DRAFT SCOPING REPORT

for

HOTAZEL SOLAR

on

Remainder Farm York A 279 and Grid connection on Remainder of Farm 280 and Portion 11 of Farm York A 279

In terms of the

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

Prepared for Applicant: ABO Wind Hotazel PV (Pty) Ltd.

Date: 2 August 2018

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Report Reference: JMO543/02

Department Reference: 14/12/16/3/3/2/1086

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DOCUMENT TRACKING

DOCUMENT HISTORY

REVISION	DATE	AUTHOR
Draft Scoping Report	02 August 2018	Dale Holder
Final Scoping Report	Pending	

APPROVAL FOR RELEASE

NAME	TITLE	SIGNATURE
Dale Holder	Senior Environmental Practitioner	

DISTRIBUTION

DISTRIBUTION LIST
Registered and Potential Registered and Affected Parties
Department of Environmental Affairs
Atlantic Energy Partners

SUBMISSION AND CORRESPONDENCE

SUBMISSION / CORRESPONDENCE	DATE
Application form Submitted	11 July 2018
Application form Acknowledged	26 July 2018
Draft Scoping Report Submitted	02 August 2018
Draft Scoping Report Acknowledged	Pending
Comment on Draft Scoping Report	Pending
Final Scoping Report Submitted	Pending
Final Scoping Report Acknowledged	Pending
Final Scoping Report Accepted	Pending

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Cape EAPrac Environmental Assessment Practitioners PO Box 2070 George 6530 Tel: 044-874 0365 Fax: 044-874 0432 **Report written & compiled by:** Dale Holder (Ndip Nature Conservation), who has over 15 years' experience as an environmental practitioner. **Registrations:** Director, Louise-Mari van Zyl (MA Geography & Environmental Science [US]; Registered Environmental Assessment Practitioner with the Interim Certification Board for Environmental Assessment Practitioners of South Africa, EAPSA). Ms van Zyl has over fifteen years' experience as an environmental practitioner.

PURPOSE OF THIS REPORT:
Stakeholder Review and Comment

APPLICANT:
ABO Wind Hotazel PV (Pty) Ltd

CAPE EAPRAC REFERENCE NO:
JMO543/02

DEPARTMENT REFERENCE:
14/12/16/3/3/2/1086

SUBMISSION DATE:
02 August 2018

Draft Scoping Report

in terms of the

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

Hotazel Solar

Remainder of Farm York A 279 with Grid connection on Remainder of Farm 280 and Portion 11 of Farm York A 279.

Submitted for:

Stakeholder Review & Comment

Report Issued by:

Cape Environmental Assessment Practitioners

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REPORT DETAILS

Title:	DRAFT SCOPING REPORT for Hotazel Solar
Purpose of this report:	This Draft Scoping report is available to all registered and potential Interested and Affected Parties (I&AP's) for Review and Comment. This Draft 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 Hotazel Solar near Hotazel in the Northern Cape Province. This is the first report in the series that that forms part of the environmental process. Registered I&APs will be given an opportunity to comment on the following reports as part of this environmental process: - Draft Scoping Report, - Draft Environmental Impact Assessment Report, and - Draft Environmental Management Programme 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 Draft Scoping Report is available to all stakeholders for a 30 day review & comment period, 02 August 2018 – 03 September 2018.
Prepared for:	ABO Wind Hotazel PV (Pty) Ltd
Published by:	Cape Environmental Assessment Practitioners (Pty) Ltd. (Cape EAPrac)
Authors:	Mr Dale Holder
Reviewed by:	Ms Melissa Mackay
Cape EAPrac Ref:	JMO543/02
DEA Case officer & Ref. No:	Azrah Essop 14/12/16/3/3/2/1086
Date:	02 August 2018
To be cited as:	*Cape EAPrac,* 2018. Draft Scoping Report for the proposed Hotazel Solar. Report Reference: JMO543/02. 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 Applicant	ABO Wind Hotazel PV (Pty) Ltd is a renewable energy developer, proposing the development of the Hotazel Solar energy facility
Site Details		
Size of the site	Description and Size in hectares of the affected property.	Remainder of Farm York A 279. Proposed Grid Connection on Remainder of Farm 280 and Portion 11 of Farm York A 279. Total Property Size: 636.7946ha

Development Footprint	This includes the total footprint of PV panels, auxiliary buildings, onsite substation, inverter stations and internal roads.	The total footprint of Hotazel Solar Energy Facility will not exceed 275ha
Technology Details		
Capacity of the facility	Capacity of facility (in MW)	Export Capacity (AC) of 100MW
Solar Technology selection	Type of technology	PV with fixed, single or double axis tracking technology.
	Capacity and dimensions of the PV field	75 MW (AC) yield. PV Panel Footprint of approximately 250ha with a total project Footprint of not more than 275ha .
	Structure height	PV Structures not more than 4m
	Surface area to be covered (including associated infrastructure such as roads)	Less than 275ha
	Structure orientation	Fixed-tilt in north-facing orientation, or mounted on horizontal axis tracking from east to west
	Laydown area dimensions	Approximately 2-5ha of laydown area will be required (the laydown areas will not exceed 5ha.)
Grid Connection Details		
Grid connection	Substation to which project will connect.	The project intends connecting to the National Grid via the Eskom Hotazel Substation. The option to loop into the new 132kV powerline on the southern boundary of the property will also be investigated.
	Capacity of substation to connect facility	Eskom Hotazel Station. The Hotazel Substation currently has in excess of 200 MW capacity to evacuate generated power.
Power line/s	Number of overhead power lines required	1x132kV line from the on-site facility substation to the Eskom Hotazel Substation or the existing 132kV powerline on the southern boundary of the property. Alternative Grid connection options will be investigated as part of the Environmental process.
	Route/s of power lines	Alternative grid connection options are under investigation. Please refer to the layout plans and report attached in Appendix D.
	Voltage of overhead power lines	132kV.
	Height of the Power Line	±24 m
	Servitude Width	Maximum of 31m – 51m.
Auxiliary Infrastructure		
Other infrastructure	Additional Infrastructure	Auxiliary buildings of approximately 2 ha. The functions within these buildings include (but are not limited to) gate house, ablutions, workshops, storage and warehousing area, site offices, substation and control centre. Perimeter Fencing not exceeding 5m in height.
	Details of access roads	The main access road will not exceed 6m in width and the internal road will not exceed 5m in width.
	Extent of areas required for laydown of materials and equipment	Approximately 2-5ha of laydown areas will be required (Laydown areas will not exceed 5ha).

LOCATION OF PREFFERED ALTERNATIVE

Two footprint alternatives are proposed as part of this environmental process. At this stage, no specific footprint alternative is preferred as the nature and intensity of impacts associated with each are similar. The proposed alternatives are situated at:

	Latitude	**Longitude**
Layout Alternative 1		
North-West Corner	27°12'38.82"S	22°59'2.79"E
North-East Corner	27°12'20.06"S	23° 0'3.24"E
South-West Corner	27°13'21.09"S	22°59'29.84"E
South-East Corner	27°13'29.23"S	22°59'2.23"E
Layout Alternative 2	**Latitude**	**Longitude**
North-West Corner	27°13'22.47"S	22°58'21.61"E
North-East Corner	27°12'26.34"S	22°59'43.30"E
South-West Corner	27°13'45.51"S	22°58'52.73"E
South-East Corner	27°13'11.50"S	22°59'55.00"E
On site Substation alternative A (layout 2)	27°13'44.24"S	22°58'52.56"E
On site Substation alternative B (layout 1)	27°13'8.92"S	22°59'23.19"E
Powerline alternative a (LILO from subs A)	**Latitude**	**Longitude**
Start (Subs A)	27°13'44.24"S	22°58'52.56"E
End	27°13'46.78"S	22°58'54.88"E
Powerline alternative b	**Latitude**	**Longitude**
Start (Subs A)	27°13'44.24"S	22°58'52.56"E
Middle	27°13'53.67"S	22°57'45.10"E
End (Eskom Hotazel sub)	27°12'21.31"S	22°57'27.45"E
Powerline alternative c		
Start (Sub B)	27°13'8.92"S	22°59'23.19"E
Middle	27°13'53.67"S	22°57'45.10"E
End (Eskom Hotazel sub)	27°12'21.31"S	22°57'27.45"E
Powerline alternative d (LILO from subs B)		
Start	27°13'8.92"S	22°59'23.19"E
Middle	27°13'25.54"S	22°59'22.93"E

End	27°12'21.31"S	22°57'27.45"E

TECHNICAL DETAILS SUMMARY OF ALTERNATIVES:

Component	Description/ Dimensions
Location of the site	Approximately 3km South East of Hotazel
PV Panel area	250 ha with a total project footprint of approximately 275 ha
Preferred Site access	Access to the site will be at one of the existing access points from the R31
Export capacity	100 MW
Proposed technology	PV with fixed, single or double axis tracking technology.
Height of installed panels from ground level	PV Structures not more than 4m
Width and length of internal roads	Main internal road - width: 6m, length: ± 17 km Secondary internal roads – width: 5m, length: ± 11 km

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 G3
(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;	The proposed facility is to be situated South of Hotazel on the Remainder of Farm York A 279. The proposed Grid connection will also cross the Remainder of the Farm 280 and Portion 11 of the Farm York A 279. 21 digit Surveyor General codes: - C04100000000002790000 - C04100000000002800000 - C04100000000002790011 .
(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. The corner point co-ordinates of both alternatives are included in the Table above.
(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 of this report. Listed and specified activities triggered are detailed in section 2.1.2 of this report
(e) a description of the policy and legislative context within which the development is proposed including an identification of all	The legislative and policy context is included in section 2 of this report.

Requirement	Details
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;	
(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 4 on 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, 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;	The details of all alternatives considered are included in section 6 of this report. 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 19 of this report. An issues and responses report is included in appendix F2. Detailed site description and attributes (including bipphysical, social and economic attributes are included in section 3 & 8 of this report. A description of potential impacts identified by the EAP as well as participating specialists is included in section 10 of this report. The methodology used for the determination and ranking of significance is included in section 14.4 of this report. Please also refer to the specific methodologies in the specialist reports attached in Appendix E. This scoping report identifies the potential positive and negative impacts associated with the proposed project. These are included in section 12 of the report. An assessment of the significance of these identified impacts will take place in the impact assessment phase of this environmental process. The potential mitigation measures are addressed in the respecitve specialist reports. Details regarding the criteria for the selection of the preferred site selection is included in section 6 (Note, the preferred alternative has not yet been determined – the outcome of stakeholder engagement of this DraftScoping Report along with the findings of the participting specialists will be used to determine the preferred alternative with a high level of confidence). 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 of this report. The preferred alternative will be detemined using a risk adverse approach whereby the baseline specialist studies and the outcome of this public participation process will be used to determine the footprint of the proposed facility. Details of this process are included in section 6 of this report.
(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;	The plan of study for Environmental Impact Assessment phase of the environmental process is included in section 14 of this report.

Requirement	Details
(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.	
(j) an undertaking under oath or affirmation by the EAP in relation to - (i) the correctness of the information provided in the report; (ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and (iii) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	The signed EAP declaration is included in Appendix G3.
(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;	Please refer to the plan of Study for EIA included in section 14 of this report
(l) where applicable, any specific information required by the competent authority;	The submission of this Draft Scoping Report to the competent authority, allows the competent authority to advise the EAP on any specific additional requirements.
(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 section 19 of the report.

ORDER OF REPORT

Report Summary

Scoping Report – Main Report

Appendix A	:	Location, Topographical Plans
Appendix B	:	Biodiversity Overlays
Appendix C	:	Site Photographs
Appendix D	:	Solar Facility Layout Plans
Appendix E	:	Supplementary Reports (Specialist Reports and Technical Reports)
Annexure E1	:	Ecological Scoping Report (Todd, 2018)
Annexure E2	:	Avifaunal Scoping Report (Todd, 2018)
Annexure E3	:	Agricultural Potential Study (Lubbe, 2018)
Annexure E4	:	Archaeology Scoping Report (Nilssen, 2018)
Annexure E5	:	Palaeontology Desktop Study (Almond, 2018)
Annexure E6	:	Integrated Heritage Study (De Kock, 2018)
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Annexure E9	:	Visual Scoping Report (Stead, 2018)
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Appendix F	:	Public Participation Process
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Annexure F2	:	Comments and Response Report (to be included later in the process)
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1. PROJECT OVERVIEW

Cape EAPrac has been appointed by ABO Wind Hotazel PV (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 'Hotazel Solar' energy facility near Hotazel in the Northern Cape Province of South Africa.

ABO Wind Hotazel PV (Pty) Ltd have an option to lease a section of the Remainder of the Farm York A 279 from the landowner, the late JP Jansen (represented by the executor of the estate, Mr Pac Jansen) for the purposes of developing the proposed solar facility. A copy of a letter from the executor of the estate providing consent for the continuation of the EIA is attached in Annexure G2.

The Grid connection across the remainder of the Farm 280 and Portion 11 of the Farm York A 279 is considered to constitute a linear activity and as such, landowner consent is not required in terms of these regulations. The applicant is currently in the process of securing the necessary option to grid services with these affected landowners and these landowners have been automatically registered as interested and affected parties and will be given an opportunity to provide input into this environmental process.

The total generation capacity of the solar facility will not exceed 100MW$_{AC}$ for input into the national Eskom grid. The project will feed into the National Grid via the Existing Eskom Hotazel Substation.

2. NEED AND DESIRABILITY

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

3. ENVIRONMENTAL LEGISLATIVE 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.

Listed activity as described in GN R.983, 984 and 985	Description of project activity that triggers listed activity
Regulation 327 – Basic Assessment	
GN R327 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	The proposed Hotazel Solar will connect to the national electricity via the Hotazel sub-station. The proposed distribution infrastructure includes the construction of an on-site substation and a 132kV overhead power line from the on-site substation.
GN R327 Activity 19: Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such	The area is currently utilised for limited agricultural purposes. The construction of a PV Facility may be considered as commercial use.

development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	
GN R327 Activity 24: The Development of a road – (ii) with a reserve wider than 13.5m or where no road reserve exists where the road is wider than 8m.	The current proposal is to upgrade the existing access roads to 8m. The results of the TIA may indicate problems with the existing accesses points, in which case, new access points will need to be considered and assessed. The applicability of this listed activity will be confirmed after completion of the TIA during the impact assessment phase of this environmental process.
GN R327 Activity 56: The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre – (ii) where no reserve exists, where the existing road is more than 8 metres	The proposed access roads utilise existing accesses to this portion of land. The lengthening of these access roads by more than 1km may be required, depending on which alternative footprint is selected and which access point is preferred from a traffic management viewpoint.
Regulation 325 – Scoping and Environmental Impact Reporting	
GN R325 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 Hotazel Solar energy facility will have a maximum generation Capacity of 100 megawatts(AC) and as such exceeds the threshold defined in this activity.
GN R325 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 Hotazel Solar energy facility will have a maximum footprint of 275ha and as such exceeds the threshold defined in this activity.
Regulation 324 – Basic Assessment	
NO Activities in terms of Regulation 324.	

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.

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.

4. DEVELOPMENT PROPOSAL & ALTERNATIVES

The proposed photovoltaic (PV) SEF will have a net generating capacity of 100 MW_{AC} with an estimated maximum footprint of ± 275 ha. A The proposed project footprint and alternatives were identified by the Applicant following the findings of the ecological expert who was appointed to develop a vegetation and sensitivity rating for the entire property.

This sensitivity plan was then used to determine the two alternatives for the proposed PV footprint.

The technology under consideration is photovoltaic (PV) modules mounted on either single or double axis tracking structures. Other infrastructure includes inverter stations, internal electrical reticulation, access road, internal roads, an on-site switching station / substation, a 132 kV overhead (OH) distribution 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 distribution 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, a gate house and security offices.

5. PROFFESIONAL INPUT

The following professionals[1] have provided input into this environmental process:

1.	Ecology	-	Mr Simon Todd (3 Foxes Biodiversity Solutions)
2.	Avifaunal	-	Mr Simon Todd & Eric Herrmann (3 Foxes biodiversity Solutions)
3.	Archaeology	-	Dr Peter Nilssen
4.	Palaeontology	-	Dr John Almond (Natura Viva)
5.	Integrated Heritage	-	Mr Stefan de Kock (Perception Heritage)
6.	Agricultural Potential	-	Mr Christo Lubbe
7.	Visual	-	Mr Stephen Stead (Visual Resource Management Africa)
8.	Freshwater	-	Dr Brian Colloty (Scherman Colloty & Associates)
9.	Social	-	Ms Sarah Watson (Savannah Environmental)
10.	Engineering aspects	-	Sonia Miszczak (Atlantic Energy Partners)
11.	Stormwater	-	To be appointed
12.	Traffic and Transportation	-	To be appointed
13.	Water Consumption	-	Sonia Miszczak (Atlantic Energy Partners)
14.	Planning	-	Macroplan.

6. PLANNING CONTEXT

A Planning specialist will be appointed in order to consider the planning implications of the proposed facility and submit the required applications as follows:

- Application for land use change in terms of the Spatial Planning and Land Use Management Act, Act 16 of 2013, submitted to the Joe Morolong Local Municipality in terms of their Land Use Management Scheme and relevant and approved SPLUMA by-laws.
- Notification of the intended process of land use change submitted to the Department of Agriculture Forestry and Fisheries (DAFF) in terms of the Subdivision of Agricultural Land Act, Act 70 of 1970.

7. CONCLUSIONS & RECOMMENDATIONS

[1] Note that not all of these professionals are considered specialists as contemplated in chapter 3 of Regulation 326. Studies such as Engineering, Stormwater, Traffic, water consumption and planning constitute "technical" studies, rather than specialist studies and as such, the requirements in appendix 6 of R326 do not apply to all these professionals

This scoping exercise is currently being undertaken to present concept proposals to the Competent Authority, Public and potential and registered 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 Hotazel Solar energy facility has been analysed from ecological, avifaunal, agricultural potential, heritage, visual, social and freshwater perspectives, and site constraints and potential impacts identified.

This Draft Scoping Report (DSR) summarises the process to date, reports on the findings of relevant baseline studies.

Cape EAPrac is of the opinion that the information contained in this DSR 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.

The DSR is made available for stakeholder review and comment for a period of 30-days, extending from **02 August 2018 – 03 September 2018**. All comments received, will be considered and addressed, and feedback will be provided to registered stakeholders.

DRAFT SCOPING - MAIN REPORT

1 INTRODUCTION

Cape EAPrac has been appointed by ABO Wind Hotazel PV (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 'Hotazel Solar' energy facility near Hotazel in the Northern Cape Province of South Africa.

ABO Wind Hotazel PV (Pty) Ltd have an option to lease a section of the Remainder of the Farm York A 279 from the landowner, the late JP Jansen (represented by the executor of the estate, Mr Pac Jansen) for the purposes of developing the proposed solar facility. A copy of a letter from the executor of the estate providing consent for the continuation of the EIA is attached in Annexure G2.

The Grid connection across the Remainder of the Farm 280 and Portion 11 of the Farm York A 279 is considered to constitute a linear activity and as such, landowner consent is not required in terms of these regulations. The applicant is currently in the process of securing the necessary option to grid services with these affected landowners and these landowners have been automatically registered as interested and affected parties and will be given an opportunity to provide input into this environmental process.

The total generation capacity of the solar facility will not exceed 100MW_{AC} for input into the national Eskom grid. The project will feed into the National Grid via the Existing Eskom Hotazel Substation.

The purpose of this **(DSR)** is to describe the environment to be affected, the proposed project, the process followed to date, to present the site constraints identified by the various specialist during their baseline investigations, and provide Plan of Study for the Impact Assessment phase of this development. This scoping report is made available to registered and potential I&AP's for review and comment.

The DSR is available for review and comment for a period of 30 Days extending from: **02 August 2018 – 02 September 2018**

All comments received on this DSR will be responded to and included in the Final Scoping Report to be submitted to the competant authority for decision making.

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

South Africa's generation capacity is dominated by coal-fired generation stations with a net output of 35.6 GWp, which represents over 85% of the country's total installed capacity of over 44 GW.

Globally, renewable energy (RE) has gained momentum, with a significant rise in the uptake of various RE technologies such as solar photovoltaics (PV), wind energy, biogas and other biofuels, hydroelectricity, landfill gas, geothermal energy, and concentrated solar power (CSP).

Ministerial determinations by the South African government to procure RE — such as the Integrated Resource Plan (IRP) for Electricity 2010-2030, which lays out the country's electricity future — have given growth in the renewable energy sector a significant boost.

South Africa's green economy, partly driven by the country's utility-scale Renewable Energy Independent Power Production Procurement Programme (REIPPPP), reflects these trends and is leading the way in some areas. According to Moody's, South Africa had the fastest growing green economy in the world in 2015. The REIPPPP, a key factor in this growth, is in its sixth year and has achieved remarkable successes. To date, the programme has:

- Procured over 6 300 MWp of RE generation capacity, of which over 2 500 MWp was connected and has been feeding electricity into the national grid since June 2016.

- Selected 102 preferred bidders to develop utility-scale projects across the country – with projects in every province across South Africa.
- Received a ministerial determination to procure a further 6 300 MWp of generation capacity. This is the second time capacity to the programme has been doubled – a testimony to its success.
- Attracted over R195 billion of investment into South Africa, with over 25% from foreign investors. In doing so, the programme, through local content requirements, has successfully stimulated the development of a local RE technology components manufacturing sector. Given the additional 6 300 MWp still to be procured, this sector is set to grow further.
- Achieved significant technology price reductions, with South Africa boasting some of the world's lowest clean energy costs.

Beyond these successes, the programme and, consequently, the utility-scale RE industry, is well positioned to continue contributing to South Africa's national development, as enshrined in the government's Strategic Infrastructure Projects (SIP) and the National Development Plan (NDP). The programme's socio-economic development (SED) and enterprise development (ED) mechanisms give successful project developers a unique opportunity to be competitive in their bidding strategy, while contributing meaningfully to the local and national economy. Project developers have fully embraced the SED/ED component of the REIPPPP, resulting in numerous inspiring contributions to priority areas on the government's developmental agenda. mong other areas, these contributions span community development, local economic development, skills development and early childhood development.

