (root casts) and termitaria (*e.g. Hodotermes*, the harvester termite), ostrich egg shells (*Struthio*), tortoise remains and shells of land snails (*e.g. Trigonephrus*) (Almond in Macey *et al.* 2011, Almond & Pether 2008, Almond 2016). Other fossil groups such as freshwater bivalves and gastropods (*e.g. Corbula, Unio*), ostracods (seed shrimps), charophytes (stonewort algae), diatoms (microscopic algae within siliceous shells) and stromatolites (laminated microbial limestones) are associated with local watercourses and pans. Microfossils such as diatoms may be blown by wind into nearby dune sands. These Kalahari fossils (or subfossils) can be expected

to occur sporadically but widely, and the overall palaeontological sensitivity of the Gordonia Formation is therefore considered to be low. Underlying calcretes might also contain trace fossils such as rhizoliths, termite and other insect burrows, or even mammalian trackways. Mammalian bones, teeth and horn cores (also tortoise remains, and fish, amphibian or even crocodiles in wetter depositional settings) may be occasionally expected within Kalahari Group sediments and calcretes, notably those associated with ancient alluvial gravels. The younger (Pleistocene to Recent) fluvial and alluvial sands and gravels within the proposed development area are unlikely to contain many, if any, substantial fossil or subfossil remains.

It is concluded that both the bedrocks and superficial sediments underlying the study area are of low palaeontological sensitivity.

17.2.3 CONCLUSIONS & RECOMMENDATIONS

The AMDA Alpha Solar PV Development study area, including the solar power plant as well as the 132 kV transmission line corridor to the Nieuwehoop MTS Substation, is underlain by highly metamorphosed gneisses of the Namaqua-Natal Province (Sandnoute Formation) that are extensively covered by Late Caenozoic superficial sediments such as alluvium, aeolian sands and surface gravels. Both the Precambrian bedrocks and the superficial sediments are of low palaeontological sensitivity.

It is concluded that, with or without mitigation, the overall impact of the proposed solar energy facility on Portion 1 of N'Rougas Zuid No 121 is of **LOW SIGNIFICANCE** in palaeontological heritage terms; the proposed development, including the *c*. 5.5 km long 132 kV overhead transmission line connection to the existing Nieuwehoop MTS Substation, is unlikely to have significant impacts on local palaeontological heritage resources.

It is therefore recommended that, pending the discovery of substantial new fossils remains during construction of the proposed AMDA Alpha Solar PV Development on Portion 1 of N'Rougas Zuid No 121 and of the associated 132 kV transmission lines, exemption from further specialist palaeontological studies and mitigation be granted for this project.

Should any substantial fossil remains (*e.g.* mammalian bones and teeth) be encountered during construction, these should be safeguarded, preferably *in situ*, and reported by the ECO to the South African Heritage Resources Authority, as soon as possible (SAHRA contact details: Mrs Colette Scheermeyer, P.O. Box 4637, Cape Town 8000. Tel: 021 462 4502. Email: cscheermeyer@sahra.org.za). This is to ensure that appropriate mitigation action can be taken by a professional palaeontologist, at the developer's expense. Mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as associated geological data (*e.g.* stratigraphy, sedimentology, taphonomy) by a professional palaeontologist.

These recommendations should be incorporated into the Environmental Management Plan for the proposed solar energy facility.

18 IDENTIFICATION AND NATURE OF POTENTIAL IMPACTS

Potential impacts of the project have been identified by the EAP and participating specialists. These are discussed below and the significance thereof will be assessed in the Environmental Impact Report.

In this section, the potential impacts and associated risk factors that may be generated by the development are identified.

18.1 IDENTIFICATION OF POTENTIAL ECOLOGICAL IMPACTS.

Potential ecological impacts resulting from the development of the AMDA Alpha PV Energy Facility would stem from a variety of different activities and risk factors associated with the preconstruction, construction and operational phases of the project including the following:

18.1.1 Preconstruction Phase

- Human presence and uncontrolled access to the site may result in negative impacts on fauna and flora through poaching of fauna and uncontrolled collection of plants for traditional medicine or other purpose.
- Site clearing & exploration activities for site establishment would have a negative impact on biodiversity if this was not conducted in a sensitive manner.

18.1.2 Construction Phase

- Vegetation clearing for the reflector field, access roads, site fencing etc could impact listed plant species as well as high-biodiversity plant communities. Vegetation clearing will also lead to habitat loss for fauna and potentially the loss of sensitive faunal species, habitats and ecosystems.
- Increased erosion risk would occur due to the loss of plant cover and soil disturbance created during the construction phase. This may impact downstream riparian and wetland habitats if a lot of silt enters the drainage systems.
- Presence and operation of construction machinery on site. This will create a physical impact as well as generate noise, pollution and other forms of disturbance at the site.
- Increased human presence can lead to poaching, illegal plant harvesting and other forms of disturbance such as fire.

18.1.3 Operational Phase

- The operation of the facility will generate noise and disturbance which may deter some fauna from the area.
- The areas inside the facility will requirement management and if this is not done appropriately, it could impact adjacent intact areas through impacts such as erosion, alien plant invasion and contamination from pollutants, herbicides or pesticides.
- The associated overhead power lines will pose a risk to avifauna susceptible to collisions and electrocution with power line infrastructure.

18.1.4 Cumulative Impacts

- The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets.
- Transformation of intact habitat would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

18.2 IDENTIFICATION OF ECOLOGICAL IMPACTS TO BE ASSESSED IN THE EIA PHASE

In this section each of the potential impacts identified above is explored in more detail with reference to the features and characteristics of the site and the likelihood that each impact would occur given the characteristics of the site and the extent and nature of the development.

18.2.1 Impacts on vegetation and protected plant species

It is highly likely that some protected species occur at the site which may be impacted by the development. Vegetation clearing during construction will lead to the loss of currently intact habitat within the development footprint and is an inevitable consequence of the development. As this impact is certain to occur it will be assessed for the construction phase.

18.2.2 Soil erosion and associated degradation of ecosystems

The large amount of disturbance created during construction would potentially leave the site vulnerable to soil erosion, from both wind and water. Vegetation clearing, the panel arrays and access roads will all result in increased levels of runoff which will need to be managed and which would pose an erosion risk. Soil erosion is therefore considered a likely potential impact and will be assessed for the construction phase and operational phase.

18.2.3 Direct faunal impacts

Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some impact on fauna is highly likely to occur during construction as well as operation and this impact will therefore be assessed for the construction phase and operational phase.

18.2.4 Impacts on Avifauna

The development would result in some habitat loss for avifauna. However, as the extent of the site is relatively low and the affected vegetation type is still largely intact, this is not likely to be of high significance. Although a power line is required by the development and it would potentially generate significantly more impact than habitat loss, the grid connection is not part of the current assessment and is not considered here. An impact on avifauna due to habitat loss is a possibility and it will be assessed for the operational phase of the development.

18.2.5 Alien Plant Invasion

The disturbance created during construction is highly likely to encourage the invasion of the disturbed areas by alien species. It is possible that species will colonise the disturbed areas if given the opportunity. This impact is deemed highly likely to occur and will be assessed as a likely impact associated with the development.

18.2.6 Reduced ability to meet conservation obligations & targets

The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets. Although the receiving vegetation type in the study area is classified as Least Threatened and is still more than 98% intact, it is a relatively restricted vegetation types for an arid area and would therefore be vulnerable to cumulative impact. This impact will therefore be assessed in light of the current development as well as any other developments in the surrounding area which would also contribute to cumulative impacts.

18.2.7 Impact on broad-scale ecological processes

Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. Due to the presence of a number of

other renewable energy and mining developments in the area, this is a potential cumulative impact of the development that will be assessed during the EIA.

18.3 IDENTIFICATION OF POTENTIAL ARCHAEOLOGICAL IMPACTS.

Because tangible heritage resources are non-renewable and each archaeological occurrence is unique, it is important that areas affected by development are assessed for the presence and sensitivity of such resources prior to development. The AMDA Alpha PV Facility will involve both area and linear developments that could have a permanent negative impact on archaeological resources if they were to occur in the area.

19 CONSIDERATION OF POTENTIAL CUMULATIVE IMPACTS

When considering South Africa's irradiation distribution, the Northern Cape Province, and Kai !Garib in particular, is known to be one of the most preferred areas for the generation of solar energy in South Africa and even in the world. This can be ascribed to the advantageous solar radiation specifications and the flat planes which are not intensively used except for low scale grazing. The annual global horizontal irradiation in the specific area is between 2200 and 2300 kWh/m^2.

There are currently a total of three projects (AMDA Alpha, AMSA Bravo and AMDA Charlie) proposed on this portion of land as depicted in the image below.

The Environmental Impact Assessment Phase of this environmental process will have to consider the potential cumulative impacts of the other proposed developments in the surrounding area.

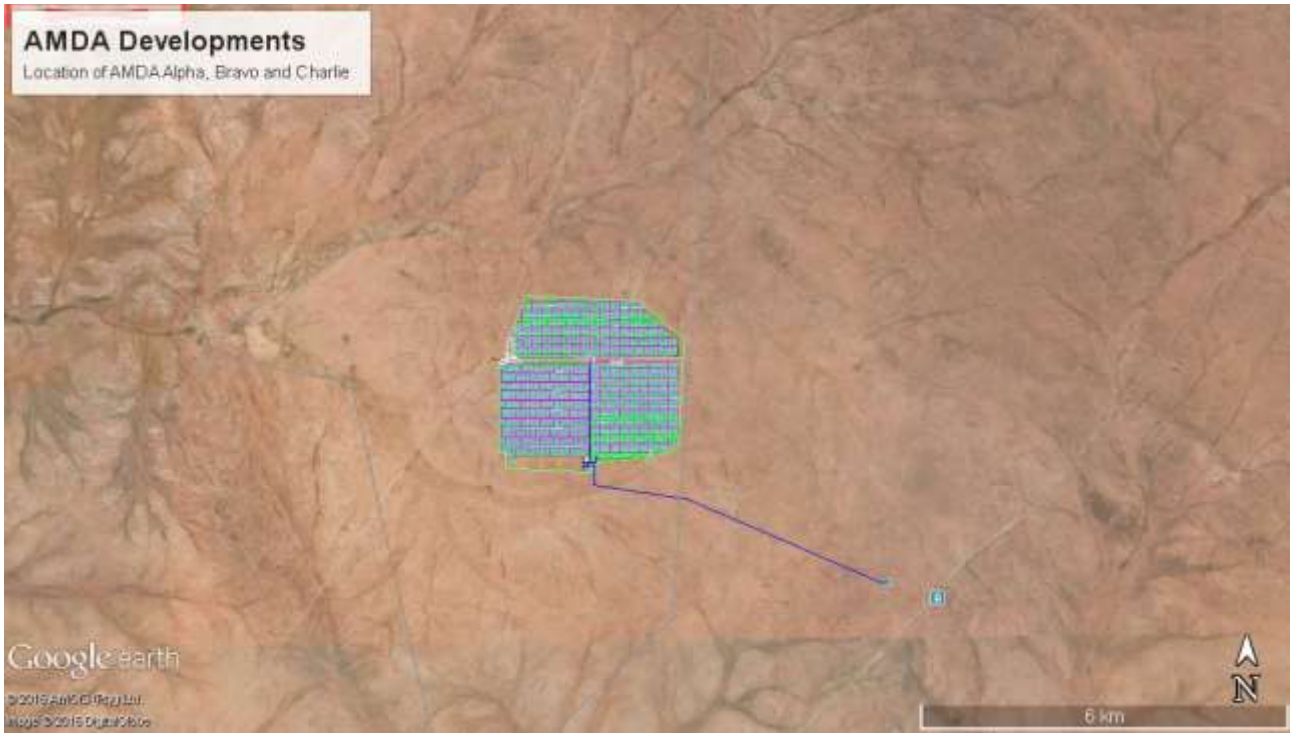


Figure 48: Showing other renewable energy projects on the property

According to the DEA Database, the only other development in the vicinity of this property is the proposed Boven PV1 75MW PV project situated directly to the east of the project as depicted in the image below.

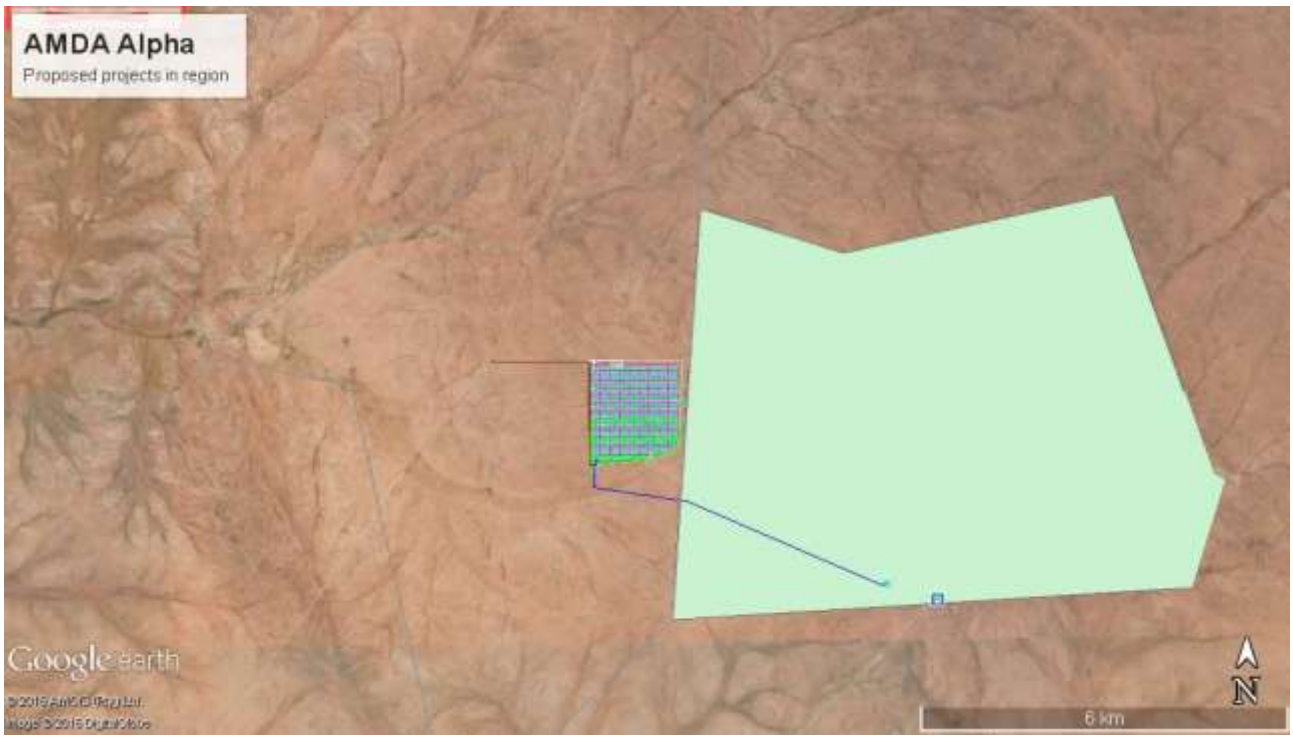


Figure 49: Showing the proposed AMDA Alpha PV Development in relation to the Proposed Boven PV1 75MW PV project

No potentially fatal flaws have been identified associated with cumulative impacts during this scoping phase of the environmental process. The potentially most significant cumulative impact is deemed to the failure to meet conservation targets as a result of all the developments combined. The ecology specialist will assess the significance of this during the impact assessment phase of the environmental process.

20 SUMMARY OF POTENTIAL SITE CONSTRAINTS

The following preliminary site-specific constraints were identified by this scoping / baseline phase of the environmental process. As part of the risk adverse approach, these site constraints once confirmed by participating specialists may used to further refine the proposed solar facility layout – The preferred layout will be developed taking all of these constraints into consideration.

20.1 FLORA:

- ***Protected*** plants species and communities;
- **Ephemeral Washes;**
- **Cumulative impact** of loss of vegetation considering the other renewable energy projects on and adjacent to the site.

20.2 FAUNA:

- Potential **collision and electrocution from power-line infrastructure** are significant causes of mortality for bustards, flamingos, eagles and vultures.

20.3 AGRICULTURAL POTENTIAL:

No specific constraints in terms of agricultural potential were identified.

The agricultural specialist will still assess the significance of the loss of agricultural land associated with this facility along with others proposed on this property and the surrounding area.