The recent uncertainties involving the state-owned utility, Eskom, highlight the need for reforms in an evolving energy sector, where electricity generation, transmission and distribution systems require unbundling. The interest from local municipalities in procuring RE generation capacity from independent power producers (IPPs) contributes further to the shift in the structure of the country's power sector.

Regionally, 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 into potential for photo-voltaic, thermal, solar and wind power (Northern Cape Business website, 2010).

The northern 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, 2014)

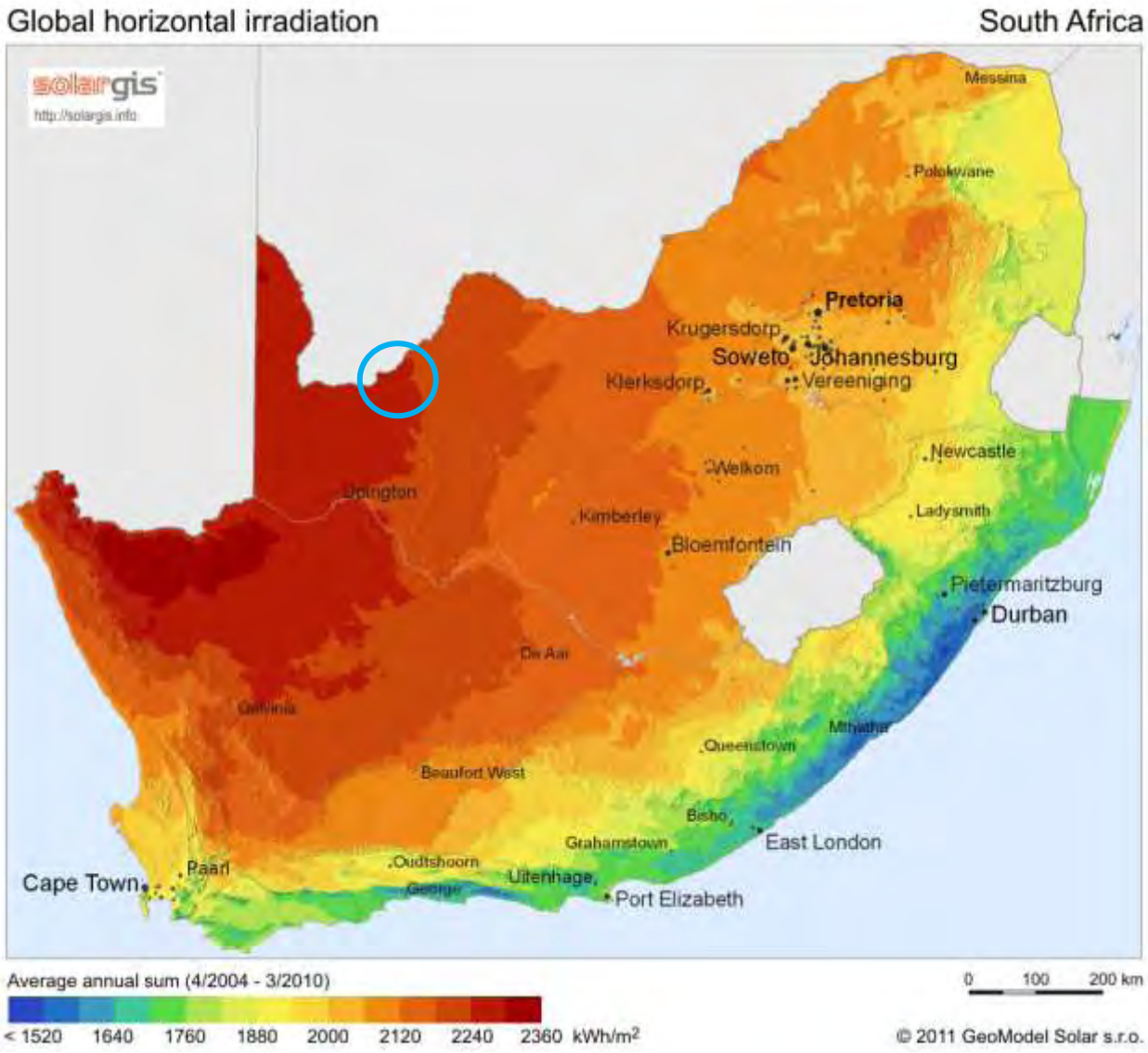

Figure 1: Global Horizontal radiation map for South Africa (Source: http://solargis.info, 2015) showing the approximate area proposed for Hotazel Solar.

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**.

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,2014). 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, 2015).

The introduction of private sector generation offers multiple benefits; it will contribute greatly to the diversification of both the supply and nature of energy production, assist in the introduction of new skills and in new investment into the industry, and enable the benchmarking of performance and pricing. The Department of Energy (DoE), National Treasury (NT) and the Development Bank of Southern Africa (DBSA) established the IPPPP Unit for the specific purpose of delivering on the IPP

procurement objectives. The REIPPPP is a competitive bidding process used by national government to procure RE generation capacity in line with the national Integrated Resource Plan (IRP) for Electricity 2010-2030.

NOTE: It is the intention that Hotazel Solar will submit a bid under this REIPPPP.

1.2 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 Affairs 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 30-days** 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 E.**

1.3 PROPOSED ACTIVITY

ABO Wind Hotazel PV (Pty) Ltd is proposing the establishment of a commercial photovoltaic (PV) solar energy facility (SEF), called Hotazel Solar, on the farm known as the Remaining Extent of the farm York A 279, situated in the District of Hotazel in the Northern Cape Province (the “Property”).

The technology under consideration is photovoltaic (PV) modules mounted on either fixed-tilt or tracking structures. Other infrastructure includes inverter stations, internal electrical reticulation, internal roads, an on-site switching station / substation, a 132 kV overhead distribution line (OHL), 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 OHL. Auxiliary buildings include, inter alia, a control building, offices, warehouses, a canteen and visitors centre, staff lockers and ablution facilities, agate house, and security offices.

Table 1: Component Areas and % of Total Project Area (AEP,2018).

SEF Component	Estimated Area	% of Total Area (± 275 ha)	% of Farm Area (636.7946 ha)
PV structures/modules	± 250 ha	90.91%	39.26 %
Internal roads	± 18 ha	6.55 %	2.83 %
Auxiliary buildings	± 1 ha	0.36 %	0.16 %
Substation	± 1 ha	0.36 %	0.16 %
Other	± 5 ha	1.82 %	0.78 %

The figure below depicts a typical layout of a solar PV energy facility.

Figure 2: Typical Layout of a Solar PV Energy Facility (AEP, 2018)

It is customary to develop the final / detailed construction layout of the SEF only once an IPP is awarded a successful bid under the REIPPPP, after which major contracts are negotiated and final equipment suppliers identified. For the purpose of the DSR, two alternative layouts and the no go alternative are assessed in accordance with the requirements prescribed in NEMA.

Please refer to the **layout plans** and **layout development report** in **Appendix D** for further information and descriptions of the proposed activity.

1.4 TECHNICAL OVERVIEW

The following section presents an overview of the main components of the solar energy facility layout as described in the Technical Design compiled by AEP. Please refer to the engineering report attached in Annexure E8 for further information regarding the Technical components of the proposed facility.

1.4.1 Solar Array

Solar PV modules are connected in series to form a string. A number of strings are then wired in parallel to form an array of modules. PV modules are mounted on structures that are either fixed, north-facing at a defined angle, or mounted to a single or double axis tracker to optimise electricity yield.

The solar arrays for the Hotazel Solar facility will be placed in such a way that they do not interfere with sensitive features defined by the participating specialists.

1.4.2 Mounting Structures

Various options exist for mounting structure foundations, which include cast / pre-cast concrete, driven / rammed piles, or ground / earth screws mounting systems.

Figure 3: Cast Concrete Foundation (Solar Power Plant Business, 2013)

The impact on agricultural resources and production of these options are considered to be the same, however concrete is least preferred due the effort required at a decommissioning phase in order to remove the concrete from the soil, and therefore its impact on the environment. The Hotazel Solar facility will therefore aim to make the most use of either driven / rammed piles, or ground / earth screws mounting systems, and only in certain instances resort to concrete foundations should geotechnical studies necessitate this.

Figure 4: Rammed / Driven Steel Pile (SolarPro, 2010)

Figure 5: Ground Screw (pv magazine, 2014)

1.5 PROJECT PROGRAMME AND TIMELINES

As mentioned previously the Hotazel Solar facility is intended to be lodged under the REIPPPP. The programme has definite and stringent timelines, which the project should meet. Note that the DoE has not yet released the exact dates of the bidding schedules, so the implementation schedule below is based on the best available information we have available at this time and is subject to change.

Table 2: Preliminary implementation schedule.

	Description	Timeline
1	Expected IPPPP submission date (5th round)	First Quarter of 2019.
2	Preferred bidders selected	Last Quarter 2019
3	Finalisation of agreements	First Quarter 2020
4	Procurement of infrastructure	Last Quarter 2020
5	Construction	2021 - 2022
6	Commissioning	2022

The table above clearly depicts the dependence of the project on the IPP procurement programme's timelines. Any delay or acceleration within the IPP procurement programme will have a corresponding effect on the timelines of the projects timelines. Also, as mentioned, no official public submission dates Round 5 have been communicated by the DoE.

NOTE: Hotazel Solar intends submitting their bid during the 5th bidding window or thereafter if unsuccessful in immediate bidding rounds

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 NATIONAL LEGISLATION

This section deals with nationally promulgated or nationally applicable legislation associated with the proposed Hotazel Solar

2.1.1 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 measures are applied to protect the environment.

This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

The Constitution and Bill of Rights provides that:

Everyone has the right:

- to an environment that is not harmful to their health or well-being; and
- to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures:
    - prevent pollution and ecological degradation
    - promote conservation; and
    - secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development.

NEMA (discussed below) is the enabling legislation to ensure this primary right is achieved.

2.1.2 National Environmental Management Act (NEMA)

The current assessment is being undertaken in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998)[2] . 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 6 below depicts a summary of the S&EIR process.

[2] 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 (as amended in April 2017). These regulations came into effect on 08 December 2014 (amended on 07 April 2017) and replace the EIA regulations promulgated in 2006 and 2010.

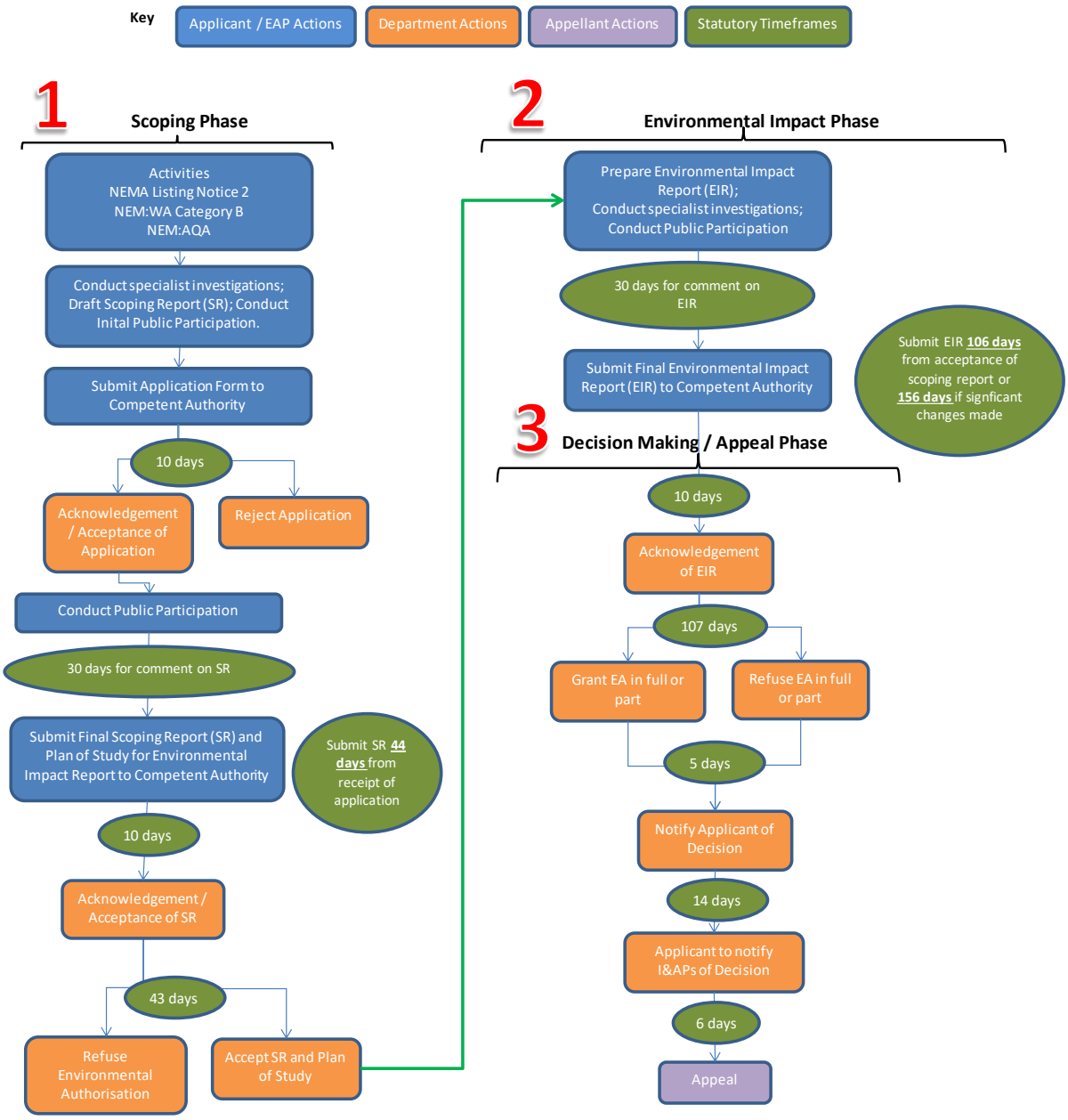

Figure 6: Summary of Scoping & EIR Process in terms of the 2014 Regulations.

The listed activities associated with the proposed development, as stipulation under 2014 Regulations **327, 325 and 324** are as follows:

Table 3: NEMA 2014 (As amended in April 2017) listed activities applicable to Hotazel Solar.

Listed activity as described in GN R.983, 984 and 985	Description of project activity that triggers listed activity
Regulation 327 – Basic Assessment	
GN R327 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	The proposed Hotazel Solar will connect to the national electricity via the Hotazel sub-station. The proposed distribution infrastructure includes the construction of an on-site substation and a 132kV overhead power line from the on-site substation.

GN R327 Activity 19: Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	The area is currently utilised for limited agricultural purposes. The construction of a PV Facility may be considered as commercial use.
GN R327 Activity 24: The Development of a road – (ii) with a reserve wider than 13.5m or where no road reserve exists where the road is wider than 8m.	The current proposal is to upgrade the existing access roads to 8m. The results of the TIA may indicate problems with the existing accesses points, in which case, new access points will need to be considered and assessed. The applicability of this listed activity will be confirmed after completion of the TIA during the impact assessment phase of this environmental process.
GN R327 Activity 56: The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre – (ii) where no reserve exists, where the existing road is more than 8 metres	The proposed access roads utilise existing accesses to this portion of land. The lengthening of these access roads by more than 1km may be required, depending on which alternative footprint is selected and which access point is preferred from a traffic management viewpoint.
Regulation 325 – Scoping and Environmental Impact Reporting	
GN R325 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 Hotazel Solar energy facility will have a maximum generation Capacity of 100 megawatts(AC) and as such exceeds the threshold defined in this activity.
GN R325 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 Hotazel Solar energy facility will have a maximum footprint of 275ha and as such exceeds the threshold defined in this activity.
Regulation 324 – Basic Assessment	
NO Activities in terms of Regulation 324.	

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.

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.

2.1.3 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, the vegetation types on both alternative footprints 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 is restricted to the **Kathu Bushveld** vegetation type. This vegetation unit occupies an area of 7443 km^2 and extends from around Kathu and Dibeng in the south through Hotazel and to the Botswana border between Van Zylsrus and McCarthysrus. In terms of soils the vegetation type is associated with aeolian red sand and surface calcrete and deep sandy soils of the Hutton and Clovelly soil forms. The main land types are Ah and Ae with some Ag. The Kathu Bushveld vegetation type is still largely intact and less than 2% has been transformed by mining activity and it is classified as **Least Threatened**. It is, however, poorly conserved and does not currently fall within any formal conservation areas. Although no endemic species are restricted to this vegetation type a number of Kalahari endemics are known to occur in this vegetation type such as *Acacia luederitzii var luederitzii*, *Anthephora argentea*, *Megaloprotachne albescens*, *Panicum kalaharense* and *Neuradopsis bechuanensis*. It is more fully described as it occurs at the site in the next section. Other vegetation types that occur in the immediate area include **Kuruman Thornveld** and **Gordoia Duneveld**, neither of which is of conservation concern nor occur on the site.

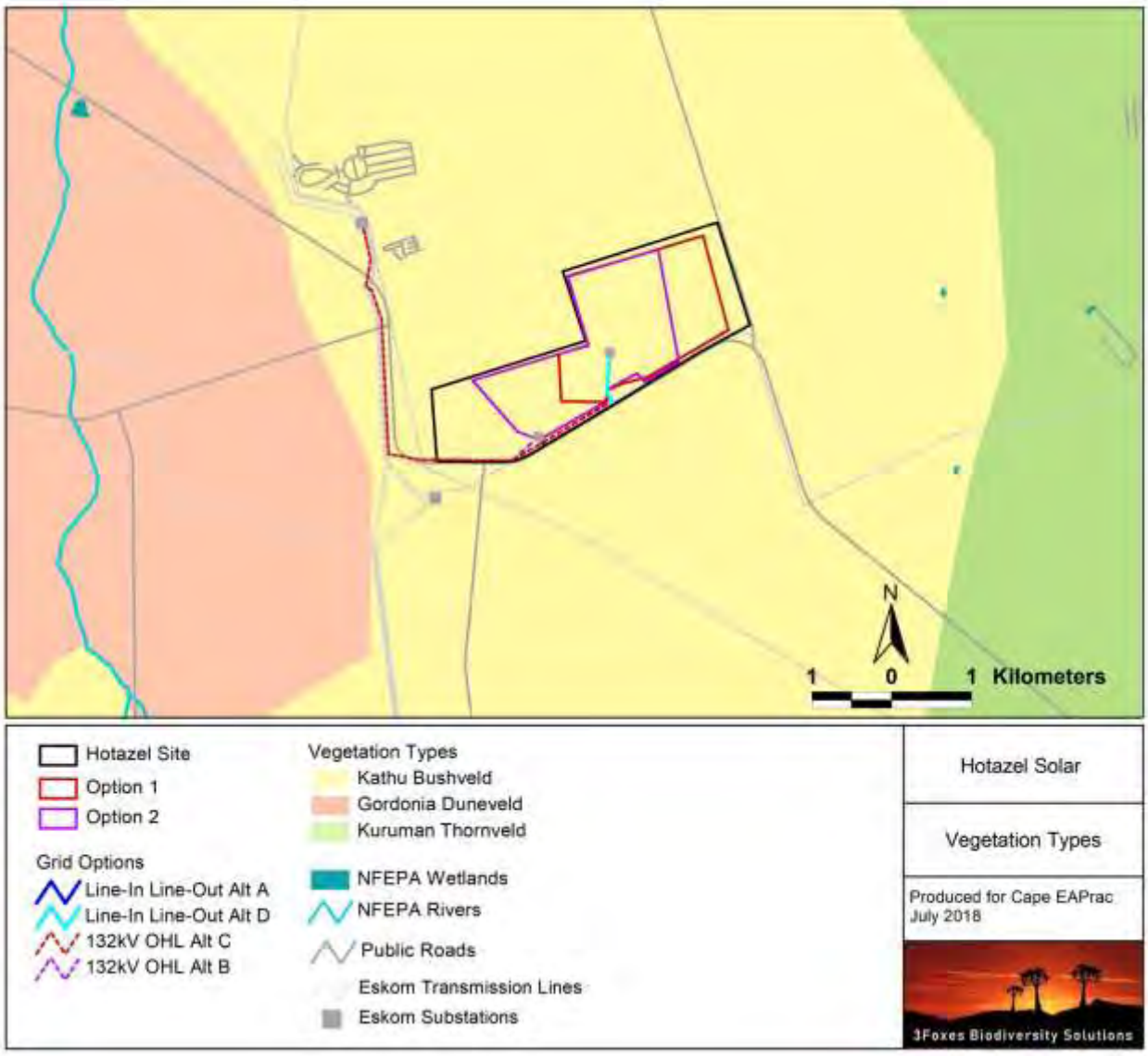

Figure 7: Broad-scale overview of the vegetation in and around Hotazel Solar (Todd, 2018)

2.1.4 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 Hotazel Solar 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 applicant is required to take note 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”.

As confirmed by the Freshwater Ecologist (Annexure E7), the proposed development will not have an impact on any freshwater resources on or adjacent to the site.

2.1.5 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 Hotazel Solar is to be sourced either from Joe Morolong Local Municipality, or utilisation of groundwater. Utilisation of groundwater for the purposes of construction or operation of the facility, will likely require a licence in terms of Section 21(a) of the NWA.

The freshwater specialist has confirmed that the proposed project is not within proximity of any freshwater resources; please refer to Annexure E7 for confirmation of this finding.

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

2.1.6 National Forests Act (No. 84 of 1998):

The National Forests Act (NFA) 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”.*

The ecological specialist, Mr Simon Todd, confirmed that two NFA-protected tree species occur in relatively large numbers at the site, *Acacia erioloba* and *Acacia haematoxylon*. The Ecology specialist has confirmed that although relatively large numbers of Acacia haematoxylon (2000-6000) would potentially be lost as a result of the development, the extent to habitat loss (275 ha) is not seen as being highly significant for this species. Please refer to the **Ecological Scoping Report** in **Annexure E1** for a detailed description of the protected species on the site.

Notwithstanding, the significance associated with the removal of protected trees for the proposed development, the applicant will be required to submit an application in terms of the NFA for a licence to remove these protected trees.