20.4 HERITAGE:

The Archaeologist has identified certain sensitive middle stone age sites within the study area. These have been passed onto the design team, who will adapt the layouts which will be presented in the environmental impact assessment phase of the environmental process.

20.5 VISUAL:

No specific site constraints have been identified to date.

20.6 AVIFAUNAL

No specific site constraints have been identified to date.

20.7 SKA

Potential risk to the SKA in terms of Electromagnetic and Radio Frequency interference.

20.8 FRESHWATER

Potential Seasonal Washes. Freshwater specialist to determine significance.

21 PUBLIC PARTICIPATION PROCESS TO DATE

Section 41 in Chapter 6 of regulation 982 details the public participation process that has to take place as part of an environmental process. The table below provides a quick reference to show how this environmental process has or intends to comply with these legislated requirements relating to public participation.

Regulated Requirement	Description
(1) If the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land. (2) Subregulation (1) does not apply in respect of-. (a) linear activities;	Proof of landowner consent for the PV facility is attached in **Annexure G3.** The proposed grid connection is deemed to constitute a linear activity and as such not required to obtain landowner consent.
The person conducting a public participation process must take into account any relevant guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of an application or proposed application which is subjected to public participation by -	
(a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of - (i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and	Two site notices have been placed on the boundary of the site. Photographic evidence of these notices is attached in **Annexure F3**.

Regulated Requirement	Description
(ii) any alternative site;	
(b) giving written notice, in any of the manners provided for in section 47D of the Act, to -	
(i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;	The owner is the only current occupier of the site. Landowner consent is attached in **Annexure G3**.
(ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;	Owners of adjacent properties have been notified of this environmental process. Such owners have been requested to inform the occupiers of the land of this environmental process. Please refer to **Annexure F4** for copies of these notifications
(iii) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;	The ward councillor has been notified of this environmental process. Please refer to **Annexure F4** for copies of these notifications
(iv) the municipality which has jurisdiction in the area;	The Kai !Garib and !Kheis Local Municipality has been notified of this environmental process. Please refer to **Annexure F4** for copies of these notifications.
(v) any organ of state having jurisdiction in respect of any aspect of the activity; and	Please refer to section 20.1 below showing the list of organs of state that were notified as part of this environmental process. Please refer to **Annexure F4** for copies of these notifications.
(vi) any other party as required by the competent authority;	A pre application meeting was held with the competent authority. At this meeting the competent authority provided input into the proposed Stakeholder register. All additional parties identified at this pre-application meeting have been included in the stakeholder register and have received notifications of the availability of this report.
(c) placing an advertisement in - (i) one local newspaper; or (ii) any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;	A notice of the availability of this Draft Scoping Report has been placed in “Die Gemsbok”. Please refer to **Annexure F3** for a copy of this advertisement. There is currently no official Gazette that has been published specifically for the purpose of providing public notice of applications
(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that	Adverts were not placed in provincial or national newspapers, as the potential impacts will not extend beyond the borders of the district

Regulated Requirement	Description
extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii);and	municipal area.
(e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to - (i) illiteracy; (ii) disability; or (iii) any other disadvantage.	Notifications have included provision for alternative engagement in the event of illiteracy, disability or any other disadvantage. In such instances, Cape EAPrac will engage with such individuals in such a manner as agreed on with the competent authority.
(3) A notice, notice board or advertisement referred to in subregulation (2) must - (a) give details of the application or proposed application which is subjected to public participation; and (b) state - (i) whether basic assessment or S&EIR procedures are being applied to the application; (ii) the nature and location of the activity to which the application relates; (iii) where further information on the application or proposed application can be obtained; and (iv) the manner in which and the person to whom representations in respect of the application or proposed application may be made.	Please refer to **Annexure F3**.
(4) A notice board referred to in subregulation (2) must - (a) be of a size at least 60cm by 42cm; and (b) display the required information in lettering and in a format as may be determined by the competent authority.	Please refer to **Annexure F3**.
(5) Where public participation is conducted in terms of this regulation for an application or proposed application, subregulation (2)(a), (b), (c) and (d) need not be complied with again during the additional public participation process contemplated in regulations 19(1)(b) or 23(1)(b) or the public participation process contemplated in regulation 21(2)(d), on condition that - (a) such process has been preceded by a public participation process which included compliance	This will be complied with if final reports are produced later on in the environmental process.

Regulated Requirement	Description
with subregulation (2)(a), (b), (c) and (d); and (b) written notice is given to registered interested and affected parties regarding where the - (i) revised basic assessment report or, EMPr or closure plan, as contemplated in regulation 19(1)(b); (ii) revised environmental impact report or EMPr as contemplated in regulation 23(1)(b);or (iii) environmental impact report and EMPr as contemplated in regulation 21(2)(d); may be obtained, the manner in which and the person to whom representations on these reports or plans may be made and the date on which such representations are due.	
(6) When complying with this regulation, the person conducting the public participation process must ensure that - (a) information containing all relevant facts in respect of the application or proposed application is made available to potential interested and affected parties; and (b) participation by potential or registered interested and affected parties is facilitated in such a manner that all potential or registered interested and affected parties are provided with a reasonable opportunity to comment on the application or proposed application. (7) Where an environmental authorisation is required in terms of these Regulations and an authorisation, permit or licence is required in terms of a specific environmental management Act, the public participation process contemplated in this Chapter may be combined with any public participation processes prescribed in terms of a specific environmental management Act, on condition that all relevant authorities agree to such combination of processes.	All reports that are submitted to the competent authority will be subject to a public participation process. These include: - Draft Scoping Report - Scoping Report - Plan of Study for Environmental Impact Report - Environmental Impact Report - Environmental Management Plan - All specialist reports that form part of this environmental process.

21.1 REGISTRATION OF KEY STAKEHOLDERS

A number of key stakeholders were automatically registered and will be given an opportunity to comment on this Draft Scoping Report. This list was agreed upon with the competent authority during the pre-application meeting. Copies and proof of these notifications are included in **Appendix E**. A list of key stakeholders registered for this process included in the table below.

Table 14: Key Stakeholders automatically registered as part of the Environmental Process

Stakeholders Registered		
Neighbouring property owners	Department of Environmental Affairs and Nature Conservation	Department of Water Affairs
Kai !Garib Municipality: Municipal Manager and Planning Department.	South African National Parks	Department of Science and Technology
Kai !Garib Municipality: Ward Councillors	South African National Roads Agency Limited	The Council for Scientific and Industrial Research
South African Heritage Resources Agency	Department of Transport and Public Works	The South African Square Kilometre Array
Northern Cape Heritage Resources Authority	Department of Health	The South African Civil Aviation Authority
Department of Agriculture, Forestry and Fisheries	Department of Minerals and Energy	Department of Science and Technology
Provincial Department of Agriculture	Eskom	Department of Communications
Kai ! Garib Municipality Ward councillors	Department of Mineral Resources	SENTECH
Department of Environmental Affairs, Biodiversity Directorate.	Birdlife Africa.	Endangered Wildlife Trust.
!Kheis Municipality: Municipal Manager and Planning Department.		

21.2 ADVERTS AND SITE NOTICES.

An advert was placed in die Gemsbok on 04 March 2016, calling for the registration of Interested and Affected parties.

BLADSY 24 DIE GEMSBOK 4 MAART 2016

Cape EAPrac

AMDA DEVELOPMENTS SOLAR ENERGY FACILITIES
Scoping & EIR Processes

Notice is hereby given of a Public Participation Process in terms of the National Environmental Management Act (Act No 107 of 1998) and the National Heritage Resources Act (NHRA)(No.25 of 1999).

Applications for a Scoping & Environmental Impact Reporting (S&EIR) process will be submitted to the National Department of Environmental Affairs (DEA) as the competent authority for decision making for three proposed Solar Energy Developments on Portion 1 of N'Rougas Zuid No 121, Strausisheim near Kenhardt in the Northern Cape Province

Reference No.: AMDA Alpha Solar Development - KAI428. AMDA Bravo Solar Development - KAI429. AMDA Charlie Solar Development - KAI430
Proponent: AMDA Alpha (Pty) Ltd, AMDA Bravo (Pty) Ltd, AMDA Charlie (Pty) Ltd.
Environmental Consultant: *Cape EAPrac*
Location: Portion 1 of N'Rougas Zuid No 121, Strausisheim, near Kenhardt in the Northern Cape Province.
Proposal: It is the intention of the proponents (listed above), as a Renewable Energy Independent Power Producers (REIPP) to develop 3 x 75MW (MegaWatt) Solar Photovoltaic (PV) Facility, with associated infrastructure on the above property including on-site substation, auxiliary buildings, access & internal roads, overhead electrical transmission line to the Eskom Nuwehoop substation and perimeter fencing.
Exemptions: None ***Deviations:*** None.

The procedures for Scoping & Environmental Impact Reporting (S&EIR) process in terms of the 2014 Regulations are being followed for this project. The following activities, in terms of Government Notice R983, R984 & R985 are applicable:
GN R983: ***12(x) & (xi) & 19(i)*** GN R984: ***1 & 15*** GN R985: ***18(a)(ii) & (ii)***

In order to be ***registered*** as an ***Interested and Affected Party*** (I&AP), individuals are requested to respond to this notice by submitting their complete contact details and any comment to *Cape EAPrac* in writing (to address below). Online registration forms are available on the *Cape EAPrac* website: ***www.cape-eaprac.co.za/active.***
Correspondence throughout the remainder of the environmental process will ***only be distributed to registered I&APs***

Cape EAPrac (Attention: Mr Dale Holder)
P O Box 2070 George 6530
Telephone: 044 874 0365 Facsimile: 044 874 0432
Email: dale@cape-eaprac.co.za

REGISTRATION REQUESTS AND COMMENTS MUST BE SUBMITTED IN WRITING

GEMSBOK - UPINGTON: Hier is nog een ander tafel met Afrikaanse mense, verder is hoor ek net Spaans.

Al 22 mans rondom my praat hard Spanjaarde, vermoedelik, wat hier in ons dorp is om te werk aan die sonpaneelprojek.

Party van hulle het meisies wat plat in Afrikaans lag en vrygewig drukkies uitdeel.

Die meisies se skuewe opmerkings teenoor die kelnerinne laat die ander Afrikaanses vinnig opkyk na die twee nuwe aankomelinge.

Twee hoërskool dogters, gégglelend, gepruik en oordadig ingekleur beweeg hulle in 'n walm van spuitgoed.

Die kleinste enetjie het inlas-sliere wat onder die muwie uitsteek.

Hulle word nader gewink deur twee ouerige, lelike mans wat geen gehelm van hul attensies maak nie.

Al kan hulle geen woord in Afrikaans of Engels praat nie, verstaan hulle mekaar.

Die meisies weet nie dat dit moeilikheid is wat hulle soek nie, maar as ek na die twee grilloerige middeljarige mans kyk wat wag dat die laaste tweetjies klaar giggel en bestel om klaar te eet sodat hulle kan betaal en ry, weet ek watter soort moeilikheid.

Vir almal beteken dit nie moeilikheid nie.

Hoe kies mens tussen 'n sink-en-riekata en honger, skreeuende kleintjies en kwynende ou mense wat net wag op pensioendag?

Dronk, hakkelende hure aan die een kant van die skaal en die wonderlike vooruitsig van bestel en eet soveel jy wil, geld vir klere en medisyne in luukse vooruitsig aan die ander kant van die skaal?

As die wêreld nie bewus geraak het van sonkrag en die groot behoefte nie, sou hierdie meisies maar dieselfde gebeen het, net op veel kleiner skaal. Sums sou hul beloning net 'n middag weg van die huis en 'n botteltjie koeldrank gewees het.

Voor my oë sien ek die begin van 'n nuwe naste, 'n nuwe mengsel van noord en suid.

Die ander soort Spanjaarde sit effens weg van die rumoerigers en in plaas van bier, drink hulle wyn uit langstreelglase.

Paartjies praat sagter met mekaar maar die kleuters in hul eie taal.

Hierdie is nie net vir hulle 'n nuwe geleentheid nie – dit is 'n nuwe wêreld vir ons almal.

Ek Praat Prontuit

Deur Mêrie Scheepers

Sondagmiddag op 'n restaurant se stoep

- Reünie - Reünie - Reünie - Reünie -

GEMSBOK-ASKHAM: JJ Adams Intermediêre Skool vier gedurende die naweek van 18 - 20 Maart die skool se 30ste bestaansjaar.

Daar word 'n vol program vir die naweek beplan, bv. 'n Kultuur- en Sportdag en Mej. JJ Adams word ook gekies.

Saam met die 30ste vieringe word daar ook 'n groot reünie beplan.

Alle oud-leerlinge en oud-onderwysers word gevra om met die skool te skakel - Ben Mayiuma - 083 584 0255 of P Willemse by 078 695 3288 of 074 588 7336.

Figure 50: Advert as placed in "die gemsbok" 4 March 2016

Site notices were placed on the boundary of the study site. Two site notices were placed on the boundary of the study site. These were placed at the two existing entrances to the property.

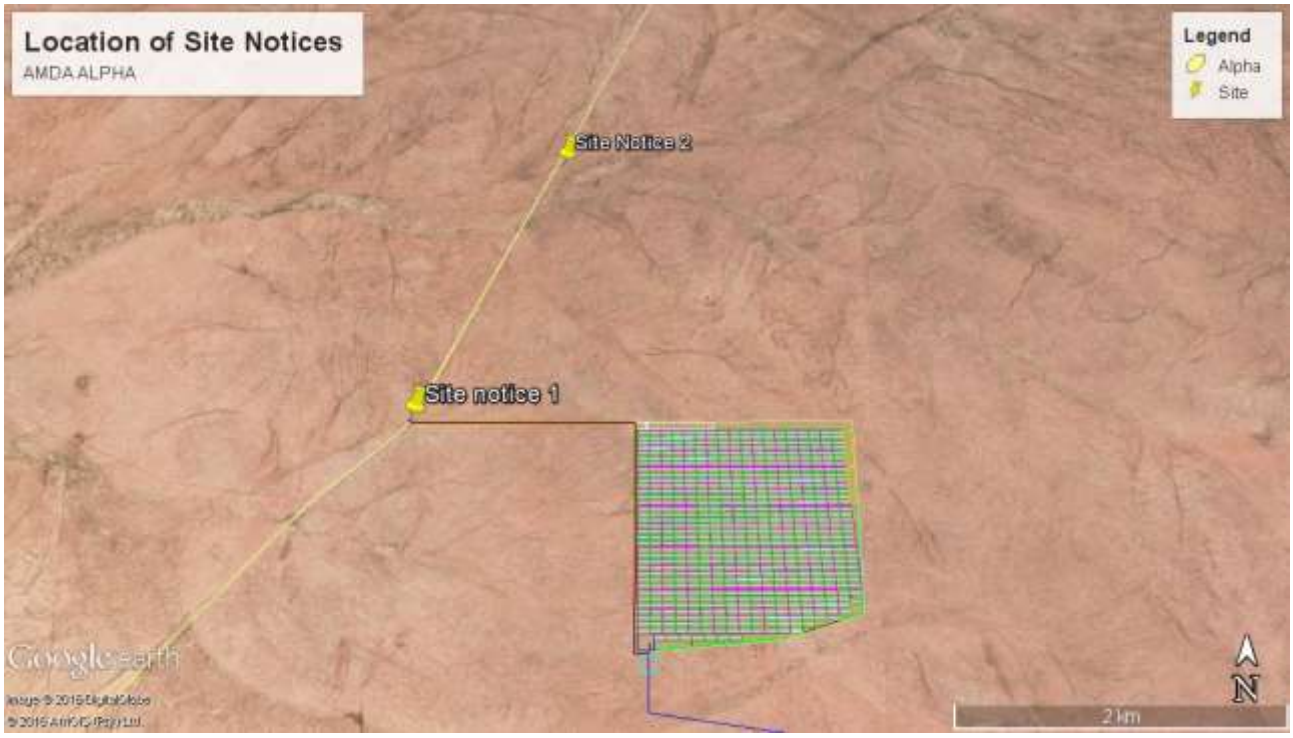


Figure 51: Showing location of site notices.

The site notices were placed at the coordinates reflected in the table below.

Table 15: Geographic location of site notices.