Due to the presence of species protected in terms of the NFA, DAFF have been automatically registered as a key authority and will be requested to provide specific input in this regard.

2.1.7 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; and
- 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.

In terms of Section 36 (3), no person may 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 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.

Mr Stefan de Kock, of Perception Heritage Planning, has been appointed to undertake an integrated heritage assessment for the proposed Hotazel Solar. This integrated heritage study has included an Archaeological Impact Assessment undertaken by Dr Peter Nilssen as well as a Paleontological Desktop Assessment undertaken by Dr John Almond.

Please refer to the Integrated Heritage Report, Archaeological scoping report and Paleontological Desktop Assessment attached in Annexure E6, E4 & E5 respectively.

2.1.8 National Energy Act (No. 34 of 2008)

The purpose of the National Energy Act (No. 34 of 2008) is to ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation; while taking environmental management requirements into account. In addition, the Act also provides for energy planning, and increased generation and consumption of Renewable Energies.

The objectives of the Act, are to amongst other things, to:

- Ensure uninterrupted supply of energy to the Republic.
- Promote diversity of supply of energy and its sources.
- Facilitate energy access for improvement of the quality of life of the people of the Republic.
- Contribute to the sustainable development of South Africa's economy.

The National Energy Act therefore recognises the significant role which electricity plays growing the economy while improving citizens' quality of life. The Act provides the legal framework which supports the development of Renewable Energy facilities for the greater environmental and social good, and

provides the backdrop against which South Africa's strategic planning regarding future electricity provision and supply takes place. It also provides the legal framework which supports the development of RE facilities for the greater environmental and social good.

2.2 PROVINCIAL LEGISLATION

This section deals with provincially promulgated or provincially applicable legislation associated with the proposed Hotazel Solar.

2.2.1 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.

The Ecology specialist did not identify any species protected in terms of this Act on site.

Please also refer to the **Ecological Scoping Report** attached in **Annexure E1** for further information on protected species present on site.

2.2.2 Nature and Environmental Conservation Ordinance (19 of 1974)

This legislation was developed to protect both animal and plant species within the various provinces of the country which warrant protection. These may be species which are under threat or which are already considered to be endangered. The provincial environmental authorities are responsible for implementing the provisions of this legislation, which includes the issuing of permits etc. In the Northern Cape, the Department of Environment and Nature Conservation fulfils this mandate as per the Northern Cape Nature Conservation Act as described above.

2.2.3 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 Nearest SKA station has been identified as **REM-Opt-14**, which is more than 160km from the site.

The South African SKA Project Office have been registered as a key stakeholder on this environmental process and will be requested to provide comment and input in terms of the Astronomy Geographic Advantage Act and potential impact to SKA.

2.2.4 Northern Cape Provincial Spatial Development Framework (PSDF) 2012

The Northern Cape Provincial Spatial Development Framework (PSDF) 2012 states that the overarching goal for the Province is to enable sustainability through sustainable development. The Province considers social and economic development as imperative in order to address the most significant challenge facing the Northern Cape, which is poverty.

The PSDF considers the release of greenhouse gas (GHG) emissions created by human activity as the key cause of global warming, which in turn could result in major negative effects and disasters in the short- and medium-term. This effect would increasingly undermine human development gains. Innovative strategies would have to be implemented to reduce the impact of global deterioration.

The PSDF identifies key sectoral strategies and plans which are considered to be the key components of the PSDF. Sectoral Strategy 19 refers to a provincial renewable energy strategy. Within the PSDF a policy has been included which states that renewable energy sources (including the utilisation of solar energy) are to comprise 25% of the Province's energy generation capacity by 2020.

The overall energy objective for the Province also includes promoting the development of renewable energy supply schemes which are considered to be strategically important for increasing the diversity of domestic energy supply and avoiding energy imports, while also minimising the detrimental environmental impacts. The implementation of sustainable renewable energy is also to be promoted within the Province through appropriate financial and fiscal instruments.

Considering the need for the development of renewable energy facilities in order to achieve the objective of sustainability the development of the proposed solar energy facility within the Northern Cape and within the study area is considered to be aligned with the Northern Cape PSDF.

2.3 REGIONAL AND MUNICIPAL LEGISLATION

This section deals with regionally and municipally promulgated or regionally or municipally applicable legislation associated with the proposed Hotazel Solar[3].

2.3.1 John Taolo Gaetsewe District Municipality Spatial Development Framework (Phase 5, Draft SDF), 2017

The main economic sectors applied within the John Taolo Gaetsewe District Municipality include eco-tourism, agriculture, mining and community services. Even though the development of renewable energy is not specifically mentioned as part of the framework, the development of a solar energy facility within the area will add to the current economic sectors. That specifically includes community services as the development of a solar energy facility will aid in the provision of electricity, as well as employment opportunities and skills development on a local level.

The SDF states that one of the key objectives for the District Municipality is to attract new business. With the development of a solar energy facility within the area, other developers might be encouraged to consider the area as a viable location for further development. This will attract new business to the area and promote financial and socio-economic development within the Municipality.

2.3.2 Joe Morolong Local Municipality Integrated Development Plan (IDP), 2017-2018

The vision of the Joe Morolong Local Municipality as contained within its 2017 / 2018 Integrated Development Plan (IDP) is:
"*A wealthy and prosperous local community with equal access to basic services and sustainable development opportunities*."
The Municipality's mission is defined as follows:

[3] This section includes legislation applicable to both the District (Category C) and Local (Category B) municipalities.

"*We commit ourselves to developing communities in a sustainable and democratic manner, with the scope of affordability with reference to:*

- *Participation in all decisions affecting their lives*
- *Basic service delivery by the municipality*."

The IDP identifies the following issues as significant challenges for the Joe Morolong Local Municipality:

- Huge service delivery and backlog challenges
- Maintenance of aging infrastructure
- Poverty
- Unemployment
- Low Economic Growth
- Rural development

Within Ward 4 of the Joe Morolong Local Municipality, which is also the ward within which the study area is located, Key Performance Areas have been identified. These Key Performance Areas include i) basic service delivery which in-turn includes the promotion of a safe and clean environment and ii) local economic development (LED) which in-turn includes the promotion of economic development. The development of a solar energy facility will assist the Local Municipality in reaching the objectives of the Key Performance Areas through the development of an electricity supply facility which will assist in service delivery and promote a clean environment due to the nature of the development. Local economic development will also take place with the construction and operation of a solar energy facility due to the fact that the development will promote skills development which will enable local residents to grow in terms of skill capacity and providing them with more opportunity for employment in the future.

2.4 GUIDELINES, POLICIES AND AUTHORITATIVE REPORTS

This section includes relevant Guidelines, Policies and Authoritative reports applicable to the proposed Hotazel Solar.

2.4.1 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. The closest focus areas are the **Eastern Kalahari Bushveld Focus Area** (situated a considerable distance from the site)

The proposed **Hotazel Solar** will **not affect** this or any other **NPAES** focus area as it is situated considerable distance from the Focus Area.

2.4.2 Critical Biodiversity Areas.

A Critical Biodiversity Areas (CBA) Map is a spatial plan for ecological sustainability. It identifies a set of biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole.

CBA Maps can be given formal legal status through the National Environmental Management: Biodiversity Act (Act 10 of 2004),

An extract of the Northern Cape Critical Biodiversity Areas map for the study area is depicted below in the Figure below. The site lies within an area classified as "Other natural areas" and is not classified as a Critical Biodiversity Area (CBA) or an Ecological Support Area (ESA). There are no CBAs in close proximity to the site, indicating that the development does not pose a threat to any CBAs or other areas considered to be of significance from a broad-scale conservation planning perspective.

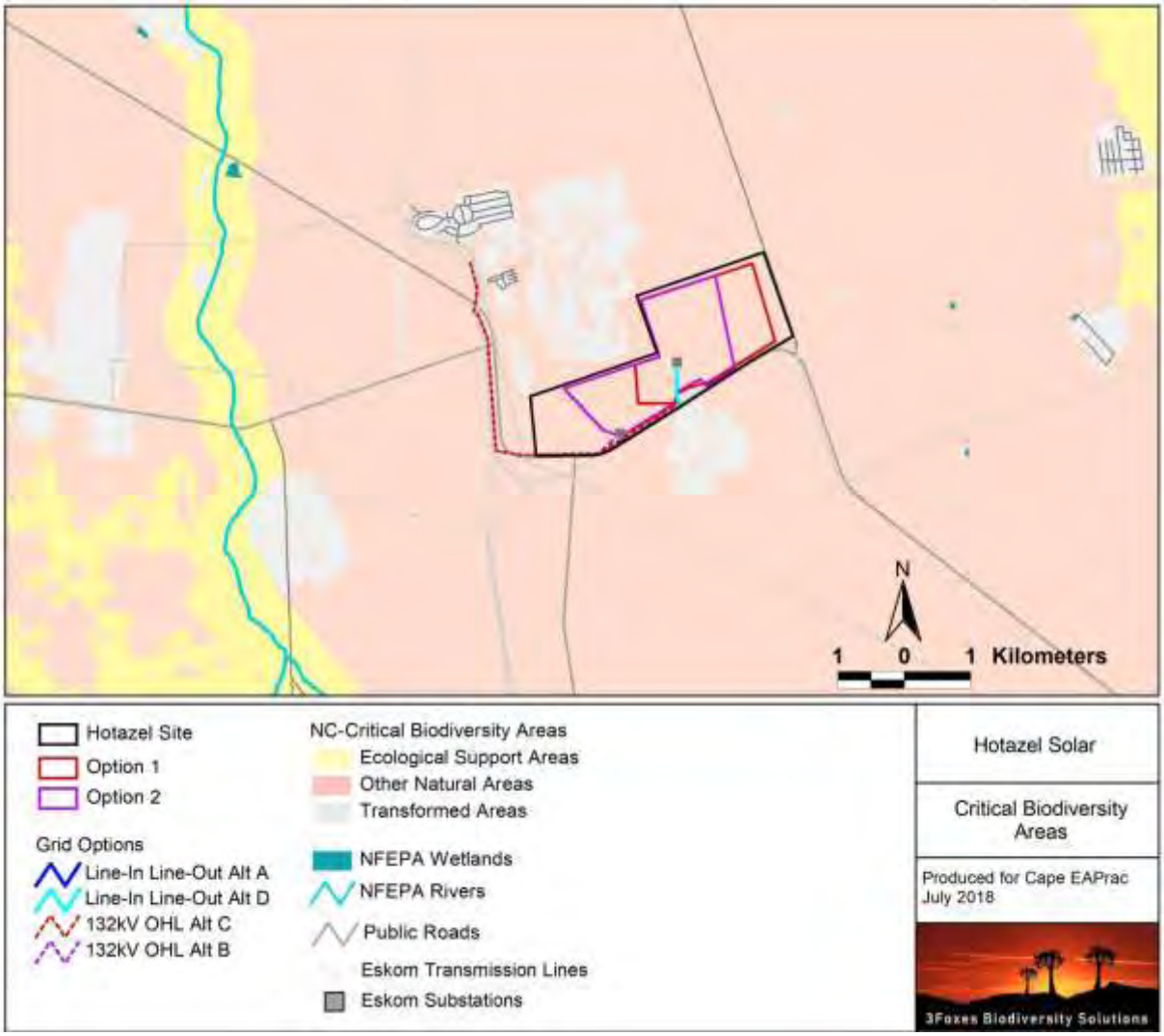

Figure 8: Extract of the Northern Cape Critical Biodiversity Areas map for the study area, showing that there are no CBAs in close proximity to the site (Todd, 2018)

2.4.3 White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)

The White Paper on Renewable Energy Policy of 2003 supplements Government's predominant policy on energy as set out in the White Paper on the Energy Policy of the Republic of South Africa (DME, 1998). The policy recognises the potential of RE, and aims to create the necessary conditions for the

development and commercial implementation of RE technologies. The position of the White Paper on RE Policy is based on the integrated resource planning criterion of:

"Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options."

The White Paper on Renewable Energy Policy sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing Renewable Energy in South Africa. The country relies heavily on coal to meet its energy needs due to its abundant, and fairly accessible and affordable coal resources. However, massive RE resources that can be sustainable alternatives to fossil fuels, have so far remained largely untapped. The White Paper on Renewable Energy Policy fosters the uptake of Renewable Energy in the economy and has a number of objectives that include: ensuring equitable resources are invested in renewable technologies; directing public resources for implementation of Renewable Energy technologies; introducing suitable fiscal incentives for Renewable Energy and; creating an investment climate for the development of the RE sector.

The White Paper on Renewable Energy Policy set a target of 10 000GWh to be generated from RE by 2013 to be produced mainly from biomass, wind, solar and small-scale hydro. The target was subsequently reviewed in 2009 during the RE summit of 2009. The objectives of the White Paper on Renewable Energy Policy are considered in six focal areas, namely; financial instruments, legal instruments, technology development, awareness raising, capacity building and education, and market based and regulatory instruments. The policy supports the investment in Renewable Energy facilities as they contribute towards ensuring energy security through the diversification of energy supply, reducing GHG emissions and the promotion of Renewable Energy sources.

2.4.4 White Paper on the Energy Policy of the Republic of South Africa (1998)

The White Paper on Energy Policy places emphasis on the expansion of energy supply options to enhance South Africa's energy security. This can be achieved through increased use of renewable energy and encouraging new entries into the generation market. South Africa has an attractive range of cost effective renewable resources, taking into consideration social and environmental costs. Government policy on renewable energy is thus concerned with meeting the following challenges:

- Ensuring that economically feasible technologies and applications are implemented.
- Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options.
- Addressing constraints on the development of the renewable industry.

The policy states that the advantages of RE include; minimal environmental impacts during operation in comparison with traditional supply technologies, generally lower running costs, and high labour intensities. Disadvantages include; higher capital costs in some cases; lower energy densities; and lower levels of availability, depending on specific conditions, especially with sun and wind based systems. Nonetheless, renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future. The White Paper on Energy Policy therefore supports the advancement of RE sources and ensuring energy security through the diversification of supply.

2.4.5 Integrated Energy Plan (IEP), 2015

The Integrated Energy Plan (IEP) (which was developed under the National Energy Act (No. 34 of 2008)), recognises that energy is essential to many human activities, and is critical to the social and economic development of a country. The purpose of the IEP is essentially to ensure the availability of energy resources, and access to energy services in an affordable and sustainable manner, while minimising associated adverse environmental impacts. Energy planning therefore needs to balance the need for continued economic growth with social needs, and the need to protect the natural environment.

The IEP is a multi-faceted, long-term energy framework which has multiple aims, some of which include:

- To guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector.
- To guide the selection of appropriate technologies to meet energy demand (i.e. the types and sizes of new power plants and refineries to be built and the prices that should be charged for fuels).
- To guide investment in and the development of energy infrastructure in South Africa.
- To propose alternative energy strategies which are informed by testing the potential impacts of various factors such as proposed policies, introduction of new technologies, and effects of exogenous macro-economic factors.

The 8 key objectives of the integrated energy planning process, are as follows:

- Objective 1: Ensure security of supply.
- Objective 2: Minimise the cost of energy.
- Objective 3: Promote the creation of jobs and localisation.
- Objective 4: Minimise negative environmental impacts from the energy sector.
- Objective 5: Promote the conservation of water.
- Objective 6: Diversify supply sources and primary sources of energy.
- Objective 7: Promote energy efficiency in the economy.
- Objective 8: Increase access to modern energy.

2.4.6 Integrated Resource Plan for Electricity (2010-2030)

The Integrated Resource Plan (IRP) for Electricity 2010 – 2030 is a subset of the IEP and constitutes South Africa's national electricity plan. The primary objective of the IRP is to determine the long term electricity demand and detail how this demand should be met in terms of generating capacity, type, timing and cost. The IRP also serves as input to other planning functions, including amongst others, economic development and funding, and environmental and social policy formulation.

The current iteration of the IRP, led to the Revised Balanced Scenario (RBS) that was published in October 2010. Following a round of public participation which was conducted in November / December 2010, several changes were made to the IRP model assumptions. The document outlines the proposed generation new-build fleet for South Africa for the period 2010 to 2030. This scenario was derived based on a cost-optimal solution for new-build options (considering the direct costs of new build power plants), which was then "balanced" in accordance with qualitative measures such as local job creation.

The Policy-Adjusted IRP reflects recent developments with respect to prices for renewables. In addition to all existing and committed power plants, the plan includes 9.6GW of nuclear; 6.25GW of coal; 17.8GW of renewables; and approximately 8.9GW of other generation sources such as hydro, and gas.

2.4.7 National Development Plan 2030 (2012)

The National Development Plan (NDP) 2030 is a plan prepared by the National Planning Commission in consultation with the South African public which is aimed at eliminating poverty and reducing inequality by 2030. The NDP aims to achieve this by drawing on the energies of its people, growing and inclusive economy, building capabilities, enhancing the capacity of the state and promoting leaderships and partnerships throughout society. While the achievement of the objectives of the NDP requires progress on a broad front, three priorities stand out, namely:

- Raising employment through faster economic growth.

- Improving the quality of education, skills development and innovation.
- Building the capability of the state to play a developmental, transformative role.

In terms of the Energy Sectors role in empowering South Africa, the NDP envisages that, by 2030, South Africa will have an energy sector that promotes:

- Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation.
- Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households.
- Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change.

The NDP aims to provide a supportive environment for growth and development, while promoting a more labour-absorbing economy. The proposed project will assist in reducing carbon emissions targets and creating jobs in the local area as well as assist in creating a competitive infrastructure based on terms of energy contribution to the national grid.

2.4.8 Strategic Infrastructure Projects (SIPs)

The Presidential Infrastructure Coordinating Committee (PICC) are integrating and phasing investment plans across 18 Strategic Infrastructure Projects (SIPs) which have the following 5 core functions:

- To unlock opportunity.
- Transform the economic landscape.
- Create new jobs.
- Strengthen the delivery of basic services.
- Support the integration of African economies.

A balanced approach is being fostered through greening of the economy, boosting energy security, promoting integrated municipal infrastructure investment, facilitating integrated urban development, accelerating skills development, investing in rural development and enabling regional integration.

SIP 8 of the energy SIPs supports the development of RE projects as follow:

SIP 8: Green energy in support of the South African economy:

Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010) and supports bio-fuel production facilities.

The development of the proposed project is therefore also aligned with SIP 8 as it constitutes a green energy initiative which would contribute clean energy in accordance with the IRP 2010 – 2030.

2.4.9 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).

An Avifaunal Specialist has been appointed to consider the impact of the proposed energy facility as well as the powerline connecting the facility to the Hotazel substation (Annexure E2). Birdlife Africa has also been given an opportunity to comment in this regard.

2.4.10 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. As mentioned above An Avifaunal Specialist has been appointed to consider the impact of the proposed energy facility as well as the powerline connecting the facility to the Hotazel substation (Annexure E2). Birdlife Africa has also been given an opportunity to comment in this regard.

2.4.11 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. Please refer to Annexure E2 for a copy of the Avifaunal assessment undertaken for this project.

2.4.12 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 REIPPPP, the DoE has been engaging with the sector in order to strengthen the role of IPPs in renewable energy development. Launched during 2011, the REIPPPP 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 the first phase of IPPs 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 4: Potential environmental impacts of solar energy projects (Adapted from DEA, 2015) showing where they have been considered in this report

Impact Description	Relevant Legislation
Visual Impact – Specialist input attached in Annexure E9.	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 E3	NEMA, NEMPAA, NHRA
Impacts on Cultural Heritage – Integrated heritage input attached in Appendix E6.	NEMA, NHRA
Impacts on Biodiversity – Biodiversity specialist input attached in Appendix E1, E2 and E7 (Ecology, Avifaunal and Freshwater respectively)	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 this regard. A freshwater ecologist has assessed the potential impacts on freshwater resources (Annexure E7).	NEMA, NEMICMA, NWA, WSA
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 will comment and input in this regard.	NEMA
Aircraft Interference – The SA CAA have been automatically registered as an interested and affected party on this environmental process. There are no airports nor landing strips in the vicinity of the proposed site.	NEMA, MSA
Loss of Agricultural Land – Agricultural specialist input is attached in Appendix E3	SALA
Sterilisation of mineral resources – The Department of Mineral resources has been registered as an I&AP on this environmental process. All parties with prospecting options on the portion of land have been automatically registered as I&AP's 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 explicitly considered in this scoping process and where necessary, additional specialist input has been obtained. Please see section 16 of this scoping report, where the nature and likely significance of these impacts have been identified.

2.4.13 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.*[4]

It is believed that the proposed 100MW Hotazel Solar energy 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.

3 REGIONAL SOCIO-ECONOMIC CONTEXT

ADDITIONAL ACTIONS REQUIRED

The project should undertake a detailed Social Impact Assessment as part of the Impact Assessment Phase of the Environmental Process.

Ms Sarah Watson of Savannah Environmental undertook a social baseline study of the proposed development (Annexure E8). The following contextual social information associated with the region is summarised from this study.

3.1 REGIONAL CONTEXT

This section provides an overview of the Spatial Context of the Province, District Municipality, and Local Municipality within which the Hotazel Solar project is proposed for development, and provides the socio-economic basis against which potential issues can be identified.

3.1.1 Spatial Context of the Northern Cape Province

The Northern Cape Province is located in the north-western extent of South Africa and comprises South Africa's largest province; occupying an area 372 889km² in extent, equivalent to nearly a third (30.5%) of the country's total land mass. It is also South Africa's most sparsely populated province with a population of 1 145 861, and a population density of 3.1/km². It is bordered by the Provinces of Western Cape, and Eastern Cape Provinces to the south, and south-east; Free State, and North West Provinces to the east; Botswana and Namibia, to the north; and the Atlantic Ocean to the west. The Northern Cape is the only South African province which borders Namibia, and therefore plays an important role in terms of providing linkages between Namibia and the rest of South Africa. The Orange River is a significant feature, and is also the main source of water in the Province, while also constituting the international border between the Northern Cape and Namibia.

[4] Refer to definition of "sustainable development" in section 1 of NEMA.