	Latitude			**Longitude**		
Site Notice 1	29°	6’	59.60”	21°	16’	16.38”
Site Notice 2	29°	5’	36.45”	21°	16’	52.28”

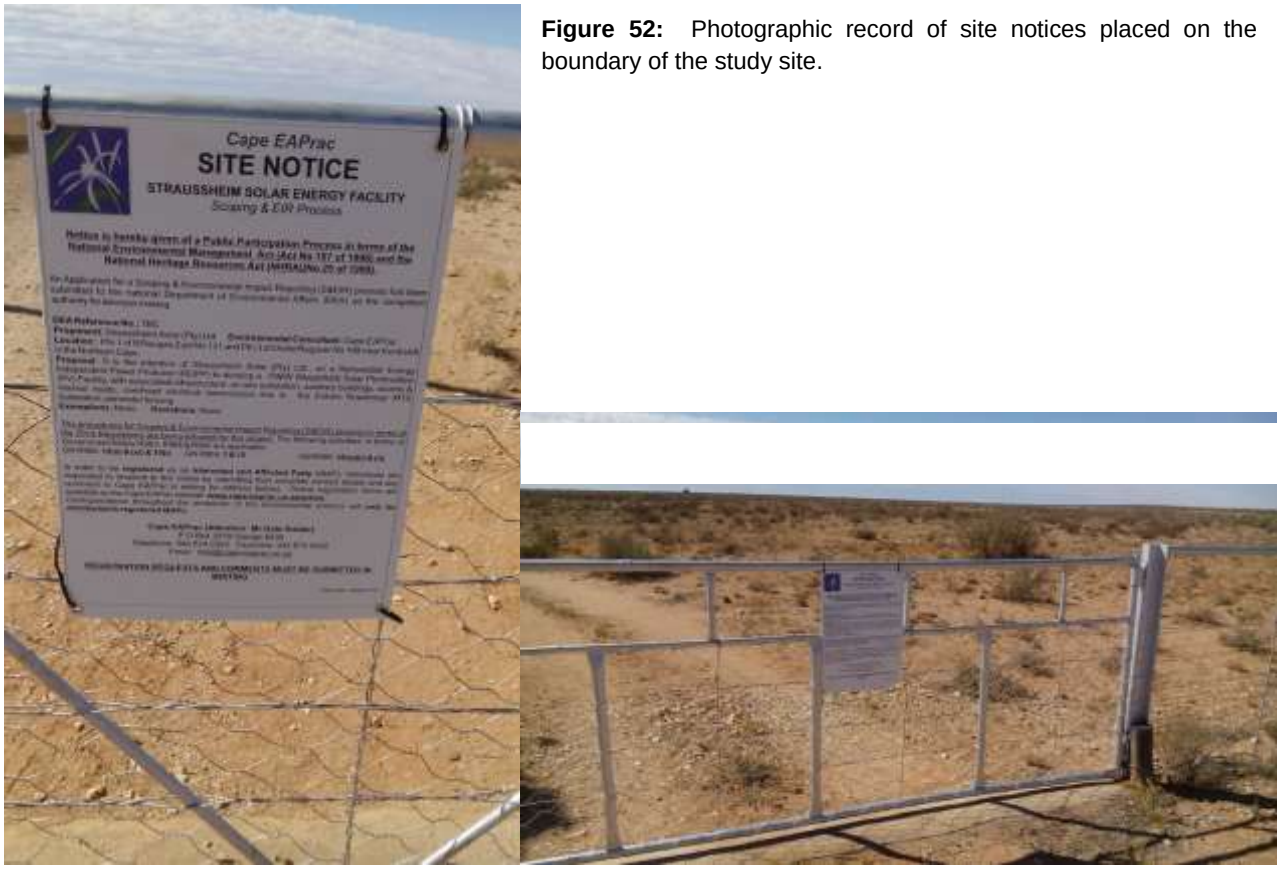


Figure 52: Photographic record of site notices placed on the boundary of the study site.

21.3 Notification Of Availability Of Draft Scoping Report

Automatically registered I&AP's as well as those who responded to the call for registration advertisement and the site notices were notified of the availability of the Draft Scoping Report for review and comment. In order to facilitate effective comment, all State Departments and key stakeholders were provided with digital copies of the report on CD.

21.4 Notification Of Availability Of Draft Scoping Report

The formal application has been submitted to the DEA along with this Scoping report. Registered I&AP's are herewith given a further opportunity to comment on this Scoping report, which will be submitted to the Department on completion of the 30 Day comment period.

22 ASSUMPTIONS & LIMITATIONS

This section provides a brief overview of *specific assumptions and limitations* having an impact on this environmental application process:

- It is assumed that the information on which this report is based (specialist studies and project information, as well as existing information) is **correct, factual and truthful.**
- The proposed development is **in line** with the statutory planning vision for the area (namely the local Spatial Development Plan), and thus it is assumed that issues such as the cumulative impact of development in terms of character of the area and its resources, have been taken into account during the strategic planning for the area.
- It is assumed that all the relevant **mitigation measures** and agreements specified in this report will be implemented in order to ensure minimal negative impacts and maximum environmental benefits.

- It is assumed that due consideration will be given to the **discrepancies in the digital mapping** (PV panel array layouts against possible constraints), caused by differing software programs, and that it is understood that the ultimate/final positioning of solar array will only be confirmed on-site with the relevant specialist/s.
- The Department of Water Affairs **may consider the submission of a water use application** necessary for allowing the use of water from the farm boreholes and possible the crossing of the on-site drainage lines by the infrastructure associated with the solar facility. The assumption is made that on review of this Draft Scoping Report the Department of Water and Sanitation will provide prompt confirmation and recommendations in this regard.
- It is assumed that Stakeholders and Interested and Affected Parties notified during the initial public participation process will submit all relevant **comments within the designated** review and comment period, so that these can included in the Final Scoping Report can be timeously submitted to the delegated Authority, the Department Environmental Affairs for consideration.

The assumptions and limitations of the various specialist studies are included in their respective reports attached in **Appendix D**.

23 PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

In compliance with section (i) of Appendix 2 of regulation 982, the following plan of study for undertaking the Environmental Impact Assessment Report is provided. In terms of these regulations the following must be included in this plan of study.

(i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;
(ii) a description of the aspects to be assessed as part of the environmental impact assessment process;
(iii) aspects to be assessed by specialists;
(iv) a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;
(v) a description of the proposed method of assessing duration and significance;
(vi) an indication of the stages at which the competent authority will be consulted;
(vii) particulars of the public participation process that will be conducted during the environmental impact assessment process; and
(viii) a description of the tasks that will be undertaken as part of the environmental impact assessment process;
(ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

23.1 DESCRIPTION OF THE ALTERNATIVES TO BE CONSIDERED AND ASSESSED

The following Alternatives have been considered in this scoping report and where relevant will be assessed in the impact assessment phase of this environmental process:

- Site Alternatives;
- Layout Alternatives;
- Technology Alternatives; and
- No Go Alternative

Please refer to **section 6** of this report, where alternatives are discussed in detail.

The participating specialists and the EAP will also assess the significance of cumulative impacts associated with the project in relation to other proposed projects on the same property as well as those within the greater landscape.

23.2 ASPECTS TO BE ASSESSED

All potential impacts to on the economic, social and biophysical environments that have been identified in this scoping report will be assessed in the Environmental Impact Assessment phase of this Environmental Process.

Please refer to **section 16** of this report where potential environmental impacts to be assessed have been identified.

23.3 ASPECTS TO BE ASSESSED BY SPECIALISTS;

The following specialists will be providing assessment of impacts in their respective disciplines:

- Faunal – Mr Simon Todd;
- Avifaunal – Mr Blair Zoghby;
- Botanical – Mr Simon Todd;
- Visual – Mr Stephen Stead (VRMA) ;
- Heritage – Mr Stefan de Kock (Perception);
- Archaeological – Dr Peter Nilssen.
- Paleontological – Dr John Almond; and
- Agricultural Potential – Mr Christo Lubbe.
- Socio Economic – Mr Tony Babrour
- Freshwater Ecology – Dr Brian Colloty.
- Traffic – KMA Consulting Engineers.

Please refer to **sections 10 - 15** of the report where the aspects to be assessed by each discipline are discussed in more detail.

23.4 ASSESSMENT METHODOLOGY

All possible impacts need to the assessed – the **direct, in-direct as well as cumulative impacts**. Impact criteria should include the following:

- **Nature of the impact**
  This is an appraisal of the type of effect the construction, operation and maintenance of a development would have on the affected environment. This description should include what is to be affected and how.
- **Extent of the impact**
  Describe whether the impact will be: local extending only as far as the development site area; or limited to the site and its immediate surroundings; or will have an impact on the region, or will have an impact on a national scale or across international borders.
- **Duration of the impact**
  The specialist should indicate whether the lifespan of the impact would be short term (0-5 years), medium term (5-15 years), long terms (16-30 years) or permanent.
- **Intensity**
  The specialist should establish whether the impact is destructive or benign and should be qualified as low, medium or high. The specialist study must attempt to quantify the magnitude of the impacts and outline the rationale used.
- **Probability of occurrence**

The specialist should describe the probability of the impact actually occurring and should be described as improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of any prevention measures).

The impacts should also be assessed in terms of the following aspects:

- **Status of the impact**
  The specialist should determine whether the impacts are negative, positive or neutral ("cost – benefit" analysis). The impacts are to be assessed in terms of their effect on the project and the environment. For example, an impact that is positive for the proposed development may be negative for the environment. It is important that this distinction is made in the analysis.
- **Cumulative impact**
  Consideration must be given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts must be evaluated with an assessment of similar developments planned and already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.
- **Degree of confidence in predictions**
  The specialist should state what degree of confidence (low, medium or high) is there in the predictions based on the available information and level of knowledge and expertise.

Based on a synthesis of the information contained in the above-described procedure, the specialists are required to assess the potential impacts in terms of the following significance criteria:

- **No significance**: The impacts do not influence the proposed development and/or environment in any way.
- **Low significance**: The impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.
- **Moderate significance**: The impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.
- **High significance**: The impacts will have a major influence on the proposed development and/or environment.

23.5 CONSULTATION WITH COMPETENT AUTHORITY.

The competent authority has been identified as the National Department of Environmental Affairs. Engagement with the competent authority will be ongoing throughout the environmental process and will include the following as a minimum:

- Pre Application Meeting (Completed);
- Provided with a copy of the Draft Scoping Report for Review and comment (Pre-application) (Completed);
- Submission of application form and engagement on the contents of the application form (Completed);
- Provided with a copy of Scoping report for review and decision making (Completed);
- Provided with a copy of the Environmental Impact Report for review and decision making; and
- Undertaking a site inspection with the competent authority if deemed necessary.

23.6 PUBLIC PARTICIPATION TO BE CONDUCTED DURING THE EIA

Please refer to **section 19** of this report where the ongoing public participation process, including aspects that will take place within the EIA phase, is discussed in detail.

23.7 TASKS TO BE UNDERTAKEN IN THE EIA PHASE

In terms of the 2014 EIA regulations, an environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include -

(a) details of -

(i) the EAP who prepared the report; and

(ii) the expertise of the EAP, including a curriculum vitae;

(b) the location of the activity, including:

(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;

(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 -

(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken;

(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;

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

(i) all listed and specified activities triggered and being applied for; and

(ii) a description of the associated structures and infrastructure related to the development;

(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;

(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;

(g) a motivation for the preferred development footprint within the approved site;

(h) a full description of the process followed to reach the proposed development footprint within the approved site, including:

(i) details of the development footprint alternatives considered;

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

(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;

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

(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 -

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be avoided, managed or mitigated;

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

(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

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

(ix) if no alternative development locations for the activity were investigated, the motivation for not considering such; and

(x) a concluding statement indicating the preferred alternative development location within the approved site;

(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 location 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;

(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;

(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;

(l) an environmental impact statement which contains -

(i) a summary of the key findings of the environmental impact assessment:

(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and

(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;

(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;

(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

(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;

(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;

(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;

(s) an undertaking under oath or affirmation by the EAP in relation to:

(i) the correctness of the information provided in the reports;

(ii) the inclusion of comments and inputs from stakeholders and I&APs;

(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and

(iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;

The Environmental Impact Report for the proposed AMDA Alpha PV energy facility will consider and comply with the legislated requirements.

23.8 MEASURES TO AVOID, REVERSE, MITIGATE OR MANAGE IDENTIFIED IMPACTS

As shown in this scoping report, the proposed AMDA Alpha Energy Facility followed a risk adverse approach, whereby primary specialist input was utilised to ensure that the project is developed in such a way as to avoid impacts, thus reducing the need for further mitigation and management.

The EAP and participating specialists, as part of the impact assessment phase, will provide mitigation measures to ensure that the potential impacts are further reduced. An environmental management programme will be developed to ensure management and monitoring of additional impacts.

The following additional specialist management plans will form part of the overall Environmental Management Programme:

- Stormwater Management Plan;
- Washwater Management Plan;
- Traffic and Transportation Management Plan;
- Alien Vegetation Management Plan;
- Habitat Restoration Plan;
- Plant Rescue and Protection Plan; and
- Open Space Management Plan.

23.9 CONTENTS OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

The final impact assessment report should as a minimum include the following sections:

- Executive Summary;
- Introduction And Description Of Study;
- Methodology;
- Results;
- Assessment of Impacts (Direct, In-direct & Cumulative, including mitigation measures to reduce negative impacts and measures to enhance positive impacts and the completion of impact tables);
- Comparative Assessment between project Alternatives;
- Discussion and Recommendation for Preferred Alternative;
- Specialist recommendation for Pre-Construction, Construction and Operational Phases); and
- Conclusion.

23.10 BRIEF FOR SPECIALIST STUDIES TO BE UNDERTAKEN AS PART OF THE EIA PHASE

- Each specialist is required to consider the project in as much detail as is required to inform his/her impact assessment.
- Specialists must ensure that they are aware of the necessary **planning, environmental and service requirements** associated with the proposal.
- Specialists must ensure that they **liaise with other relevant specialists** (via the EAP) if it seems necessary to use information from another discipline.
- Impact Assessments must **consider all the identified alternatives** in order to provide a comparative assessment of impacts **as well as the no-go option.**
- Specialists should consider **national and international guidelines and standards** relevant to their respective focus area. For example: *The Environmental, Health and Safety Guidelines (2007) IFC, World Bank Group* etc.
- Any **assumptions** made and any uncertainties or **gaps in knowledge**, as well as **limitations** regarding the specialist studies, must be clearly described and explained.
- The proximity of the site in relation to **key features** must be considered.
- The **Draft Impact Assessment report** of each specialist are subject to public/stakeholder review and comment – all comments received will be considered by each specialist, responded to and the final impact assessment report updated accordingly.

The following specialists will undertake assessments as part of this environmental process:

- Faunal – Mr Simon Todd (Simon Todd Consulting);
- Avifaunal – Mr Blair Zoghby (Simon Todd Consulting);

- Botanical – Mr Simon Todd (Simon Todd Consulting);
- Visual – Mr Stephen Stead (VRMA) ;
- Heritage – Mr Stefan de Kock (Perception);
- Archaeological – Dr Peter Nilssen.
- Paleontological – Dr John Almond; and
- Agricultural Potential – Mr Christo Lubbe.
- Socio Economic – Mr Tony Babrour
- Freshwater Ecology – Mr Brian Colloty.
- Traffic – KMA Consulting Engineers.

24 PLAN OF STUDY FOR SPECIALIST IMPACT ASSESSMENTS

The relevant participating specialists will undertake impact assessments of the proposal in their specific field of expertise.

24.1 TERMS OF REFERENCE FOR SPECIALIST IMPACT ASSESSMENTS

Please refer to the table below for a summary of the terms of reference that specialists will consider as part of their studies. Please also refer to the detailed plans of study for each specific specialist in the sections below.

Table 16: Summary of terms of reference for specialist assessments.