The Northern Cape offers unique tourism opportunities including wildlife conservation destinations, natural features, historic sites, festivals, cultural sites, stars gazing, adventure tourism, agricultural tourism, ecotourism, game farms, and hunting areas, etc. The Province is home to the Richtersveld Botanical and Landscape World Heritage Site, which comprises a United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Site under the World Heritage Convention. The Northern Cape is also home to 2 Transfrontier National Parks, namely the Kgalagadi Transfrontier Park, and the Richtersveld /Ai-Ais Transfrontier Park, as well as 5 national parks, and 6 provincial reserves.

The Northern Cape also plays a significant role in South Africa's science and technology sector, as it is home to the Square Kilometre Array (SKA), the Southern African Large Telescope (SALT), and the Karoo Array Telescope (MeerKAT).

The Northern Cape makes the smallest contribution to South Africa's economy (contributing only 2% to South Africa's Gross Domestic Product per region (GDP-R) in 2007). At 26% the mining sector is the largest contributor to the provincial GDP. The Northern Cape's mining industry is of national and international importance, as it produces approximately 37% of South Africa's diamond output, 44% of its zinc, 70% of its silver, 84% of its iron-ore, 93% of its lead and 99% of its manganese.

In 2007 the agricultural sector contributed 5.8% to the Northern Cape GDP per region which was equivalent to approximately R1.3 billion. The agricultural sector also employs approximately 19.5% of the total formally employed individuals (LED Strategy). The sector is experiencing significant growth in value-added activities, including game-farming; while food production and processing for the local and export market is also growing significantly (PGDS, July 2011). Approximately 96% of the land is used for stock farming; including beef cattle and sheep or goats, as well as game farming; while approximately 2% of the province is used for crop farming, mainly under irrigation in the Orange River Valley and Vaalharts Irrigation Scheme (LED Strategy).

3.1.2 Spatial Context of the District[5]

The John Taolo Gaetsewe District (previously known as the Kgalagadi District Municipality) is situated in the north-eastern extent of Northern Cape Province. It is the second smallest district in the Province in terms of land mass (27 283km², equivalent to 7.32% of the total Provincial land mass), and third largest in terms of population (224 799, equivalent to 19.62% of the total Provincial population), with the second highest population density of 8.2/km². The John Taolo Gaetsewe District is bordered by ZF Mgcawu District to the south-west, and south; Frances Baard District to the south-east; Dr Ruth Segomotsi Mompati District of North West Province to the east; and Botswana to the north. The District comprises 3 Local Municipalities, namely: Joe Morolong, Ga-Segonyana, and Gamagara Local Municipalities. In 2006 the boundaries of the John Taolo Gaetsewe District were demarcated to include the once north-western part of Joe Morolong and Olifantshoek, along with its surrounds, into the Gamagara Local Municipality.

The John Taolo Gaetsewe District comprises 186 towns and settlements, approximately 80% of which comprise villages. Predominant towns within the District include: Bankhara-Bodulong, Deben, Hotazel, Kathu, Kuruman, Mothibistad, Olifantshoek, Santoy, and Van Zylsrus. It is characterised by a mixture of land uses, of which agriculture and mining are dominant. The main economic sectors within the District include agriculture, mining, and retail. The District holds potential as a viable tourist destination and has numerous growth opportunities in the industrial sector.

[5] John Taolo Gaetsewe District Municipality

Figure 9: Map showing the municipalities of the John Taolo Gaetsewe District.

The proposed Hotazel Solar is situated in the Joe Mololong local municipality in the North of the District

3.1.3 Spatial context of the local area[6]

The Joe Morolong Local Municipality is the largest municipality in the John Taolo Gaetsewe District in terms of land mass (20 172km², equivalent to 73.94% of the District land mass), and second largest in terms of population (i.e. 89 530, equivalent to 39.83% of the District population), with the lowest population density of 4.4/km². The Joe Morolong Local Municipality is bordered by the Gamagara and Ga-Segonyana Local Municipalities to the south; Greater Taung, and Kagisano-Molopo Local Municipalities of North West Province to the south-east, east, and north-east; Botswana to the north, and north-west; and Dawid Kruiper, and Tsantsabane Local Municipalities to the south-west.

The Joe Morolong Local Municipality is predominantly rural in nature, with approximately 60% of the municipality comprising virgin land surface. Although unemployment is high, the municipality has potential for developers, especially those interested in ecotourism and conservation. Predominant towns within the municipality include: Hotazel, Santoy, and Van Zylsrus. The predominant economic sectors within the municipality include agriculture, mining, and community services.

3.1.4 Spatial context of the project site

[6] Joe Morolong Local Municipality

Hotazel Solar is proposed on the Remaining Extent of the Farm York A 279, located approximately 3km south-east of Hotazel. Other towns in proximity of the project site include Kuruman, located approximately 52km south-east, and Kathu located approximately 60km south of the project site. Built infrastructure in the form of farm homesteads, workers quarters and storage areas occur within proximity of the project site, and may be impacted on (i.e. in terms of nuisance and / or visual impacts) as a result of the proposed project.

A number of manganese mining operations occur within close proximity of the project site. The Langdon Devon Manganese Mine is located immediately south of the project site. As a result numerous waste rock dumps associated with these Manganese mines are located within the vicinity of the project site. The presence of these waste rock dumps have influenced the local landscape character. The greater area within which the project is proposed has already been transformed as a result of mining, and associated infrastructure, and waste rock dumps.

The vertical and horizontal landscapes are also disturbed due to the presence of linear infrastructure within the surrounding area, including:

- Power lines:
    - Hotazel SAR Traction / Hotazel 1 132kV power line traverses the area west of the project site in a north-to-south direction from the SAR Hotazel 132kV Traction Substation located adjacent to the south-western extent of the project site, coming to an end at the Hotazel 132 / 66 / 11kV Substation located north-west of the project site in Hotazel.
    - Hotazel / Middelplaats 1 66kV power line traverses the area west of the project site in a north-to-south direction coming to an end at the Hotazel 132 / 66 / 11kV Substation located north-west of the project site in Hotazel.
    - Hotazel / Riries 1 66kV power line traverses the south-western corner of the project site, and traverses the area west of the project site in a north-to-south direction, coming to an end at the Hotazel 132 / 66 / 11kV Substation located north-west of the project site in Hotazel.
    - There is a 132kV power line currently under construction on the southern boundary of the site, that comes from Eldoret substation and follows the R31 and will run adjacent to the other lines to the Hotazel substation connect
- Regional roads:
    - R31 Regional Road traverses the south-eastern boundary of the project site, and provides primary access to the project site.
    - R380 Regional Road joins the R31 in the south-western extent of the project site.
- Railway line:
    - A railway line occurs along the south-western boundary of the project site, and also traverses the area just west of the project site in a north-to-south direction.

3.2 BASELINE DESCRIPTION OF THE SOCIAL ENVIRONMENT

The following subsections provide an overview of the socio-economic profile of the Joe Morolong Local Municipality described above. The data presented in this section from the SIA scoping study which sourced the data from the 2011 Census, the Local Government Handbook South Africa 2018, the Northern Cape Provincial Spatial Development Framework (PSDF), and the John Taolo Gaetsewe DM and Joe Morolong LM IDPs.

3.2.1 Population Size

The Joe Morolong LM has a very small population of 89 528; which is equivalent to approximately 39.8% of the DM population, 7.8% of the provincial population, and only 0.2% of the national population. The Joe Morolong LM also has a relatively low population density of 4.4/km², which is almost half of the DM's population density (8.2/km²).

Between 2001 and 2011 the LM experienced a negative population growth of -0.9% per year. This is in contrast to the DM, Province, and South Africa as a whole, which all experienced positive population growth rates in the region of 1.4% to 1.6% per year. The Joe Morolong LM's negative population growth rate can be attributed to individuals leaving the municipality in search of employment opportunities elsewhere.

3.2.2 Population Group

According to Census 2011, the significant majority of 96.4% of the Joe Morolong LM population are Black African, followed secondly by 2% which are Coloured, 1.2% which are White, and 0.3% which are Indian / Asian. This population structure is similar to that of the John Taolo Gaetsewe DM which is also characterised by a majority of 84.8% comprising Black African, followed by 9.3% Coloured, and 5% White; but differs from the Northern Cape Provincial population structure, which is characterised by a much more predominant split, and a much larger proportion of the population (40.3%) comprising Coloured individuals.

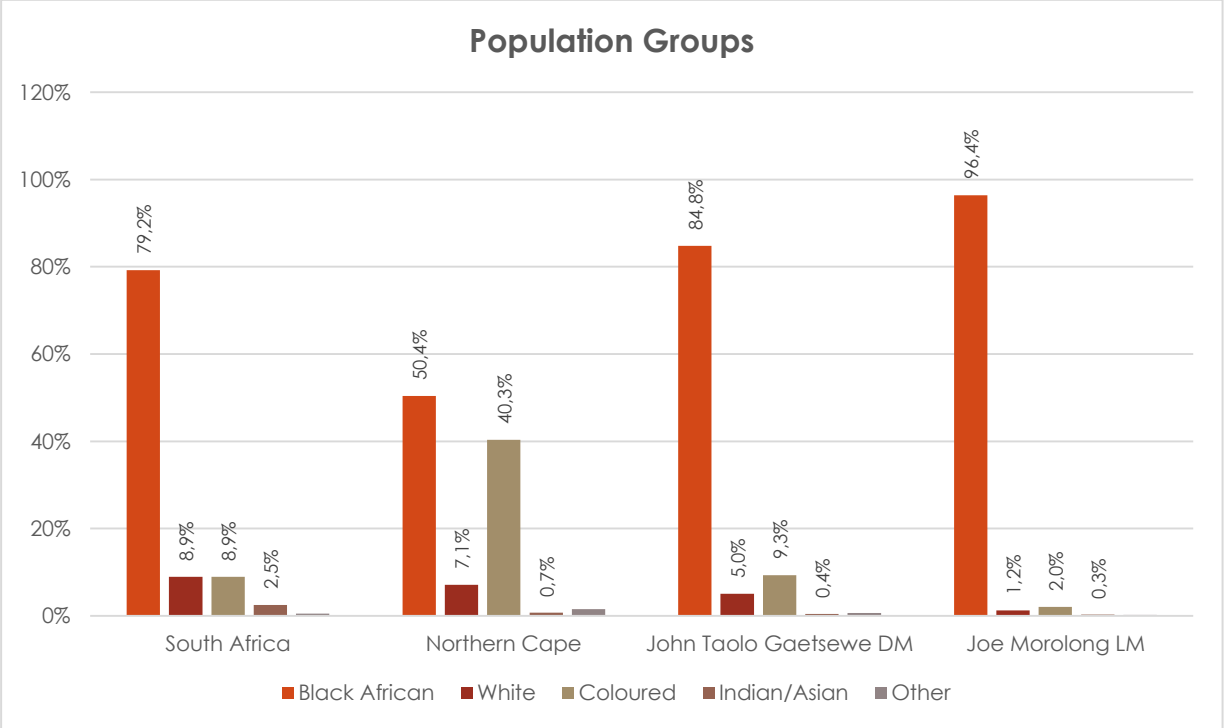

Figure 10: Population groups of South Africa, Northern Cape, John Taolo Gaetsewe DM, and Joe Morolong LM (Savannah, 2018).

3.2.3 Sex Profile

The Joe Morolong LM is female dominated with females making up 53.9% of the population, and males the remaining 46.1%. This correlates with the District, Provincial and National populations, which are all female dominated, however the split between males and females is slightly more pronounced within the Joe Morolong LM. Such a profile can again be attributed to the fact that a significant number of male individuals may have left the LM in search for employment opportunities elsewhere, thus resulting in a more heavily female dominated population.

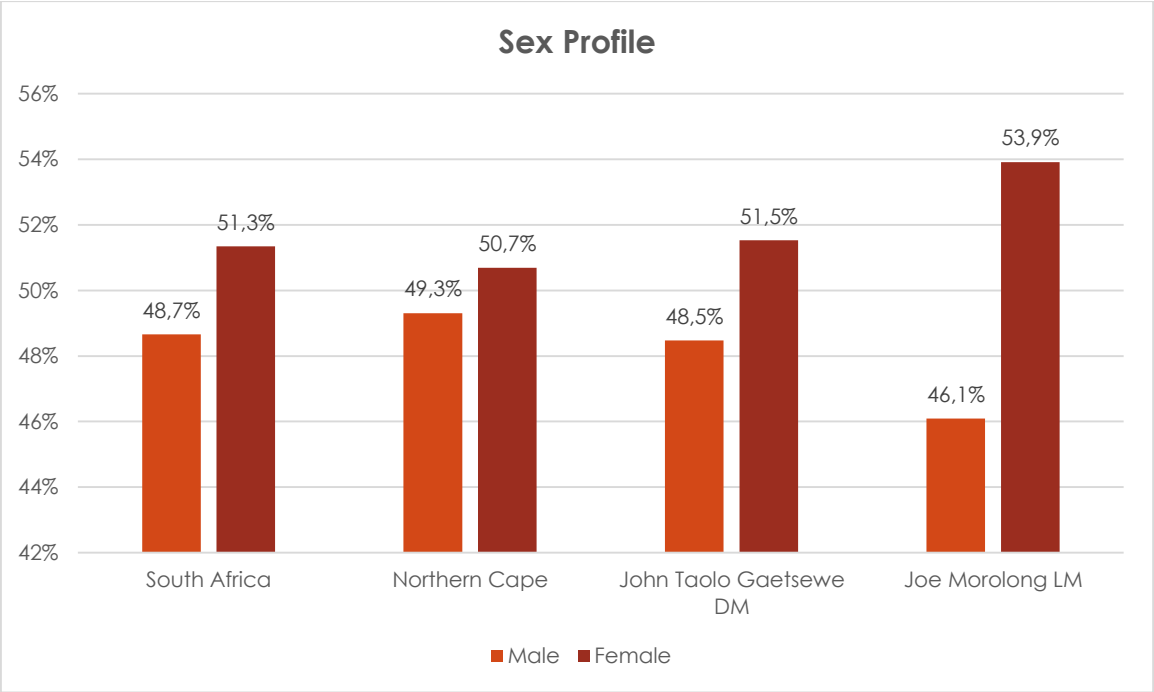

Figure 11: Sex profile within South Africa, Northern Cape, John Taolo Gaetsewe DM, and Joe Morolong LM (Savannah, 2018).

3.2.4 Age Profile

The age structure of the Joe Morolong LM**,** John Taolo Gaetsewe DM, Northern Cape Province and South African national populations differ somewhat from one another. Whereas the South African national population is characterised by a large proportion of youth specifically between 0 – 4 years, and 15 – 29 years; the Northern Cape Provincial population and John Taolo Gaetsewe DM while also youth dominated are far more uniform. The Joe Morolong LM is also heavily youth dominated, but is characterised by a much smaller proportion of males of working age (between 20 and 59 years of age.

The lower proportion of potentially economically active persons within the Joe Morolong LM implies that there is a small human resource base for development projects to involve the local population. The youth represents the largest proportion of the population, which means that focus needs to be placed on youth development.

3.2.5 Dependency Ratio

The Joe Morolong LM has a dependency ratio of 45.8; implying that for every 100 people within the Joe Morolong LM, 45.8 (i.e. almost half) of them are considered dependent. This figure is considerably higher that the John Taolo Gaetsewe DM (i.e. 38.8), which is itself higher than the Provincial (35.8) and National (34.5) dependency ratios.

3.2.6 Education Levels

Almost a quarter (22.8%) of the Joe Morolong LM population aged 20 years and older have received no form of schooling. This figure is significantly higher than the DM (14.3%), Provincial (11.1%), and national (8.4%) averages. The majority of 27.6% of the LM population have received some secondary (which correlates with the DM, Provincial, and national averages), followed closely by 26.5% which have received some primary. This differs from the DM, Provincial, and national averages where the second highest proportion of each of these populations citizens aged 20 years and older have completed Matric. Only 15.1% of the LM population completed Matric, with only 2% having received some form of higher / tertiary education.

Due to the fact that a significant proportion of the Joe Morolong LM population have received no form of schooling (22.8%), and due to the fact that 76.8% of the LM population which have received some schooling have not completed Matric, it can be expected that a large proportion of the population will be either unskilled or have a low-skill level, and would therefore either require employment in non-skilled or low-skill sectors; or alternatively would require skills development opportunities in order to improve the skills, and income levels of the area.

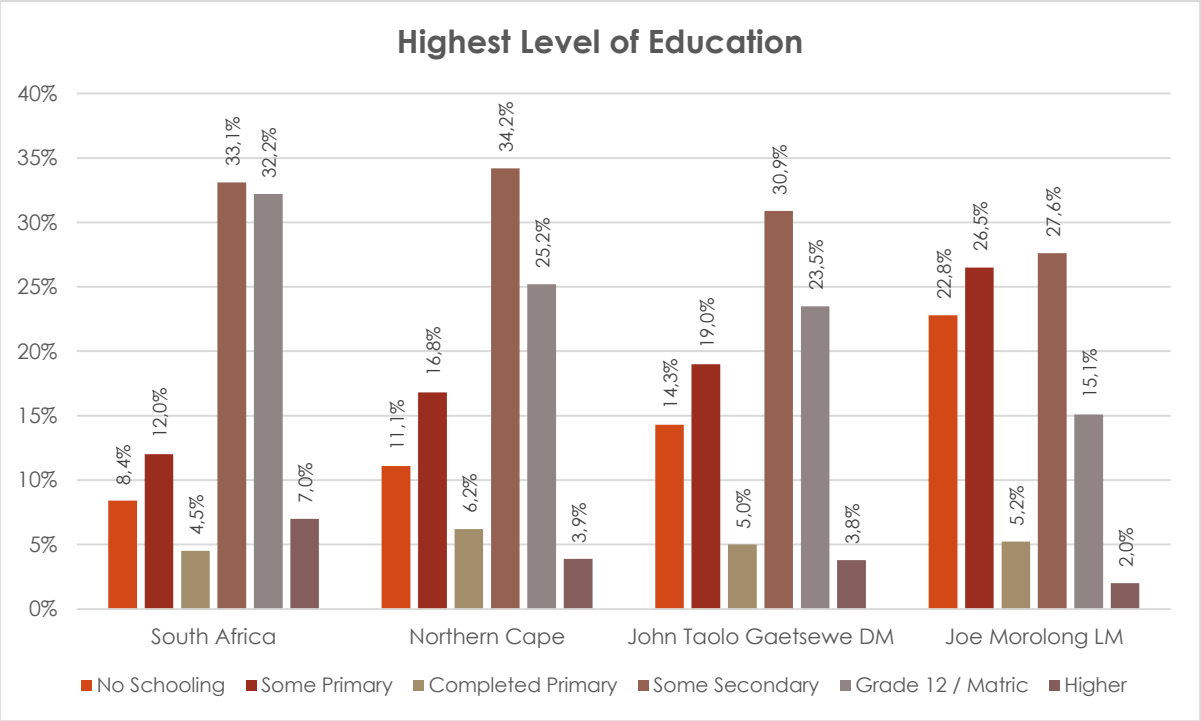

Figure 12: Highest Level of Education in South Africa, Northern Cape, John Taolo Gaetsewe DM, and Joe Morolong LM (Savannah, 2018).

3.2.7 Employment

Of the Joe Morolong LM's labour force (i.e. individuals ages between 15 and 64 years of age) the majority of 61% are not economically active. This refers to the economically inactive portion of the population who are able and available to work, but who do not work, and who are not looking for work. Such a figure is of significance as it demonstrates a population's willingness and desire to find employment. The economically inactive proportion of the Joe Morolong LM's labour force is significantly higher than the DM (46.8%), Provincial (41.6%), and national averages (39.2%).

Approximately 10.1% of the Joe Morolong LM's labour force is unemployed. This means that 10.1% of the economically active population within the LM are currently unemployed, but are willing and able to work, and are actively seeking employment. While the unemployment rate for the LM is somewhat lower than the DM (13.5%), Provincial (14.5%), and national averages (16.5%); the employment proportion of the population within the LM (16.1%) is considerably lower and equivalent to approximately half of the DM (31.8%), Provincial (38.4%), and national averages (38.9%). This implies that irrespective of the size of the Joe Morolong LM's labour force, a far smaller proportion would be available to absorb employment opportunities; and the possibility therefore exists that labour may need to be sourced from elsewhere (i.e. beyond the Joe Morolong LM).

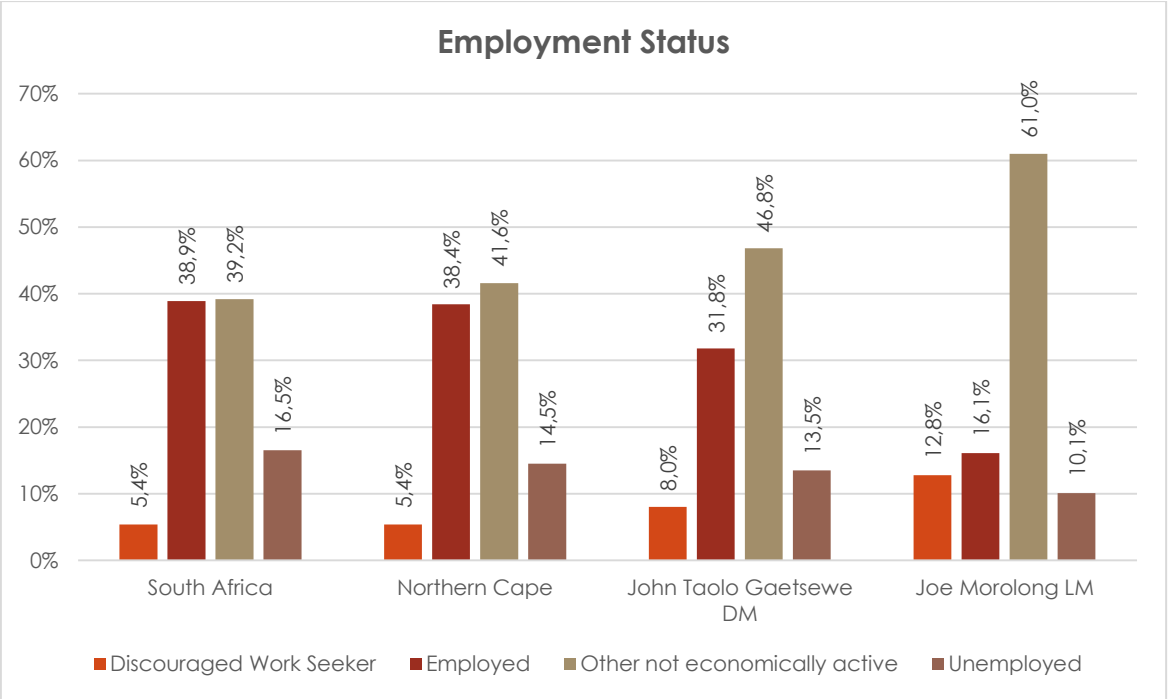

Figure 13: Employment Status in South Africa, Northern Cape, John Taolo Gaetsewe DM, and Joe Morolong LM (Savanah, 2018).