Specialist Study	Aim of the Study / Input	Terms of Reference
Agricultural Potential	Determine the impacts that the construction, operation and decommissioning of the proposed 75MW AMDA Solar Development and associated infrastructure will have on agricultural resources and recommend mitigation measures. The above assessment must include the NO-GO option as a baseline.	• Investigate the study site as identified. • Assess the impact on the loss of agricultural land; • The impact of the loss of agricultural land within the property as well as the cumulative impacts from loss of agricultural land within the greater ares.
Ecological / Biophysical	Determine the impacts that the construction, operation and decommissioning of the proposed AMDA Alpha PV Energy Facility, substation / auxiliary building site, transmission line and associated infrastructure will have on vegetation and fauna. The above assessment must include the NO-GO alternative and include a cumulative assessment.	• Approximately 250ha will be disturbed during construction and shaded during operation. • A six metre wide access road will be required to access the facility • 5m wide access gravel roads and internal road network will need to be constructed to and between the PV panel arrays. These roads may cross small drainage lines, which may require Low-Level-Crossing-Structures / drifts, with associated anti-erosion gabion structures, where necessary. • An on-site substation of approx. as well as auxiliary buildings with a footprint of approximately 1ha will be constructed. • A transmission line of approximately 6km from the on-site substation to the new MTS substation will be required. • Based on the findings of the Scoping Ecological Report assess potential impacts on fauna & flora from the

		construction, operation and decommissioning activities. • Describe avoidance measures required, as well as mitigation / management measures that may be implemented to avoid or reduce any negative impacts on vegetation and fauna. • Assess the cumulative impact associated with the loss of habitat and the impacts on meeting conservation targets for that vegetation type.
Avifaunal	Undertake an avifaunal impact assessment.	• Undertake an avifaunal impact assessment for the proposed development that complies with the current (adopted) guidelines of Bird Life South Africa (BLSA)
Heritage	Assess the proposed AMDA Alpha PV Energy Facility and associated infrastructure (on-site substation, auxiliary buildings, transmission line, roads etc.) during construction, operation and decommissioning on Heritage Resources and the Cultural Landscape and provide recommendations for avoidance &/ mitigation.	• On the basis of the public participation process for the Scoping phase, conclude the Heritage Impact Assessment, which includes: • Analysis of Cultural Landscape, Visual – Spatial and Cumulative Impacts; • Liaison with other specialists regarding the Archaeological and Paleontological and Impact Assessments. • Describe mitigation / management measures that may be implemented to avoid or reduce any negative impacts.
Archaeological	Assess the proposed AMDA Alpha PV Energy Facility and associated infrastructure (on-site substation, auxiliary buildings, transmission line, roads etc.) during construction, operation and decommissioning on Archaeological Resources and provide recommendations for avoidance &/ mitigation.	• Undertake a detailed foot survey • Assess the impacts of the proposed facility on the archaeology resources. • Outline the requirements for the Archaeological monitoring (should this be necessary) during earthmoving activities so as to avoid or minimize negative impact on potential subsurface archaeological resources. • Describe mitigation / management measures that may be implemented to avoid or reduce any negative impacts.
Palaeontology	Undertake a Paleontological desktop assessment of the study site	• Determine the significance of the site in terms of potential paleontological resources. • Provide recommendation for the conservation of any resources identified.
Planning	Re-zoning and Long-term Lease Applications.	• Start preparing Re-zoning & Lease Applications based on preferred, mitigated layout of the solar facility. • Follow-up with Kai !Garib Municipality and Department of Agriculture regarding progress of the Re-zoning & Lease Applications for the Solar Facility on Agricultural land.
Visual	Undertake a Visual Impact assessment of the proposed AMDA Alpha PV Energy Facility.	• Determine sensitive visual resources in the surrounding. • Undertake a view shed analysis of the proposed development. • Assess the visual significance of the proposed project. • Provide mitigation measures if necessary.

Freshwater	Undertake a freshwater Ecology Impact Assessment	• The freshwater impact report should assess the impacts for both of the proposed development alternatives and the no-go option, which have been proposed and include the requirements highlighted in the Departments letter, namely: - Identification and sensitivity rating of all water courses for the impact phase of the proposed development; - Identification, assessment of all potential impacts to the water courses and suggestion of mitigation measures; and - Recommendations on the preferred placement of photovoltaic panels and associated infrastructure.
Socio Economic	Undertake a Social Impact Assessment	Undertake a Social impact Assessment as per the requirements highlighted below.
SKA requirements	Assess the impacts on the SKA station nearest the proposed study site.	Undertake a Radio Frequency Interference and Electromagnetic Interference assessment to the satisfaction of the SKA SA Project Office.
Traffic Assessment	Assess the Traffic impacts associated with the development and provide a Traffic Plan for the transport of materials to the site.	• Undertake the required studies to determine the extent of the impacts on the road networks associated with the solar development. • Determine the extent of any hazards that may result from the increased truck traffic. • Determine the impacts on traffic flow. • Consider cumulative impacts related to the various renewable energy facilities proposed for the area. • Provide measures to minimise impacts on local commuters and businesses.

The sections below elaborate on certain specialist studies where relevant information could not be captured in the table above.

24.2 PLAN OF STUDY FOR ECOLOGICAL IMPACT ASSESSMENT

The Ecological specialist, Mr Simon Todd will undertake the following activities as part of the ecological impact assessment.

24.2.1 Assessment methodology

Direct, indirect and cumulative impacts of the issues identified above, will assessed during the Impact Assessment phase of the project according to the following standard methodology:

- The **nature** which shall include a description of what causes the effect what will be affected and how it will be affected.
- The **extent** wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The **duration** wherein it will be indicated whether:

  - the lifetime of the impact will be of a very short duration (0- 1 years).
  - the lifetime of the impact will be of a short duration (2-5 years).
  - medium-term (5-15 years).
  - long term (> 15 years); or
  - permanent
- The **magnitude** quantified as small and will have no effect on the environment, minor and will not result in an impact on processes, low and will cause a slight impact on processes, moderate and will result in processes continuing but in a modified way, high (processes are altered to the extent that they temporarily cease) and very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** of occurrence, which shall describe the (likelihood of the impact actually occurring. Probability will be estimated as very improbable (probably will not happen), improbable (some possibility, but of low likelihood), probable (distinct possibility), highly probable (most likely) and definite (impact will occur regardless of any prevention measures).

The significance which shall be determined through a synthesis of the characteristics described above and will be assessed as follows:

- **No significance**: the impacts do not influence the proposed development and/or environment in any way.
- **Low significance**: the impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.
- **Moderate significance**: the impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.
- **High significance**: the impacts will have a major influence on the proposed development and/or environment and will result in the “no-go” option on the development or portions of the development regardless of any mitigation measures that could be implemented. This level of significance must be well motivated.

and;

- the status, which will be described as either **positive**, **negative** or **neutral**.
- the degree to which the impact can be **reversed**.
- the degree to which the impact may cause **irreplaceable loss of resources**.
- the degree to which the impact can be **mitigated**.

24.2.2 Proposed activities for the EIA phase

Although the current study includes information collected on-site as well as a desktop assessment, the proposed development area has been specifically investigated and fieldwork during the EIA phase will be an important activity required to validate and refine the findings of this report. This will include the following studies and activities:

- **Characterise** the vegetation and plant communities present within the site in greater detail. On-site surveys will be conducted to generate a species list for the site as well as identify and where necessary map different plant communities present at the site if they are associated with different sensitivity classes.
- **Identify and map** the presence of any **unique** and special habitats at the site such as gravel patches, rock fields and other localised habitats.

- **Locate, identify and map** the location of **significant populations** of species of conservation concern, so that the final development footprint can be adjusted so as to avoid and reduce the impact on such species. Some species of concern may be widespread and others localised and the distribution of such species will be established during the site visit.
- Evaluate the likely **presence** of listed **faunal** species at the site such as the Giant Bullfrog, and identify associated habitats that should be avoided to prevent impact to such species.
- Evaluate, based on the site attributes, what the most applicable **mitigation measures** to reduce the impact of the development on the site would be and if there are any areas where specific precautions or mitigation measures should be implemented.
- **Assess** the **impacts** identified in the scoping phase in light of the site-specific findings and the final layout to be provided by the developer.

24.3 PLAN OF STUDY FOR ARCHAEOLOGICAL / HERITAGE IMPACT ASSESSMENT

The purpose of an AIA is to conduct a survey of the affected areas in order to identify, record and rate the significance of archaeological resources, to assess the impact of the proposed area and linear developments on such resources and to recommend mitigation measures where necessary.

To assess the nature and significance of the archaeological record in the affected area, it was necessary to conduct a comprehensive foot survey. The latter focused on the provisional development layout plan including the 250ha portion of the affected property as well as the power line route and access roads.