Based on the statistics provided it can be assumed that there are fewer individuals in search of employment opportunities within the LM than the DM, Province or South Africa as a whole. This implies that there is little human capital available for any kind of work in the Joe Morolong LM, without providing the necessary training and development of young and economically active people in occupations in the relevant fields needed.

3.2.8 Annual Household Income levels

Households that have either no income or low income fall within the poverty level (R0 – R38 400 per annum), indicating the difficulty to meet basic need requirements. Middle-income is classified as earning R38 401 – R307 200, and high income is classified as earning R307 201 or more per annum.

Almost two thirds (64%) of households within the Joe Morolong LM fall within the low income (poverty level) bracket. This figure is similar to that of the Northen Cape provincial average (61%), but somewhat higher than the John Taolo Gaetsewe DM (54%) and national average (56%). Approximately one third (33%) of households within the LM fall within the medium income bracket, while the remaining 3% fall within the high income bracket.

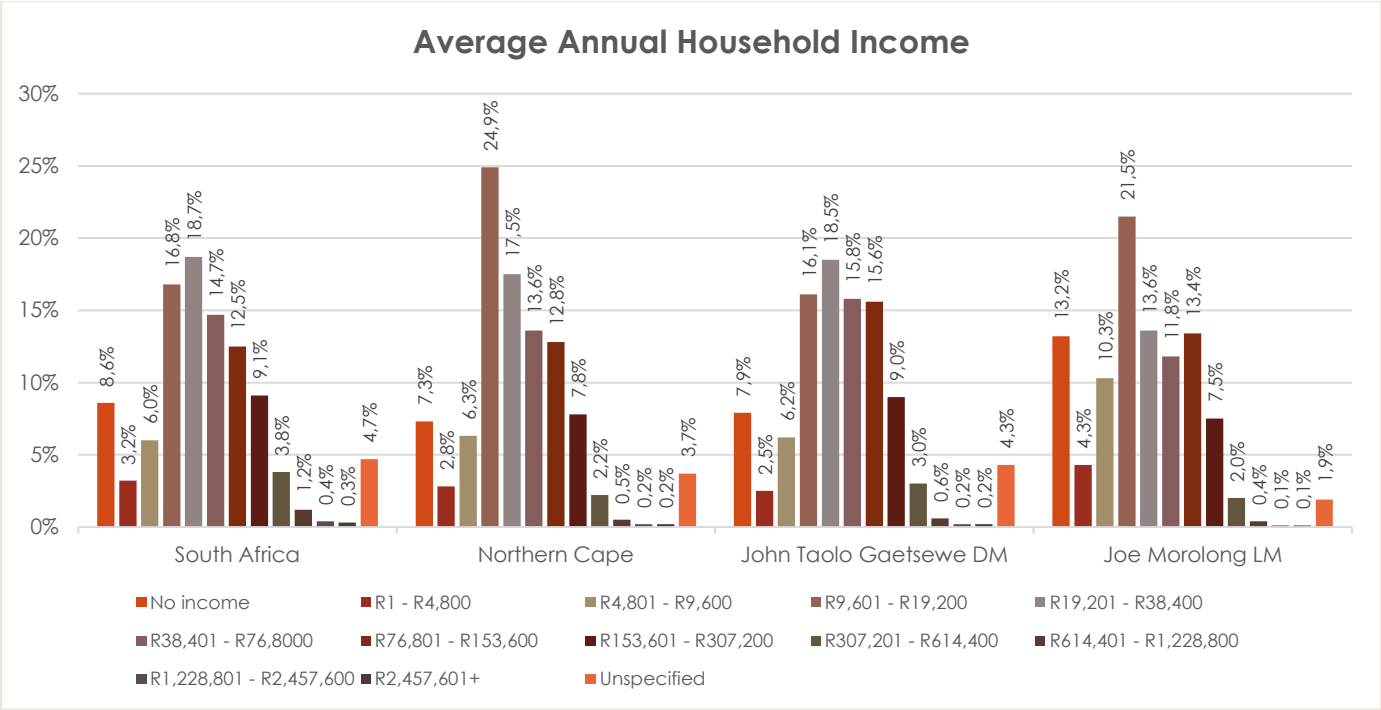

Figure 14: Average Annual Income in South Africa, Northern Cape, John Taolo Gaetsewe DM, and Joe Morolong LM (Savannah,2018).

The high poverty level prevalent within the LM can be attributed with social consequences such as an inability to pay for basic needs and services, which in turn has influence on an individuals' standard of living.

3.2.9 Economic Activities

According to the Joe Morolong LM IDP 2017/18 mining and agriculture are the largest contributors to the LM's economy. In terms of employment however, the majority of 41% of formally employed individuals are employed in the Community Services sector, followed by 18% employed in agricultural work, and 12% employed in Mining, and Quarrying. The Electricity, Gas, and Water industry employs approximately only 3% of formally employed individuals within the LM.

3.2.10 Access to Water

The majority of 73.3% of households within the Joe Morolong LM receive their water from a regional / local water scheme (operated by the municipality or other water services provider), which is considered to be above basic level service provision. Approximately only

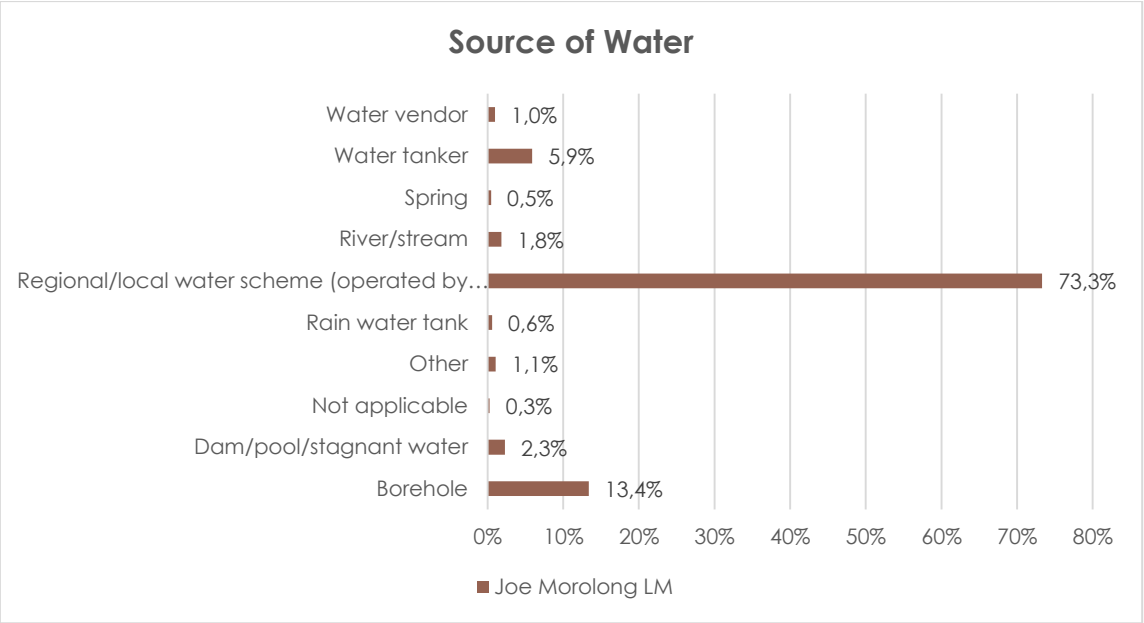

Figure 15: Access to Water within the Joe Morolong LM (Source: Census 2011).

3.2.11 Access to Sanitation

The majority of 40.1% of households within the Joe Morolong LM make use of Ventilated Improved Pit Latrines (VIP), followed by 36.5% which make use of pit latrines without ventilation, and 10.2% which have no access to sanitation services. Approximately only 6.1% of households within the LM have access to a flush toilet connected to a sewage system. Households within the Joe Morolong LM are characterised by poor access to sanitation services.

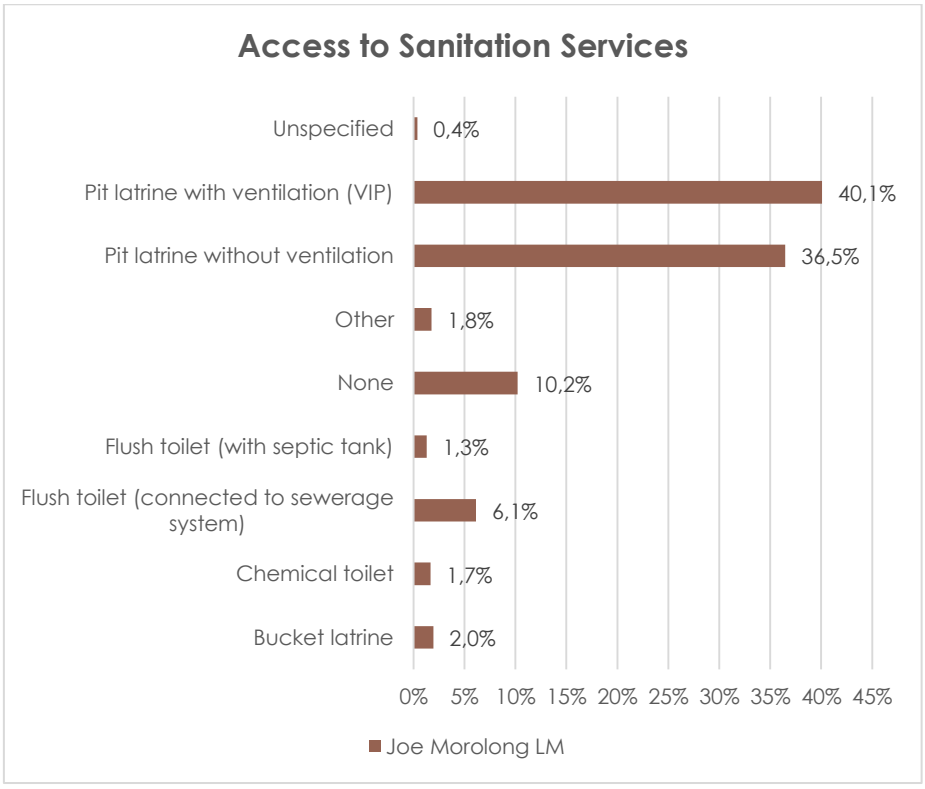

Figure 16: Access to Sanitation Services within the Joe Morolong LM (Source: Census 2011).

3.2.12 Access to Electricity

Energy is required for cooking, heating, and lighting purposes. Individuals' access to different energy sources for cooking, heating, and lighting purposes is significant; as the burning of fuel sources such as wood, coal, and / or animal dung over extensive periods of time could result in negative health impacts for household members. Health impacts would be most significantly experienced by those vulnerable members of society, such as young children, pregnant women, and the elderly.

The significant majority of 81.8% of households within the Joe Morolong LM have access to electricity for lighting purposes. Similarly the majority of over half of the households within the LM (53.2%) make use of electricity for cooking purposes, while the majority of 51.2% of household make use of wood for heating purposes. A significant proportion of 39.3% of households within the LM make use of wood for cooking purposes, and 16.1% make use of candles for their lighting purposes.

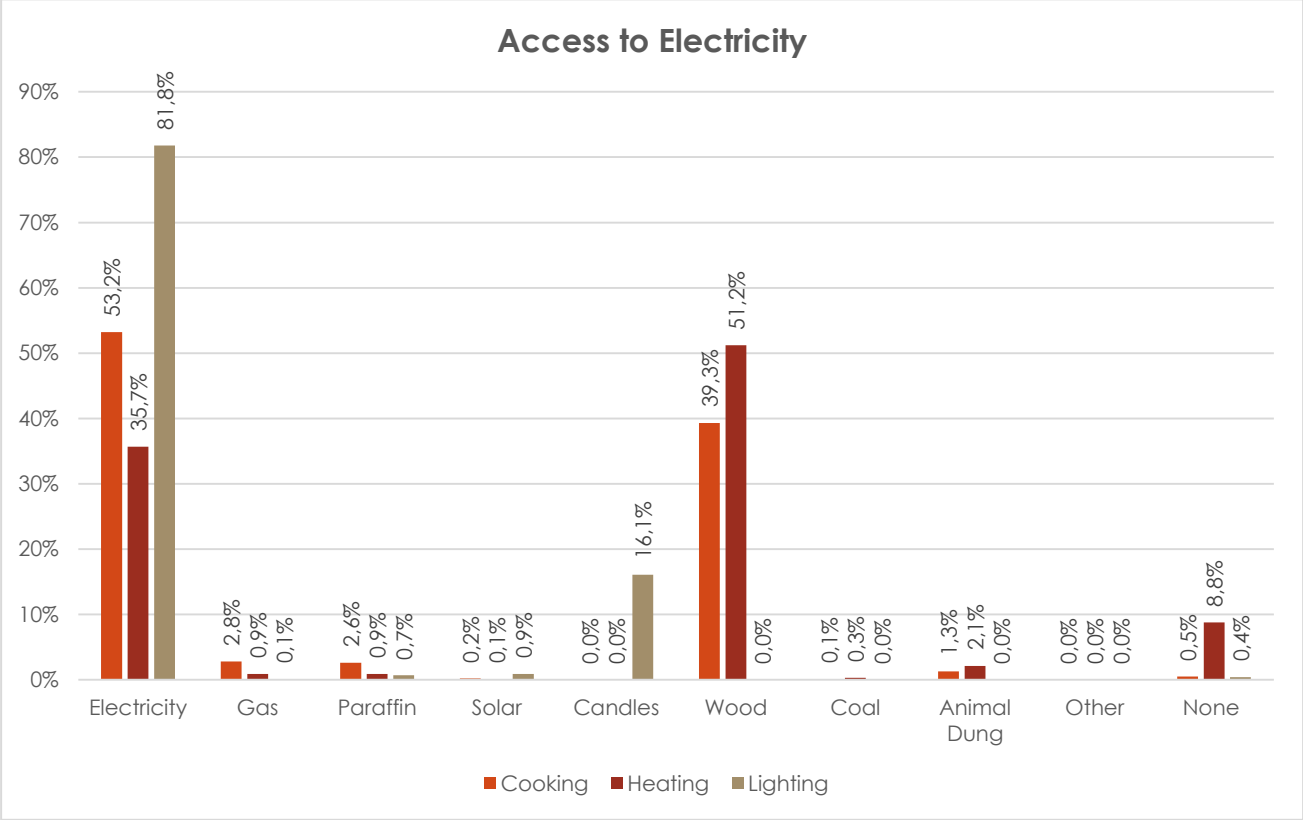

Figure 17: Access to Electricity within the Joe Morolong LM (Source: Census 2011).

3.2.13 Access to Refuse Removal

Approximately 81.2% of households within the Joe Morolong LM dispose of their refuse by making use of their own refuse dump, which is considered to be below the basic level of service provision for refuse removal. Approximately only 5.2% of households have their refuse removed by a local authority at least once a week, while 10.8% of households have no form of refuse removal.

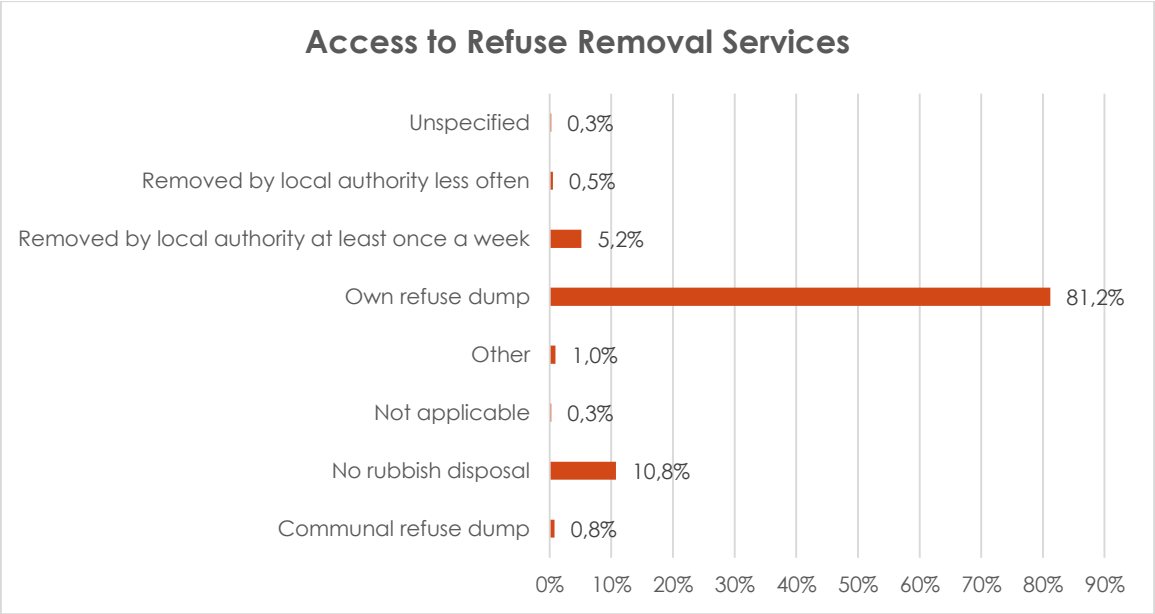

Figure 18: Access to Refuse Removal Services within South Africa, Northern Cape, John Taolo Gaetsewe DM, and Joe Morolong LM (Source: Census 2011).

3.3 SUMMARY OF SOCIOECONOMIC CONTEXT

In summary, the area was found to have the following socio-economic characteristics:

- The project is proposed within the Northern Cape Province, which is South Africa's largest, but least populated Province.
- The project is proposed within the Joe Morolong LM of the John Taolo Gaetsewe District.
- The Joe Morolong LM covers an area of land 20 172km² in extent and comprises 1 semi-urban area, villages, and commercial farms. The LM is largely characterised by rural establishments that are mostly connected through gravel and dirt roads.
- There are Tribal authorities with 8 Paramount Chiefs present within the Joe Morolong LM's area of jurisdiction.
- The Joe Morolong LM is regarded as the poorest area in the John Taolo Gaetsewe DM.
- The Joe Morolong LM municipal population is 89 377 (Census 2011), and comprises 146 villages, 2 small towns, and surrounding private commercial farms and government owned farms (belonging to the Department of Rural Development and the Department of Public Works).
- The Joe Morolong LM has 168 schools, 4 police stations, 24 clinics, and 3 community health centres.
- The following mining houses are located within the the Joe Morolong LM: UMK, South 32, Assmang Blackrock Mine, Tshipi-e-Ntle, Kalagadi, Kudumane Mining Resources, Baga Phadima Sand Mining, Sebilo Mine and Aqcuila mine (Sebilo and Aqcuila not yet in operation).
- Between 2001 and 2011 the Joe Morolong LM experienced a negative growth rate of -0.9% per year. This can largely be attributed to the fact that a large number of individuals have left the LM in search of employment opportunities elsewhere.
- The Joe Morolong LM is female dominated, with females comprising approximately 53.9% of the LM population.
- Black Africans comprise the predominant population group within the Joe Morolong LM, John Taolo Gaetsewe DM, and Northern Cape Province.

- The Joe Morolong LM, John Taolo Gaetsewe DM, and Northern Cape Provincial population age structures are youth dominated. A considerable proportion of the respective populations therefore comprise individuals of the economically active population between the ages of 15 – 64.
- The Joe Morolong LM has a high dependency ratio (45.8), which is considerably higher than the John Taolo Gaetsewe DM (38.8), and Northern Cape Province (35.8).
- Education levels within the Joe Morolong LM are very low with almost a quarter (22.8%) of the population aged 20 years and older have received no form of schooling, and only 15.1% having completed Matric, with 2% having received some form of higher / tertiary education. This means that the majority of the population can be expected to have a relatively low-skill level and would either require employment in low-skill sectors, or skills development opportunities in order to improve the skills level of the area.
- The unemployment rate of the Joe Morolong LM is lower than that of the John Taolo Gaetsewe DM, however the percentage of economically inactive individuals within the Joe Morolong LM is much higher than in the John Taolo Gaetsewe DM. This could have a negative impact in terms of the local human capital available for employment.
- Household income levels are low within the area, with almost two thirds falling within the poverty level. The area can therefore be expected to have a high poverty level with associated social consequences such as not being able to pay for basic needs and services and poor living conditions.
- The primary economic activities within the Joe Morolong LM comprise mining, and agriculture; while the highest employers comprise Community Services, Agriculture, and Mining, and Quarrying
- The Joe Morolong LM and John Taolo Gaetsewe DM are poorly serviced in terms of public sector health facilities. There are no hospitals within the Joe Morolong LM; and only 3 public sector dentists within the John Taolo Gaetsewe DM, and no public sector optometrists.
- The majority of households within the Dihlabeng LM comprise formal brick dwellings, however a significant proportion (22.1%) comprise traditional dwellings.
- The majority of households within the Joe Morolong LM are well serviced with regards to electricity, and water, but are poorly services with regards to sanitation and refuse removal.

3.4 PROJECT COST OVERVIEW

Renewable energy projects, such as the proposed solar facility, require significant capital investment. Funds of equity and debt investors either from foreign or domestic sources are obtained. The cost requirements and potential revenue are discussed in this section, sketching a business case for the development of renewable energy projects within South Africa (specifically solar farms in the Northern Cape).

The project costs consist of two parts, capital cost and running cost. The capital cost pertains to all costs incurred for the establishment of a producing facility. The running cost relates to those costs incurred to ensure that the facility operates as it should throughout its expected lifetime.

Solar PV installations can operate for many years with relatively little maintenance or intervention. Therefore after the initial capital outlay required for building the solar power plant, further financial investment is limited. Operating costs are also limited compared to other power generation technologies.

3.4.1 Project specific costs

The Hotazel Solar detailed costing has not been completed on the date of submitting this scoping report. The project is, however, based on the industry standard cost with capital expenditure that can

amount to more or less R20-25M per megawatt installed capacity. The running cost of a solar PV facility is minimal related to the initial capital cost, contributing to the most significant cost of constructing and running a solar PV facility.

3.4.2 Revenue streams

The payback of the facility results mainly from electricity sales, intended under the current governmental programme, known as the REIPPPP.

The REIPPPP portrays fixed ceiling prices for bidders to tender against in a competitive environment. The establishment of these ceiling prices is based on industry standard return on investments.

As part of the REIPPPP preferred bidders will enter into a power purchase agreement between the IPP generator and Eskom. National treasury provides surety, while NERSA regulates the IPP licences.

The bidding and tender procedure of the REIPPPP requires an approved EIA Environmental Authorisation/Record of Decision as a gate keeping criteria, where no project would be considered without the EIA Environmental Authorisation being given.

4 NEED AND DESIRABILITY

In keeping with the requirements of an integrated Environmental Impact process, the DEA&DP [7] *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 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.

4.1.1 Feasibility consideration

The commercial feasibility for the proposed 100MW_{AC} Hotazel Solar to be built on private land near Hotazel, has been informed by its contextual location, and economic, social and environmental impacts and influence. The project has gathered sufficient information and conducted studies of the site and the region to make qualified and reliable assumptions on the project's various impacts.

4.1.2 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 Hotazel Solar site, the resource is sufficient to guarantee a positive return on investment.

4.1.3 Solar Farm & Grid Connection

Among the outstanding characteristics of the Hotazel Solar site is its exceptionally flat nature, sufficient medium-low 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 R31 and R380 decreases the impact on secondary roads and natural habitat from the traffic going to and from

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

the solar facility during construction and operations. The close proximity of the existing Eskom Hotazel Sub-Station also allows for connection via a short distribution line. As the site is not used for intensive agricultural purposes, the solar facility will not significantly interfere with the agricultural productivity of the area.

4.1.4 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 chain. 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**.

4.1.5 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.

Hotazel Solar will have a positive impact on local employment. During the estimated 18 month construction phase, the project will **employ approximately 300 – 400** individuals of various qualifications. The majority will be provided by the local labour market. During operations, the solar facility is expected to have up to **60 employment opportunities** 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, Hotazel Solar will likely 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.

Note a Social Impact Assessment will be undertaken for this project and will be presented to I&AP's in the Impact Assessment phase of the environmental process. The baseline social study undertaken by Savannah Environmental is annexed to this report.

4.1.6 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 Joe Morolong 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 Hotazel Solar is to be located outside the Hotazel 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 Joe Morolong 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 Hotazel, the proposed solar farm will contribute electricity to the constrained Northern Cape and National electrical network, contributing to a provincial and national need. Hotazel Solar 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. Hotazel Solar requires the installation of a 132 kV overhead distribution line to connect to the existing Eskom Hotazel Substation (feed into the national grid system), as well as an access road to the development site from the R31. The cost of supplying the new infrastructure will be covered by the Applicant.

The water required for the construction and operation of the solar facility will be sourced from the Joe Morolong Municipality / Groundwater and will be supplemented by stored rainwater (Proof of confirmation of availability will be included in the Environmental Impact Report).

Construction waste (General Waste) will be disposed of at the existing landfill sites - confirmation of capacity of the municipal landfill site to accept the estimated volumes of general waste will be included in the Draft Environmental Impact Report. Defunct and damaged panels identified during construction will be returned to the supplier for recycling and/or disposal.

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). ABO Wind Hotazel PV (Pty) Ltd is one such IPP which intends to generate not exceeding 100MW_{AC} of electricity from the proposed Solar Farm, for input into the national grid (via the existing Hotazel Sub Station).

4.1.7 Desirability (place)

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

The target property is outside the Hotazel 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 other limiting factors. These factors have rendered the property vacant with limited land use option alternatives.

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

No. According to the 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 the 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 Hotazel 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 carrying capacity of the site is too low to generate noteworthy financial benefit from agricultural activities. The development of the proposed solar facility would constitute the loss of less than 275ha 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 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.

5 PLANNING CONTEXT

ADDITIONAL ACTIONS REQUIRED

A planning specialist needs to be appointed to ensure compliance with the regional and local planning legislation and to lodge necessary applications in terms of Act 70 of 70 (Subdivision of Agricultural Land Act)

A Planning specialist will be appointed in order to consider the planning implications of the proposed facility. The results of the findings of the planning specialist will be presented in the EIR. The following key components will likely take place from a planning perspective.

- A **land use change application** for the rezoning of approximately 275ha, from **Agricultural Zone I to Special Zone**, will be lodged at the Joe Morolong Local Municipality, in accordance with the Northern Cape Planning and Development Act (Act 7 of 1998).
- If there are restrictive Title Deed conditions burdening the proposed development, an application for the removal thereof will be lodged at the Government of the Northern Cape Province, Department: Corporate Governance and Traditional Affairs, in accordance with the Removal of Title Deed Restriction Act (Act 84 of 1967).
- Parallel to the rezoning application, a **long term lease application will be lodged at the National Department of Agriculture**, in accordance with the Subdivision of Agricultural Land Act (Act 70 of 1970).
- Relevant planning documents, on all spheres of Government, will be evaluated before any land use change application is launched. These documents include, but are not limited to the following: **NSDP** (National Spatial Development Perspective); **PGDS NC** (Provincial Growth and Development Strategy), Northern Cape Province; **IDP** (Integrated Development Plan); **SDF** (Spatial Development Framework).

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

- **Joe Morolong 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.

6 SITE SELECTION

ADDITIONAL ACTIONS REQUIRED

The preferred footprint alternative needs to be selected after consideration of the comments received during this initial public participation phase.

The site selection process followed a two stage approach; firstly, to select the property for the proposed development (Remainder of the Farm York A, 279), and secondly, to select the footprint of the proposed development within the farm portion.

6.1 PROPERTY SELECTION PROCESS

6.1.1 Solar resource

The proposed site was selected for the development of a solar PV facility based on the predicted solar resource, as the economic viability of a solar facility is directly dependent on the intensity of the solar resource/ global horizontal irradiation (GHI). The overarching objective for the solar energy facility is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. The Northern Cape receives the highest average daily GHI in South Africa, with the Hotazel area exhibiting approximately 2233 kWh/m2/annum.

6.1.2 Proximity to towns with a need for socio-economic upliftment.

The Site is situated in close proximity to the town of Hotazel and relatively close proximity to the towns of Deben, Kathu, and Kuruman. These towns are typically masked with high rates of unemployment, as is the case in the Northern Cape. The closest cities in the area are Kimberley and Upington, which both also experience the same level of unemployment and poverty. Consequently, local labour would be easy to source, which fits in well with the REIPPPP economic development criteria for socio-economic upliftment. Currently, a large proportion of local labour is used in the mining and agricultural industry. A few negatives related to agricultural employment are that it is very seasonal and it is not always in close proximity to their homes, forcing workers to travel large distances on a daily basis to reach their place of employment. Over the years, employment in the mining sector has shown to be very volatile.

6.1.3 Access to grid

Ease of access to the Eskom electricity grid is vital to the viability of a SEF. The applicant corresponded with Eskom network planners to understand their future demand centres as well as strategic plans to upgrade and strengthen any local networks. Hotazel Solar is intended to connect to the Hotazel Substation, which is less than 3 km from the site. The 66kV network between Hotazel, Kuruman and Kathu is planned to be upgraded to 132kV to meet the increasing demand from mining activity in the area. Some of these upgrades are already in progress, most noteworthy being the Hotazel-Eldoret 132kV line build currently under construction. In addition, Eskom intends to construct a 400kV transmission line from the Mookodi MTS in Vryburg through to Hotazel. Notwithstanding the fact that the SEF will contribute to meeting the electrical demand on the distribution network, close proximity to the planned 400kV infrastructure means that in due course, surplus power can be evacuated into Eskom's Transmission System and conveyed at very high voltage for consumption elsewhere in the country.

6.1.4 Land availability

The majority of land surrounding the Hotazel town is mining land reserved for related mining activities. The Remaining Extent (Portion 0) of the farm York A 279, is one of the few available privately-owned land parcels suitable for solar PV development.

6.1.5 Declining farming activity in the area

For a number of reasons, agricultural land around Hotazel generally has very low agricultural potential, owing particularly to the following factors:

- The depletion of underground water resources due to mining activity;
- Periodic droughts directly impact the ability to farm sustainably; and
- Stock theft is a persistent problem in the area and therefore the area sees low agricultural production as cattle and sheep farming and other forms of small livestock farming proves to be challenging.

6.1.6 Wind and dust consideration

Several mines in the area are located to the north-west, south-west and south of the Site. Venturing closer to these mining areas (downwind) will expose the SEF to increased dust levels thus reducing the efficiency of the solar PV modules and hence power generation of the SEF. The wind direction distribution for the Site appears to be predominantly from the north-east which it is hoped will blow most of the dust from the mines away from the Site. The manganese mine located directly north of the site is no longer in use and is under rehabilitation with reduced dust emission.

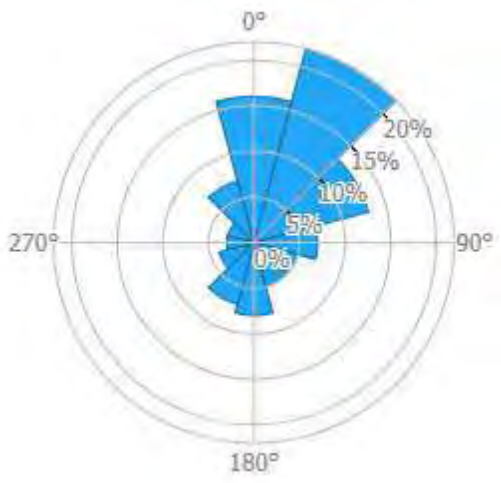

Figure 19: Wind Frequency Rose for Hotazel (https://globalwindatlas.info/)

6.1.7 Proximity to access road for transportation of material and components

Large volumes of material and components will need to be transported to the Site during the construction phase of the project. The accessibility of the Site was therefore a key factor in determining the viability of Hotazel Solar, particularly taking transportation costs (direct & indirect) into consideration and the impact of this on project economics and therefore the ability to submit a competitive bid under the DoE's REIPPPP.

6.1.8 Proximity to airport/s

The Sishen / Kathu airport is located more than 45km south of the Site, and therefore will not be affected in any way by the proposed SEF. Based on the above list of findings it was decided that the proposed site would be suitable for such a development. With consideration to the farm extents, it is believed that the site could accommodate the maximum 100 MW contracted capacity permitted under the DoE's RFP, and furthermore, that all this power would be able to be absorbed into the national grid under stipulated contingency conditions.

6.2 FOOTPRINT SELECTION PROCESS

The selection of the proposed study area within the Remaining Extent (Portion 0) of the farm York A 279 followed a risk adverse, bottom up approach in order to ensure that the impacts of the proposed developments can be avoided as far as possible. This avoidance approach reduces the degree of mitigation required in order ensure that potential environmental impacts are within acceptable levels.

This approach was achieved by means of appointing an ecological expert, Mr Simon Todd, to develop a vegetation and sensitivity rating for the entire property.

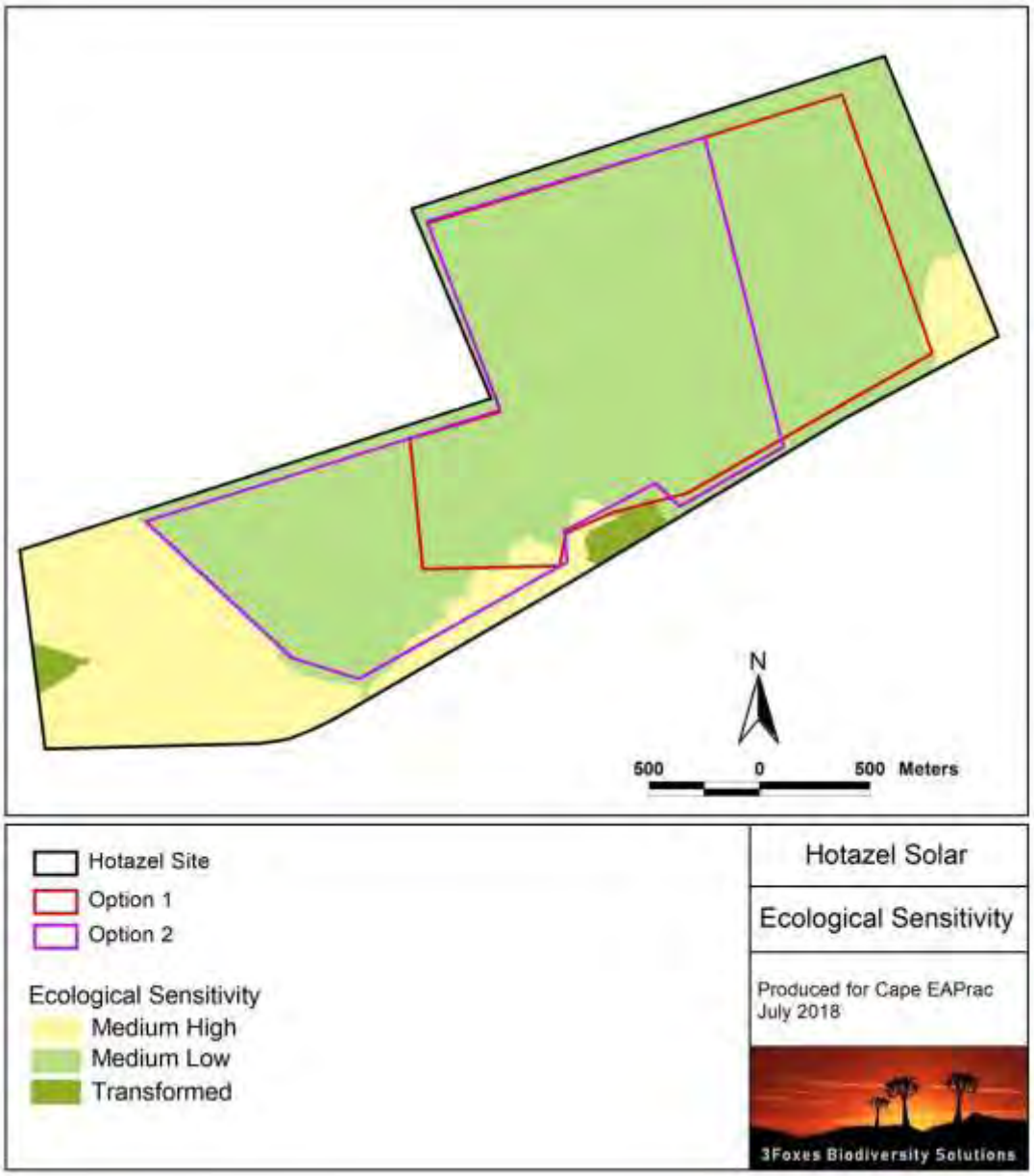

Figure 20: Ecological Sensitivity of Remainder of the Farm York A 279 (Todd,2015)

Both development footprints were then developed to avoid the majority of Medium – High sensitivity areas situated in the west and the south eastern portions of the property. The ecology specialist has confirmed that impacts associated with either of the proposed footprints are similar. The preferred alternative will thus only be determined after the public participation process associated with this DSR is completed.

7 CONSIDERATION OF ALTERNATIVES

ADDITIONAL ACTIONS REQUIRED

The preferred footprint alternative needs to be selected after consideration of the comments received during this initial public participation phase.

The Hotazel Solar 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 100MW$_{AC}$ 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 132kV electrical distribution line / grid connection connecting to the existing Eskom Hotazel Substation;
- Rainwater tanks; and
- Perimeter fencing and security infrastructure.

A number of alternatives, including **layout** and **technological** alternatives were considered for the proposed Hotazel Solar. The consideration of these alternatives are detailed below as summarised from the technical development report produced by AEP.

7.1 LAYOUT ALTERNATIVES

It is customary to develop the final / detailed construction layout of the SEF only once an IPP is awarded a successful bid under the REIPPPP, after which major contracts are negotiated and final equipment suppliers identified. However, for the purpose of the DSR in accordance with the minimum requirements prescribed by the Department of Environmental Affairs (DEA), two alternative layouts were identified. The following section elaborates on the layout options for the Hotazel Solar facility.

7.1.1 Initial Assessment Area

The Remainder (Portion 0) of the farm York A 279 is highlighted in yellow in the figure below.

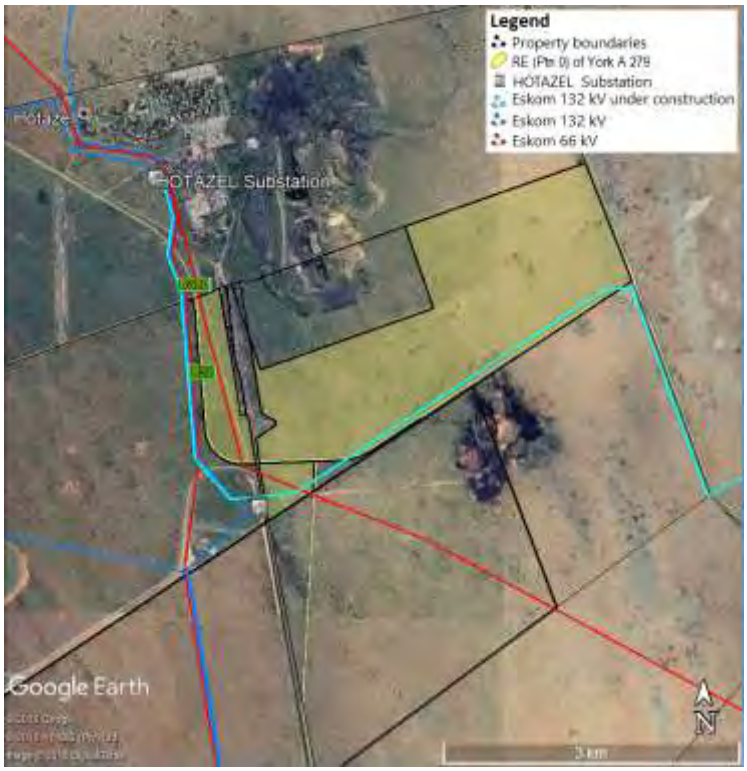

Figure 21: Locality of the Property

An initial/ conceptual area of ± 450 ha was identified for the ecologist to assess during his site visit in the initiation phase of the EIA for Hotazel Solar; this area is shown outlined in white in the Figure below.

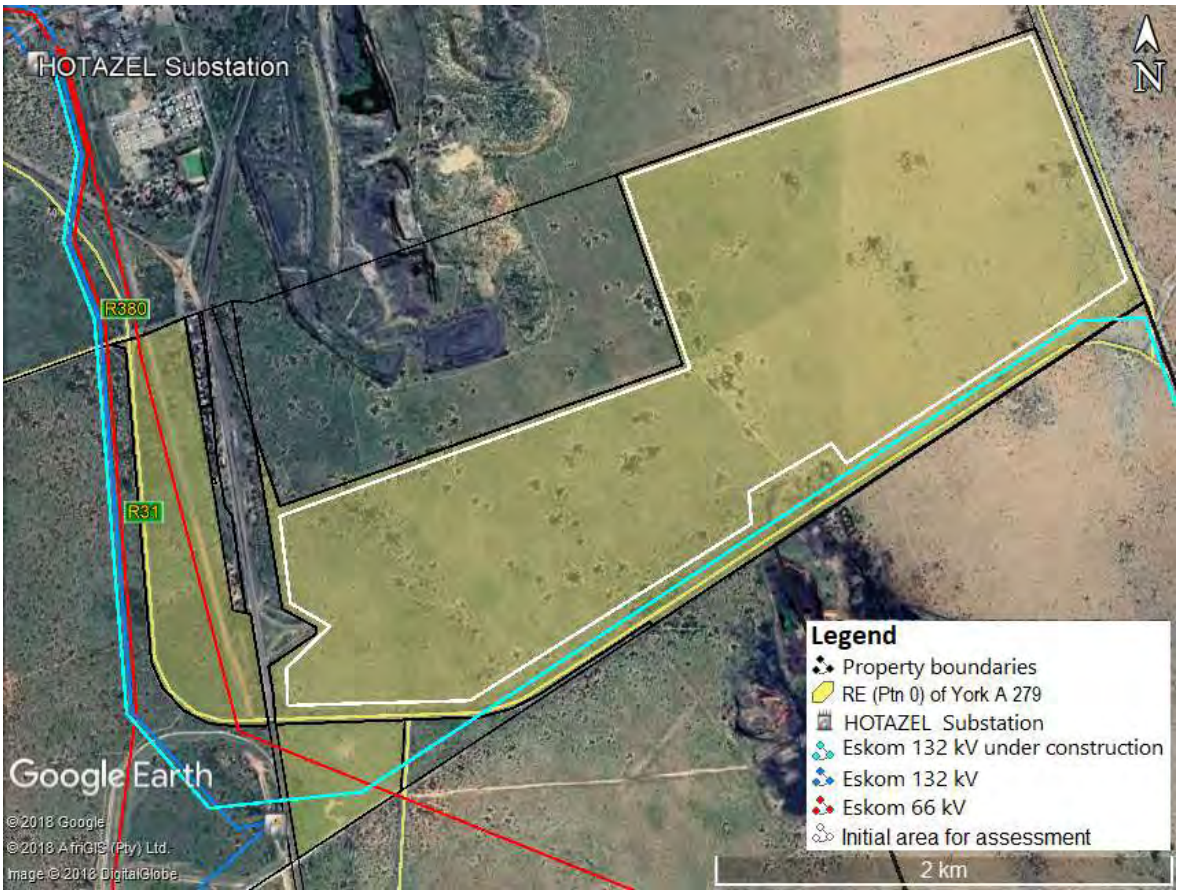

Figure 22: Initial/ Conceptual Area

This initial/ conceptual area only considered the power lines over the Property, and the regional roads that segment the property into three sections and was thus driven primarily by its undivided space. The initial/ conceptual area did not consider any environmental sensitive areas (to be identified by the various specialist studies). Following the identification of the initial/ conceptual area, an ecological expert, Mr Simon Todd, was appointed to assess the area and advise suitable areas for the location of the SEF; these are discussed in section 2.2.