The potential for different landforms, sediments or landscape features to contain archaeological traces is assessed according to type, such as rocky surfaces, sandy surfaces, cultivated areas, previously developed or disturbed areas, rock shelters, and so on. Overall, the significance of archaeological occurrences or sites are evaluated in terms of their content and context. Attributes to be considered in determining significance include artefact and/or ecofact types, rarity of finds, exceptional items, organic preservation, aesthetic appeal, potential for future research, density of finds and the context in which archaeological traces occur.

Open vegetation and large expanses of exposed ground surfaces provided excellent archaeological visibility and allowed for a good understanding of the archaeological record in the area based on surface observations. Due to good archaeological visibility and, as it turned out, very sparse archaeological occurrences, survey walk tracks were spaced between about 50 and 80m apart and were fixed with a hand held GPS to record the search area. After gaining an understanding of the nature of the archaeological record, the survey transects were set further apart. The position of archaeological occurrences, observations and photo localities were also fixed by GPS. Digital audio notes of observations and a comprehensive, high quality digital photographic record were made.

Once archaeological traces have been identified, recorded and assessed in terms of their significance, the aim of the AIA is to assess the potential negative impacts of development on such resources and to make recommendations in mitigation. The end product of the AIA is a report that forms part of the Integrated Heritage Impact Assessment and that meets standards required by the South African Heritage Resources Agency (SAHRA) in terms of the National Heritage Resources Act, No. 25 of 1999. The AIA report will detail results from the literature review and fieldwork, and will assess potential negative impacts associated with the proposed development and make recommendations in mitigation where necessary.

24.3.1 Plan of Study for Social Impact Assessment

24.3.1.1 APPROACH

The proposed approach to the SIA is based on the Guidelines for SIA endorsed by Western Cape Provincial Environmental Authorities (DEA&DP) in 2007. The Guidelines are based on accepted international best practice guidelines, including the Guidelines and Principles for Social Impact Assessment (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment, 1994) and IAIA Guidance for Assessing and Managing Social Impacts (2015). The approach to the study will involve

- Project initiation and review of project information etc.
- Collection and review of reports and baseline socio-economic data on the area. This includes socio-economic characteristics of the affected areas, current and future land uses, and land uses planning documents relating to the study area and surrounds;
- Identification of the components associated with the construction and operational phase of the proposed project, including estimate of total capital expenditure, number of employment opportunities created, breakdown of the employment opportunities in terms of skill levels (low, medium and high skilled), breakdown of wages per skill level, assessment procurement policies etc.;
- Identify and set up meetings key stakeholders;
- Interviews with key affected parties, including local communities, local landowners, key government officials (local and regional), non-government organizations, the client, local farmers associations, tourism and conservation officials, chamber of commerce etc.;
- Identification and assessment of key social issues and assessment of potential impacts (negative and positive) associated with the construction and operational phase of the proposed PV facility. A key focus of the assessment will be an assessment of the potential socio-economic benefits for the local community associated with the proposed development.
- Identification of appropriate measures to avoid, mitigate, enhance and compensate for potential social impacts;
- Preparation of Draft Report for comment;
- Incorporate comments and prepare Final Report.

24.3.1.2 Comments on the interview process

The interview process is a fundamental component of the SIA process. The experience with previous SIA's is that the interview process (identifying interviewees, setting up meetings, confirming interviews, and undertaking interviews) is a time consuming process that is not always fully understood and or appreciated by the client.

24.3.1.3 Identifying and contacting interested and affected parties to set up interviews

In this regard the first stage of the interview process is identifying the key stakeholders to be interviewed as part of the SIA. The public participation database provides a starting point for this process. However, the SIA also seeks to identify people who may not have been able to attend public meetings and or register as Interested and Affected Parties (IAPs), such as farm workers and other potentially vulnerable groups who do not have access to daily newspapers, computers and or transport etc. The process of identifying and contacting people to set up interviews can be a time consuming process and in many instances dates and times have to be changed on a regular basis to accommodate the needs of the IAPs.

24.3.1.4 Time allocated to interviews

Experience with previous interviews has shown that a minimum of 45 – 60 minutes should be allocated to each interview. This provides the interviewer with the opportunity to introduce himself or herself to the interviewee and outline the proposed development, before focusing on the interview itself. Based on this timeframe the maximum number of interviews that can be conducted in a day is in the region of 5-6, bearing in mind that time must be allocated for traveling between interviews. In rural areas the distances can be significant and as such the number of interviews that can be undertaken in a day is less than 5. The process of setting up, confirming and undertaking interviews is therefore a time consuming exercise.

24.3.1.5 OBJECTIVES OF THE SIA

The objectives of the SIA are to provide the EIA with a detailed description of the local socio-economic conditions affected by the proposed project and to identify the potential social opportunities and risks associated with the project. Is so doing the SIA will seek to identify measures that can be implemented to avoid and or minimize the potential social risks. The SIA will also identify measures to enhance the potential social benefits associated with the proposed project. Experience with other renewable energy projects has also shown that the information collected as part of the SIA can assist the proponent to identify potential opportunities and beneficiaries for the establishment of a Community Trust.

25 PROCESS TO BE FOLLOWED

The following process is to be followed for the remainder of the environmental process:

- Once the DEA accepts the Scoping Report and Plan of Study for Environmental Impact Report, the relevant specialists will undertake and complete their respective impact assessments;
- Discussions will be held with the various specialists and project team members in order to determine how best the development concept should be amended / refined to avoid significant impacts;
- The EIR will be made available for public review and comment period of 30-days;
- The Final EIR will be submitted to the DEA for consideration and decision-making;
- The DEA's decision (Environmental Authorisation) on the FEIR will be communicated with all registered I&APs.

26 CONCLUSION & RECOMMENDATIONS

This scoping exercise is currently being undertaken to present concept proposals to the public and potential Interested & Affected Parties and to identify environmental issues and concerns raised as a result of the proposed development alternatives to date. This will allow Interested & Affected Parties (I&APs), authorities, the project team, as well as specialists to provide input and raise issues and concerns, based on baseline / scoping studies undertaken. The AMDA Alpha PV Energy Facility will be analysed from Ecological, Avifaunal, Agricultural Potential, Heritage and Visual perspectives, and site constraints and potential impacts identified.

This Scoping Report (DSR) summarises the process to date, reports on the relevant baseline studies that have been undertaken.

The results of the baseline / scoping studies have not found any fatal flaws that should prevent the project from being considered further. The EIR phase of this environmental process will further

assess the potential impacts, including cumulative impacts that may occur as a result of this development.

Cape EAPrac is of the opinion that the information contained in this Scoping Report and the documentation attached hereto is sufficient to allow the general public and key stakeholders to apply their minds to the potential negative and/or positive impacts associated with the development, in respect of the activities applied for. It furthermore provides sufficient information in order for the competent authority to decide whether or not the project should proceed to the next phase of the environmental process.

The Draft Scoping Report (DSR) was made available for stakeholder review and comment for a period of 21-days, extending from **11 March 2016 – 01 April 2016**. All comments received, have been considered and addressed, and feedback provided to registered stakeholders.

An application has been submitted to the National Department of Environmental Affairs along with this Scoping report, which is herewith available for a further **30 Day period** extending from **03 June 2016 – 04 July 2016**.

This Final Scoping report constitutes the final report that is submitted to the competent authority for decision making.

27 ABBREVIATIONS

AIA	Archaeological Impact Assessment
BGIS LUDS	Biodiversity Geographic Information System Land Use Decision Support
CBA	Critical Biodiversity Area
CDSM	Chief Directorate Surveys and Mapping
CEMPr	Construction Environmental Management Programme
DEA	Department of Environmental Affairs
DEA&NC	Department of Environmental Affairs and Nature Conservation
DME	Department of Minerals and Energy
EAP	Environmental Impact Practitioner
EHS	Environmental, Health & Safety
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GPS	Global Positioning System
GWh	Giga Watt hour
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
kV	Kilo Volt
LUDS	Land Use Decision Support
LUPO	Land Use Planning Ordinance
MW	Mega Watt
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NPAES	National Protected Area Expansion Strategy
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act
PM	Post Meridiem; “Afternoon”

PSDF	Provincial Spatial Development Framework
S.A.	South Africa
SACAA / CAA	South African Civil Aviation Authority
SAHRA	South African National Heritage Resources Agency
SANBI	South Africa National Biodiversity Institute
SANS	South Africa National Standards
SDF	Spatial Development Framework
TOPS	Threatened and Protected Species

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