7.1.2 Layout Alternatives

Layout Alternative 1 is depicted in **Figure 23**. Layout Alternative 1 constitutes a preliminary layout area within the initial/ conceptual area restricted to the east of the Property.

Layout Alternative 2 is shown in Figure 11. Layout Alternative 2 includes a bit more sensitive habitat in the west with a higher abundance of Acacia haematoxylon, however it would have a shorter grid connection to the Hotazel substation.

The ecologist advised that the far west and far eastern sides of the site should be avoided as these areas have a higher density of protected trees.

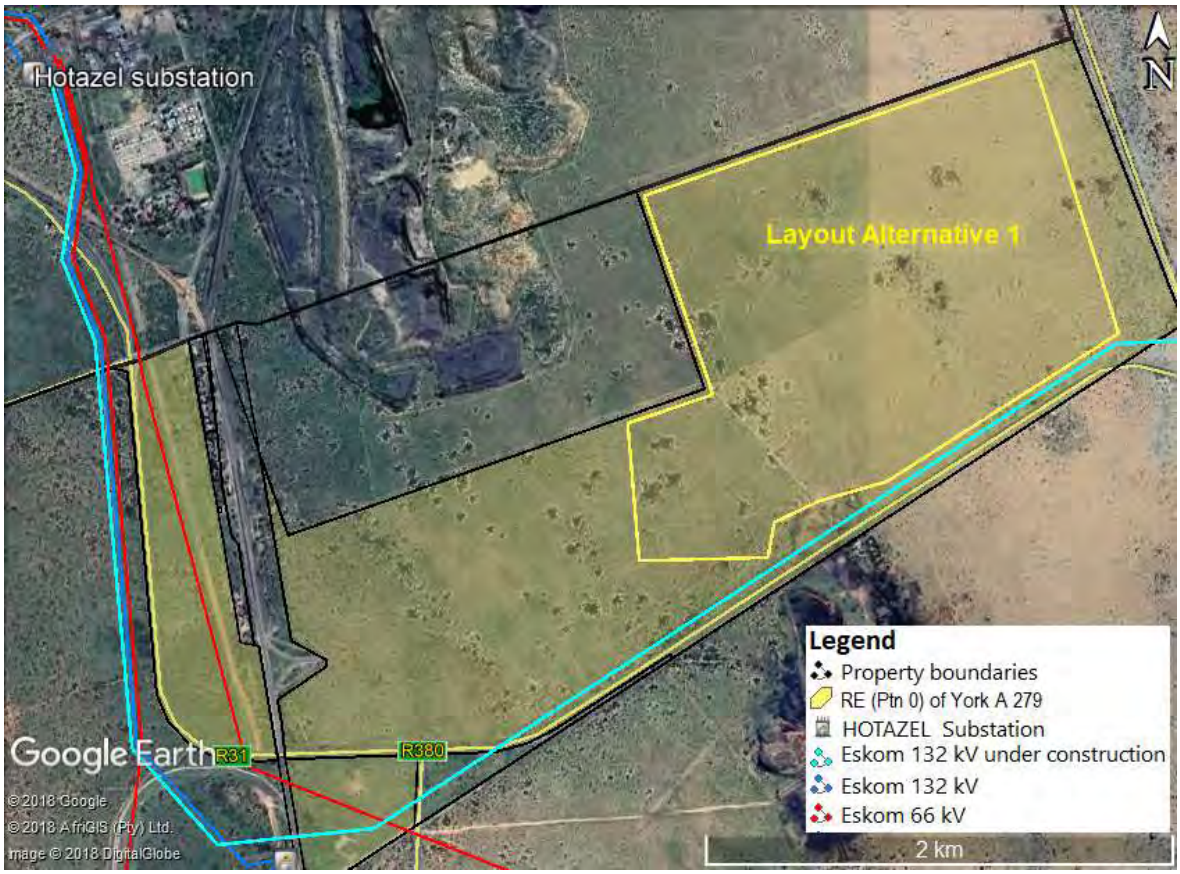

Figure 23: Layout Alternative 1

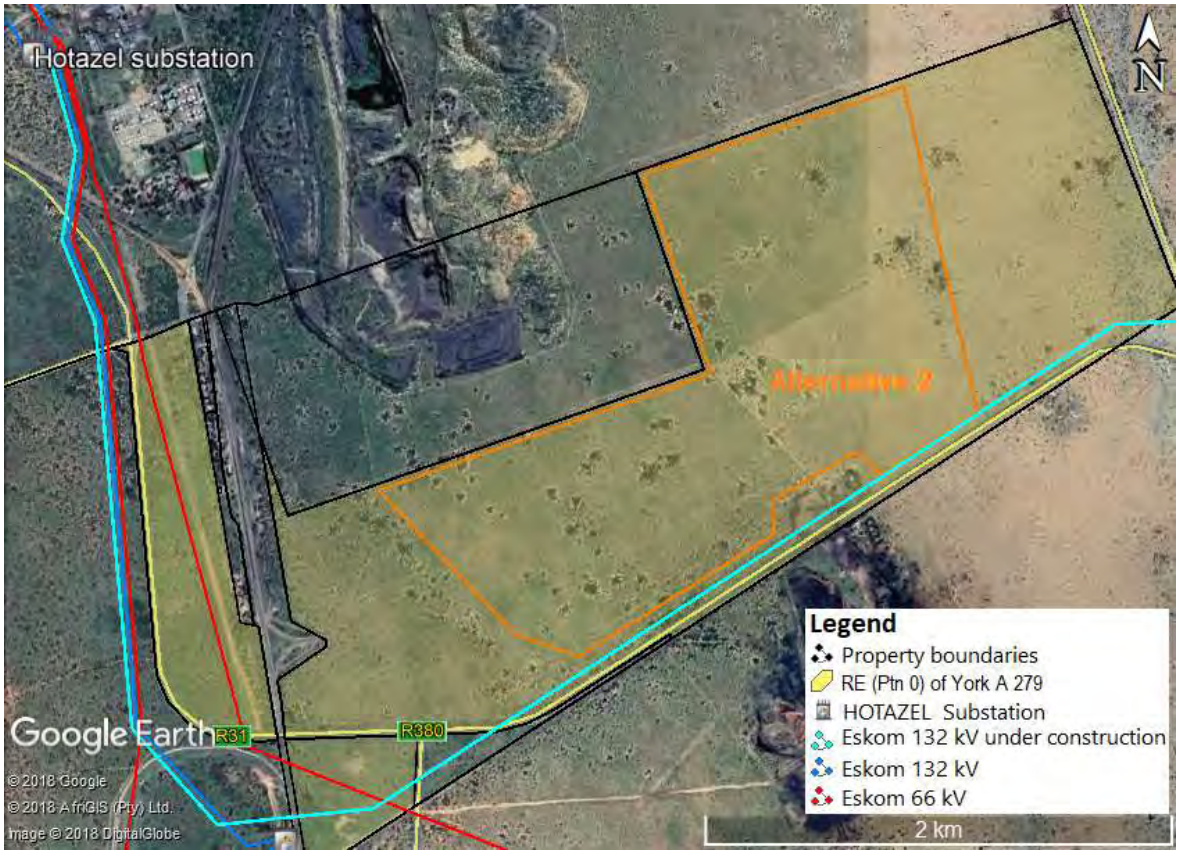

Figure 24: Layout Alternative 2

7.2 GRID CONNECTION ALTERNATIVES

It is proposed to connect the SEF directly to Eskom's Hotazel Substation located ± 3km to the north west of the Property. The SEF substation will be approximately 100m x 100m in size and feature a step-up transformer/s to transmit electricity via a 132 kV OHL directly to the Hotazel Substation. Depending on which layout alternative is selected, there are options for the SEF substation location, and the OHL routing to the Hotazel Substation, as shown below.

The longest OHL alternative (Alternative C from Substation Alternative B) is ± 6km in length. The OHL will be a maximum height of 24m and occupy a servitude width of between 31m – 51m.

A 100 MW_{AC} installation will require specific electrical components to meet the national grid code requirements in order to generate and supply electricity into the national grid. The conversion from DC (modules) to AC is achieved by means of inverter stations. A single inverter station is connected to a number of solar arrays, are will be placed along the internal service roads for ease of access. A number of inverter stations will be installed for the SEF (up to maximum of ± 80 centralised inverters, or a maximum of ± 1120 string inverters), each of which is connected to the on-site / facility substation.

Final placement of the inverter stations and on-site / facility substation will need to take ground conditions into consideration. Interconnecting electrical cabling will be trenched where practical and follow internal access roads to the greatest extent. Sensitive areas will consequently be avoided as far as possible, or alternatively, cables will be fastened above- ground to the mounting structures so as to avoid excessive excavation works and clearing of vegetation.

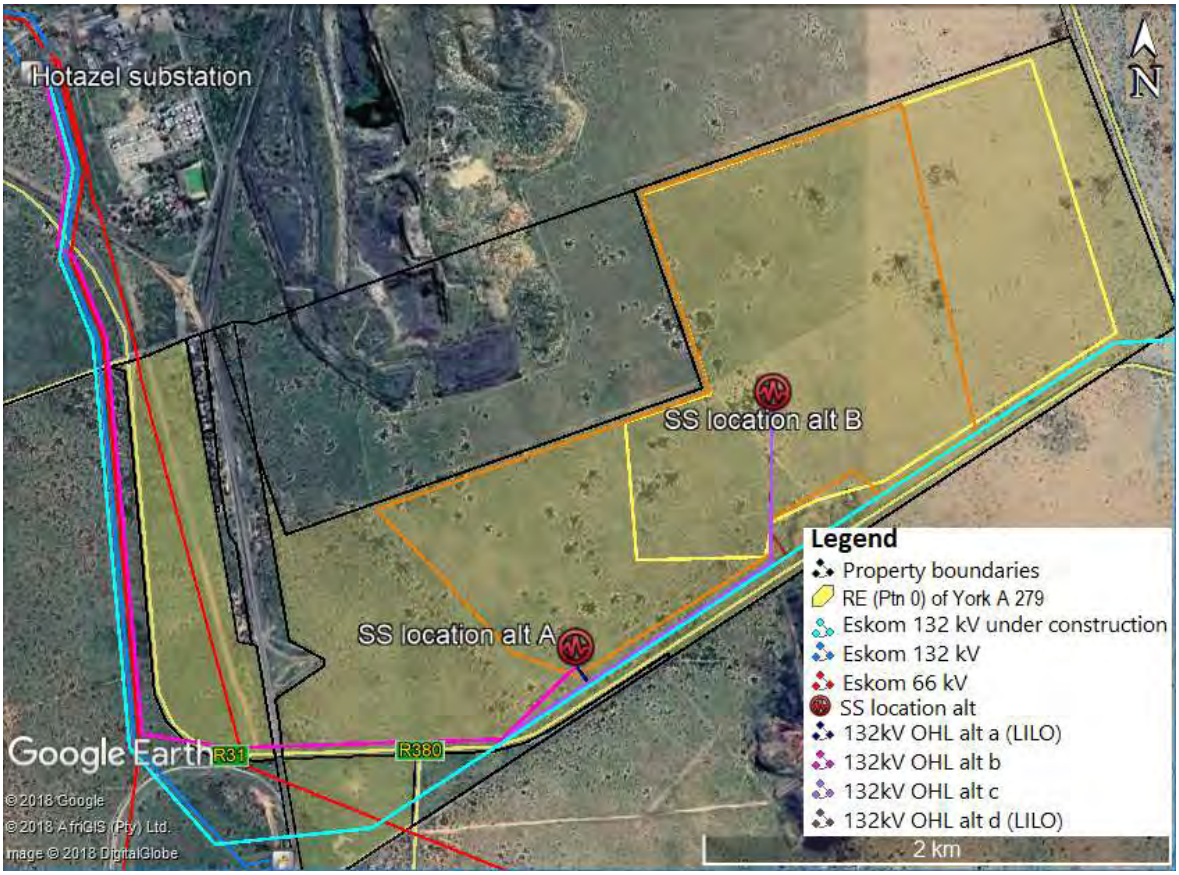

Figure 25: Grid Connection Alternatives

7.3 ACCESS ROAD ALTERNATIVES

The internal road network of the SEF will be gravelled roads, 4 – 5m in width, around the solar array periphery. Roads located in-between the solar modules will be un-surfaced tracks to be used for maintenance and cleaning of solar PV panels.

Precautionary measures will be taken to mitigate the risk of ground disturbances where access roads will be constructed. Special attention will be given to drainage, water flow and erosion by applying appropriate building methods.

A detailed transport and traffic plan will be undertaken during the EIA phase of the project to determine the best route to site. Depending on the layout alternative that is selected, there are two existing access points that could be used for the SEF, as depicted below. The main access road will not exceed 8m in width.

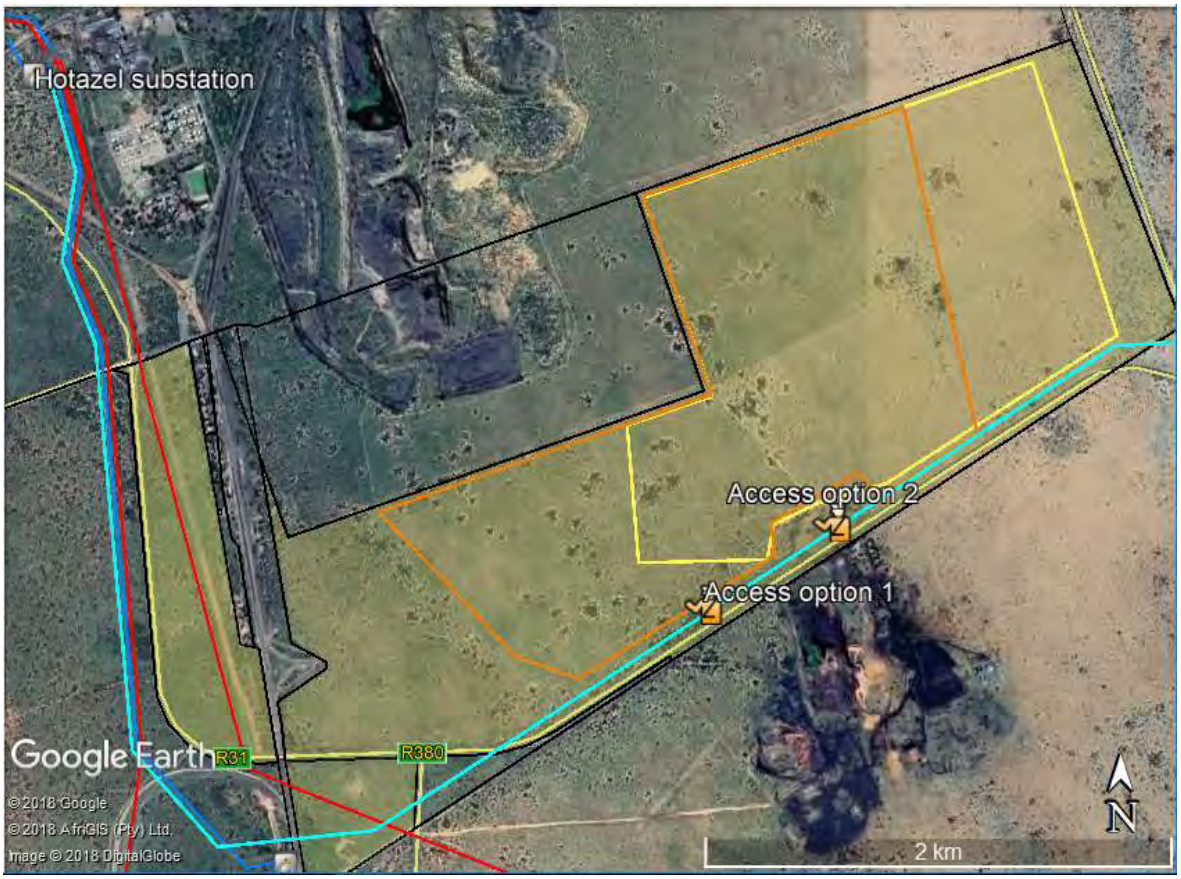

Figure 26: Access Road Alternatives

7.4 THE NO-GO ALTERNATIVE

The Status Quo Alternative proposes that Hotazel Solar not go ahead and that the area in proximity to the Eskom Hotazel 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 water scarcity and extreme climatic conditions, it has no potential for irrigated crop cultivation (this has been confirmed by the Agricultural Specialist in his report attached in Annexure E3). 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 SITE DESCRIPTION AND ATTRIBUTES

The following sections provide a description of the natural environmental and built environment context of the Remainder of the Farm York A 279, with particular focus on the site location for the proposed Hotazel Solar.

8.1 LOCATION & BUILT ENVIRONMENT

The target property, Remainder of Farm York A 279, is located in the John Taolo Gaetsewe District (previously Kgalagadi District) of the Northern Cape Province, within the jurisdiction area of the Joe Morolong Local Municipality. The property is approximately **636.794 ha** in size and is located approximately 3km south of Hotazel

The proposed Hotazel Solar is situated directly north of the R31 and directly east of the R380.

No buildings, ruins or any other structures were noted on or within the direct proximity of the proposed solar development site.

8.2 GEOLOGY & CLIMATE

The following information relating to geology and climate was obtained from the Agricultural Specialist; please refer to **Annexure E3** for a full copy of his report.

8.2.1 Geology

The geology of the area around and to the southeast of Hotazel is outlined on the 1: 250 000 scale geological map 2722 Kuruman. The Hotazel PV Facility project area (including the overhead distributiom line corridor options) is entirely underlain by Pleistocene to Recent aeolian sands of the **Gordonia Formation** (**Kalahari Group**) The geological map as well as recent field studies in the region (Almond 2013a, 2013b) show that the Kalahari sands here are extensively underlain by hardpan calcretes some of which at least can be assigned to the **Mokalanen Formation** of the Kalahari Group. Subdued linear sand dunes trending NW-SE as well as pale calcrete exposures along the Ga-Mogara River and nearby pans are clearly visible outside the present project area on satellite images. No major drainage lines or pans are visible on satellite images within the present project area but calcretes are expected here at depth beneath the cover sands.

The following account of the geology of the Hotazel region has largely been abstracted from previous PIA reports by Almond (2103a, 2013b, 2016). Ancient bedrocks of the Transvaal Supergroup and other Precambrian sediments in the Hotazel area are mantled by a thick succession of **superficial sediments** of probable Late Caenozoic (*i.e.* Late Tertiary or Neogene to Recent) age, most of which are assigned to the **Kalahari Group**. The geology of the Late Cretaceous to Recent Kalahari Group is reviewed by Thomas (1981), Dingle *et al.* (1983), Thomas & Shaw 1991, Haddon (2000) and Partridge *et al.* (2006). Other superficial sediments whose outcrop areas are often not indicated on geological maps include colluvial or slope deposits (scree, hillwash, debris flows *etc*), sandy, gravelly and bouldery river alluvium, surface gravels of various origins, as well as spring and pan sediments. The colluvial and alluvial deposits may be extensively calcretised (*i.e.* cemented with pedogenic limestone), especially in the neighbourhood of dolerite intrusions or overlying Ghaap Group carbonate rocks.

Calcretes or **surface limestones** (**Ql** in Fig. 2) in the southern Kalahari Region are pedogenic limestone deposits that reflect seasonally arid climates in the region over the last five or so million years. They are briefly described by Truter *et al.* (1938) as well as Visser (1958) and Bosch (1993).

The surface limestones may reach thicknesses of over 20 m, but are often much thinner, and are locally conglomeratic with clasts of reworked calcrete as well as exotic pebbles. The limestones may be secondarily silicified and incorporate blocks of the underlying Precambrian carbonate rocks. The older, Pliocene - Pleistocene calcretes in the broader Kalahari region, including sandy limestones and calcretised conglomerates, have been assigned to the **Mokalanen Formation** of the **Kalahari Group** and are possibly related to a globally arid time period between 2.8 and 2.6 million years ago, *i.e.* late Pliocene (Partridge *et al.* 2006).

Large areas of unconsolidated, reddish-brown to grey aeolian (*i.e.* wind-blown) sands of the Quaternary **Gordonia Formation** (**Kalahari Group**; **Qs** in Fig. 2) are mapped in the southern Kalahari study region. According to Bosch (1993) the Gordonia sands in the Kimberley area reach thicknesses of up to eight meters and consist of up to 85% quartz associated with minor feldspar, mica and a range of heavy minerals. The Gordonia dune sands are considered to range in age from the Late Pliocene / Early Pleistocene to Recent, dated in part from enclosed Middle to Later Stone Age stone tools (Dingle *et al*., 1983, p. 291). Note that the recent extension of the Pliocene - Pleistocene boundary from 1.8 Ma back to 2.588 Ma would place the Gordonia Formation almost entirely within the Pleistocene Epoch. Reworked and diagenetically altered sands of probable aeolian origin in the Kimberley area are often referred to as Hutton Sands.

8.2.2 Climate

The Kalahari region has consistent temperatures with summer and early autumn rainfall. Winters are very dry. The wettest part appears in the east with a mean annual precipitation of 500mm / annum and driest in the west with 120 mm/annum. The MAP for the whole Ecozone is 250 mm/annum. The region is classified as an arid zone with desert climate.

8.3 SOILS

Soils in this region usually show the following characteristics:

- Soils have minimal development, are 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, structure less soils may occur.
- Soils may have favourable physical properties.
- Soils may also have restricted depth, excessive drainage, high erodibility and low natural fertility.

8.4 TOPOGRAPHY

The site has an almost level topography with the straight shape and slope gradient of 0,5 % Features captured on Topographical map 2722BB Hotazel include Arterial road R31, Main road R320, Railway station and railway lines, power lines, a wind pump, a communication tower, mine dumps and excavations, prominent rock outcrops, erosion and sand, a narrow gauge track, a hiking trail, cadastral and internal fences, and contours at 20 m intervals.

The cross section below provides information regarding the shape of the slope of the development footprint. It shows a straight shape for the foot slope. This information is valuable when interpreting the land type data as this will indicate what soil forms can be expected in each terrain unit.

The terrain slope can be calculated using the difference in vertical height (20 m) divided by difference in horizontal distance (4000 m) X 100. The slope is 0.5%. It is expected to find deeper soils on concave soils with water locked soils at foot slopes and valley bottoms.

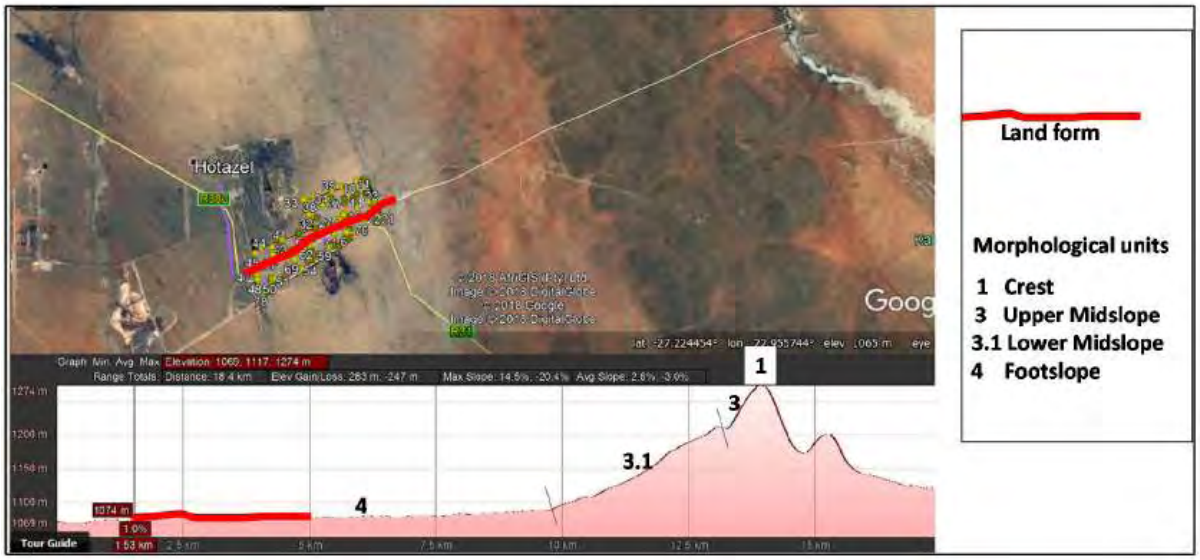

Figure 27: Topographical Map (Lubbe, 2018)

8.5 BOTANICAL COMPOSITION OF THE SITE

Mr Simon Todd undertook a site assessment of the entire property in order to develop a site sensitivity plan and to determine the baseline botanical composition of the site. Please refer to the Ecological scoping report attached in **Annexure E1**.

8.5.1 Broad-Scale Vegetation Patterns

According to the national vegetation map (Mucina & Rutherford 2006), the site is restricted to the Kathu Bushveld vegetation type. This vegetation unit occupies an area of 7 443 km^2 and extends from around Kathu and Dibeng in the south through Hotazel and to the Botswana border between Van Zylsrus and McCarthysrus. In terms of soils the vegetation type is associated with aeolian red sand and surface calcrete and deep sandy soils of the Hutton and Clovelly soil forms. The main land types are Ah and Ae with some Ag. The Kathu Bushveld vegetation type is still largely intact and less than 2% has been transformed by mining activity and it is classified as Least Threatened. It is however, poorly conserved and does not currently fall within any formal conservation areas. Although no endemic species are restricted to this vegetation type a number of Kalahari endemics are known to occur in this vegetation type such as *Acacia luederitzii* var *luederitzii, Anthephora argentea*, *Megaloprotachne albescens*, *Panicum kalaharense* and *Neuradopsis bechuanensis*. It is more fully described as it occurs at the site in the next section. Other vegetation types that occur in the immediate area include Kuruman Thornveld to the east and Gordonia Duneveld to the west, neither of which is of conservation concern nor occur within the site.

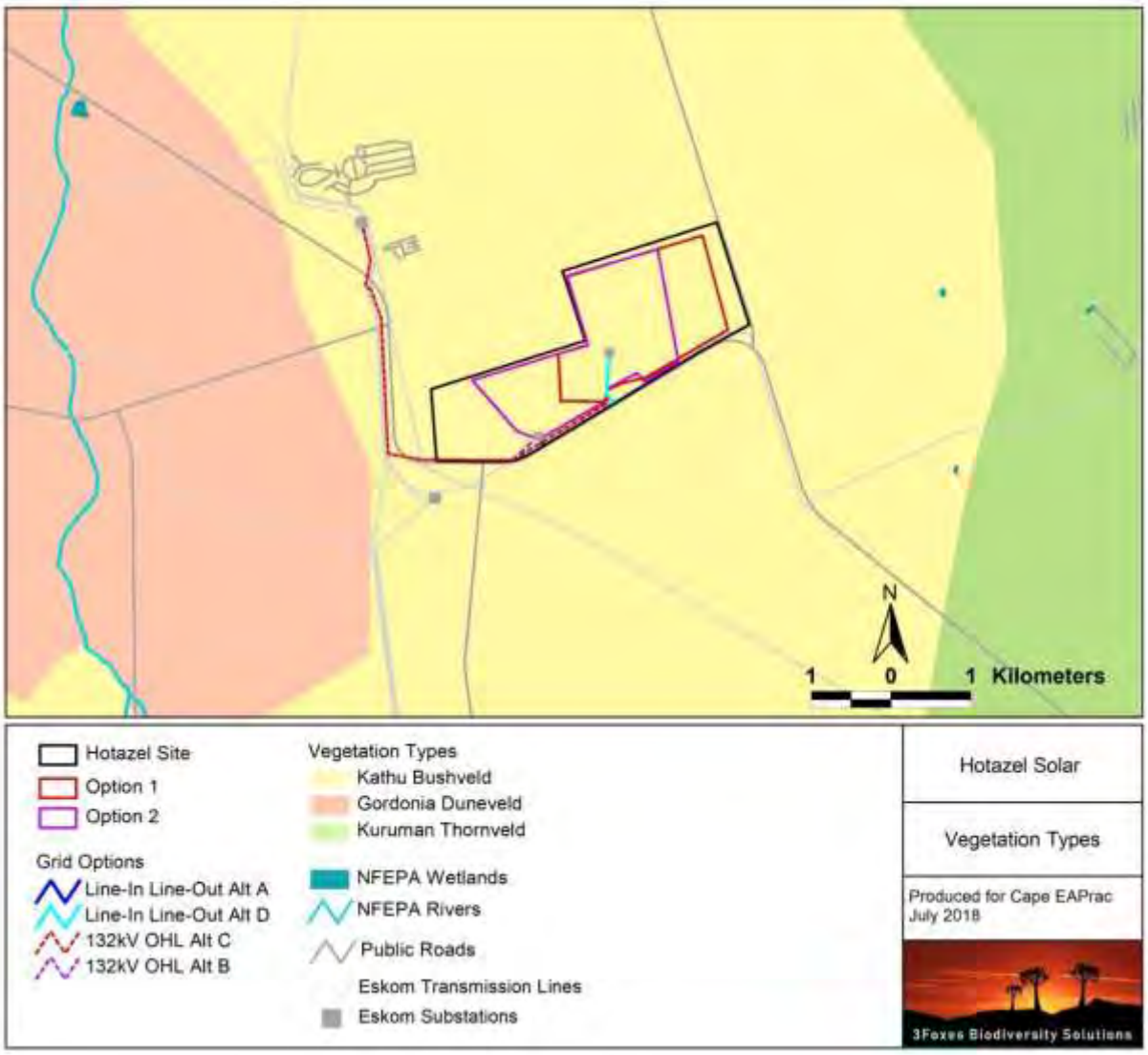

Figure 28. Broad-scale overview of the vegetation in and around the Hotazel site.

The vegetation map is an extract of the national vegetation map as produced by Mucina and Rutherford (2006/2012), and also includes wetlands delineated by the NFEPA assessment (Nel et al. 2011).

8.5.2 Habitats & Plant Communities

The vegetation of the site consists of Bushveld with a well-developed grass layer and a variable-density tree layer. A feature of the site that is also clearly visible from the satellite imagery of the site are the *Acacia mellifera* bush clumps that occur across the site. As this is a bush encroaching species, this is considered to represent a symptom of degradation and the aggregations of trees are not considered sensitive. Apart from the *Acacia mellifera* bush clumps, *Acacia erioloba* and *Acacia haematoxylon* are also dominant species across large parts of the site and are particularly dense in the western section of the site. The grass layer is fairly homogenous across the site and there is not a lot a variation in the grass layer which can be ascribed to the sandy substrate. Apart from the above dominant trees other common woody species present at the site include *Zizyphus mucronata*, *Gymnosporia buxifolia*, *Acacia mellifera* subsp. *detinens*, *Searsia ciliata*, *Ehretia rigida* subsp. *rigida*, *Diospyros lycioides* subsp. *lycioides* and *Grewia flava*. The grass layer is dominated by *Schmidtia pappophoroides*, *Aristida meridionalis, Aristida stipitata* subsp. *stipitata*, *Stipagrostis uniplumis* var. *uniplumis*, *Stipagrostis obtusa*, *Cynodon dactylon, Enneapogon desvauxii, Eragrostis lehmanniana*

and Aristida *congesta* subsp. *congesta*. The density and diversity is shrubs is fairly low but includes *Asparagus laricinus*, *Asparagus retrofractus*, *Felicia muricata* subsp. c*inerascens*, *Pentzia calcarea*, *Acacia hebeclada*, *Hermannia tomentosa*, *Gnidia polycephala* and *Lantana rugosa*. Due to the good rains preceding the site visit, forbs were abundant and included *Dicoma schinzii*, *Geigeria ornativa*, *Elephantorrhiza elephantina*, *Indigofera daleoides* var. *daleoides* and *Gisekia pharnacioides* var. *pharnacioides*.

Figure 29: The western margin of the site, showing the high density of trees in this area with dense *Acacia mellifera* in the foreground and *Acacia haematoxylon* in the distance with occasional *Acacia erioloba*. This part of the site is not within the development footprint of either PV footprint option (Todd, 2018)

Figure 30: Typical vegetation of the site with the low *Acacia hebeclada* in the foreground and numerous *Acacia haematoxylon* throughout the area (Todd, 2018)

Figure 31: Example of more open veld from near the centre of the site, showing more open grassland with occasional *Acacia haematoxylon* and *Acacia mellifera* (Todd, 2018)

8.5.3 Listed and Protected Plant Species

Two NFA-protected tree species occur at the site, *Acacia erioloba* and *Acacia haematoxylon*. The density of both species is fairly high across the site and it would not be possible to avoid impact on these species. Although *Acacia erioloba* has a higher density in some parts of the site, *Acacia haematoxylon* is widely distributed across the site and there are no areas where this species does not occur. The density of *Acacia haematoxylon* at the site varies from less than 10 trees/ha to approximately 30 trees/ha in the higher density areas. As a result, several thousand trees would likely be lost as a result of the development. This species is however very common in the area and their loss from the development area would not compromise the local population. Devils' Claw *Harpagophytum procumbens* is common at the site, especially in the west, but is widely distributed and would not be significantly affected by the development.

Figure 32: Devils' Claw is common at the site, especially in the west of the site.

8.6 FAUNAL COMPONENT OF THE SITE

Mr Simon Todd undertook a site assessment of the entire property in order to develop a site sensitivity plan and to determine the baseline faunal composition of the site. Please refer to the Ecological scoping report attached in **Annexure E1**.

8.6.1 Mammals

The mammalian community at the site is likely to be of moderate diversity; although more than 50 species of terrestrial mammals are known from the wider area, the extent and habitat diversity of the site is too low to support a very wide range of mammals. Species observed or otherwise confirmed present at the site include Aardvark, Cape Porcupine, Springhare, South African Ground Squirrel, Scrub hare, Vervet Monkey, Small-spotted Genet, Yellow Mongoose, Slender Mongoose, Black-Backed Jackal, Steenbok, Duiker and Kudu. Small mammals trapped in the area on the current or previous site visits include Desert Pygmy Mouse *Mus indutus*, Multimammate Mouse *Mastomys coucha*, Bushveld Gerbil *Tatera leucogaster*, Hairy footed Gerbil *Gerbillurus paeba*, Pouched Mouse *Saccostomus campestris* and Grey Climbing Mouse *Dendromus melanotis*.

Six listed terrestrial mammal species potentially occur in the area; these are the Brown Hyaena *Hyaena brunnea* (Near Threatened), Black-footed Cat *Felis nigripes* (Vulnerable), Leopard *Panthera pardus* (VU), Ground Pangolin *Smutsia temminckii* (Vulnerable), South African Hedgehog *Atelerix frontalis* (Vulnerable). The Leopard and Brown Hyaena are not likely to occur in the area on account of the agricultural land-use in the area which is not usually conducive to the persistence of large carnivores. The Black-footed Cat is a secretive species which would probably occur at the site given that it occurs within arid, open country. The Hedgehog and Ground Pangolin may also occur in the area at typically low density. Given the extensive national ranges of these species, the impact of the development on habitat loss for these species would be minimal and a long-term impact on these species would be unlikely.

Figure 33: Species observed with the camera traps at the site include from top left, Duiker, Steenbok, Black-backed Jackal and Scrub Hare (Todd, 2018)

8.6.2 Reptiles

The Hotazel site lies in or near the distribution range of more than 50 reptile species, although many of these are unlikely to occur at the site as it is restricted largely to sandy substrate and does not include rocky habitat or other habitats that are important for reptiles. No species of conservation concern are known to occur in the area. The habitat diversity within the study area is relatively low with the result that the number of reptile species present within the site is likely to be relatively low and only a proportion of the species known from the area are likely to be present on the site itself.

Species observed at the site or in the area in the past include Serrated Tent Tortoise *Psammobates oculifer* , Cape Cobra *Naja nivea*, Ground Agama *Agama aculeata*, Spotted Sand Lizard *Pedioplanis lineoocellata*, Variable Skink *Trachylepis varia*, Bibron's Blind Snake *Afrotyphlops bibronii*, Western Rock Skink *Mabuya sulcata sulcata*, Cape Gecko *Lygodactylus capensis capensis*, Speckled Rock Skink *Trachylepis punctatissima*, Striped Skaapsteker *Psammophylax tritaeniatus* and Boomslang *Dispholidus typus typus*. Impacts on reptiles are likely to be restricted largely to habitat loss within the development footprint. This is likely to be of local significance only as there are no very rare species or specialised habitats present within the footprint areas.

Figure 34: The Serrated Tent Tortoise *Psammobates oculifer* was observed at the site (Todd, 2018)

8.6.3 Amphibians

The site lies within or near the range of 10 amphibian species, indicating that the site potentially has a moderately diverse frog community for an arid area. There is no natural permanent water or artificial earth dams within the site that would represent suitable breeding habitat for most of these species. The pans which are present at the site would occasionally contain sufficient water for breeding purposes for those species which do not require permanent water. Given the paucity of permanent water at the site, only those species which are relatively independent of water are likely to occur in the area. Species observed in the area include Eastern Olive Toad *Amietophrynus garmani* and Bushveld Rain Frog *Breviceps adspersus*, both of which are likely to occur at the site. There is no standing water on the site that could be used by amphibians for breeding purposes.

The only species of conservation concern which occurs in the wider area is the Giant Bullfrog *Pyxicephalus adspersus*. The site lies at the margin of the known distribution of this species and it has not been recorded from any of the quarter degree squares around the site, suggesting that it is unlikely to occur at the site. Impacts on amphibians are however likely to be low and restricted largely to habitat loss during construction.

8.7 AVIFAUNAL COMPONENT OF THE STUDY SITE

Mr Simon Todd and Mr Eric Herrmann undertook a site assessment of the entire property in order to develop a site sensitivity plan and to determine the baseline avifaunal composition of the site. Please refer to the Avifaunal scoping report attached in **Annexure E2**. The following baseline status of the avifaunal component of the site are summarised from this report.

An approximate total of 156 bird species are known to occur in the study area and surrounds, of which 59 species were recorded on site during the field survey. Six of these species are listed as threatened, one species is considered Near-Threatened, while a further three species (Endangered, Vulnerable and Near-Threatened) may likely occur within the area. Only two species are considered as true near-endemics to South Africa (Taylor *et al*., 2015), while another three are considered as biome-restricted species (Marnewick *et al*., 2015). A literature review indicates that there are no Important Bird Areas (IBAs), Coordinated Avifaunal Roadcounts (CAR) routes, or Coordinated Waterbird Counts (CWAC) wetlands in the vicinity of the study area.

The bird assemblage recorded within the study site is typical of the Kalahari bioregion. Of the 59 species recorded on site, 48 species were detected during walking transects. An average of 18.6 species were recorded per transect, with an average of 77.5 individual birds. Small passerines species made up the majority (37 species, 77%) of the species detected, compared to non-passerines (11 species, 23%). The two near-endemic species reported for the broader study area (Fiscal Flycatcher *Sigelus silens* and Karoo Thrush *Turdus smithi*) were not detected along the transects, although all three biome-restricted species were reported, namely, the Kalahari Scrub-robin *Cercotrichas paena*, Pale-winged Starling *Onychognathus nabouroup* and Burchell's Sandgrouse *Pterocles burchelli.*

The most abundant species was Scaly-feathered Finch *Sporopipes squamifrons*, with a relative abundance of 25.0 birds/km. Other common species which occurred at significantly lower abundances included Black-chested Prinia *Prinia flavicans* (7.7 birds/km), Kalahari Scrub-robin (6.7 birds/km), and Chestnut-vented Warbler *Sylvia subcaeruleum* (6.1 birds/km). These three species were markedly more common than the next most abundant species such as Cape Turtle-dove *Streptopelia capicola*, Namaqua Dove *Oena capensis* and Fawn-coloured Lark *Calendulauda africanoides*. The remaining species all had relative abundances of less than two birds/km.

Some species showed rather clear preferences for parts of the study area. Northern Black Korhaan Afrotis afraoides was found exclusively in the eastern half of the site, which is less dense with fewer woody plant species and a more expansive grass layer. The Red-crested Korhaan Lophotis ruficrista, which prefers more closed woodland, showed the opposite trend, being detected only within the woodier western half of the site. Amongst the passerines, Desert Cisticola Cisticola aridulus, Fawn-coloured Lark Calendulauda africanoides, and White-browed Sparrow-weaver Plocepasser mahali also showed a distinct preference for the less woody eastern half of the site.

Red-listed species are considered fundamental to this study, because of their susceptibility to the various threats posed by solar facilities and associated infrastructures. Only six species that have been recorded in the area are threatened, while one other species is considered Near-Threatened. The most important of these is the Critically Endangered White-backed Vulture Gyps africanus, which has been recorded in the area previously during SABAP2 and hence has a high probability of occurring again. Two Red-listed species were recorded during the field survey, a pair of Verreaux's Eagle Aquila verreauxii (Vulnerable) and a single Lanner Falcon Falco biarmicus (Vulnerable). Both species were considered to have a high likelihood of occurring in the area. Another species of concern that may have a high probability of occurring in the study area is the Martial Eagle Polemaetus bellicosus (Endangered). The local populations of these species are, however, mostly of moderate importance, as the study site and surrounds most likely serve as only part of the foraging range of occasional individuals passing through.

An additional three species which have not yet been recorded in the area, but have a moderate probability of occurring, are also considered. These include the Tawny Eagle Aquila rapax (Endangered), Secretarybird Sagittarius serpentarius (Vulnerable) and the European Roller Coracias garrulus (Near-Threatened). The Kori Bustard Ardeotis kori (Near-threatened) was recorded during SABAP1 and therefore has a moderate probability of occurring again, especially considering that the species favours open savanna as characterised by the study area.

Other red-listed species which may occur with negligible frequency and therefore are of less concern include the Vulnerable Black Stork Ciconia nigra and Burchell's Courser Cursorius rufus. The lack of suitable microhabitats such as water bodies and shrubland plains, respectively, will in all likelihood exclude these species from the site.

Table 5: Red-listed species recorded in the study area during SABAP1 (1987-1991), SABAP2 (2007 on-going) and the site visit (28 to 30 April 2018), ranked according to their red-list status. Seven species have been recorded during the bird atlasing periods, while three have not yet been recorded but may likely occur (Tawny Eagle, Secretarybird and European Roller). Only two species were

observed during the site visit (marked in bold). None of these species are listed as regional endemics or near-endemics.

English name	Taxonomic name	Red-list status	Estimated importance of local population	Preferred habitat	Probability of occurrence	Threats
Vulture, White-backed	*Gyps africanus*	Critically Endangered	Low	Savanna	High	Habitat loss/Disturbance Collisions/Electrocution
Eagle, Martial	*Polemaetus bellicosus*	Endangered	Moderate	Savanna & shrublands	High	Habitat loss/Disturbance Collisions/Electrocution
Eagle, Tawny	*Aquila rapax*	Endangered	Low	Savanna & Karoo plains	Moderate	Habitat loss/Disturbance Collisions/Electrocution
Courser, Burchell's	*Cursorius rufus*	Vulnerable	Low	Shrubland plains	Low	Habitat loss/Disturbance
Eagle, Verreaux's	***Aquila verreauxii***	**Vulnerable**	**Moderate**	**Mountainous and rocky areas**	**Recorded**	**Habitat loss/Disturbance** **Collisions/Electrocution**
Falcon, Lanner	***Falco biarmicus***	**Vulnerable**	**Moderate**	**Widespread**	**Recorded**	**Habitat loss/Disturbance** **Collisions/Electrocution**
Secretarybird	*Sagittarius serpentarius*	Vulnerable	Low	Open savanna & grassland	Moderate	Habitat loss/Disturbance Collisions
Stork, Black	*Ciconia nigra*	Vulnerable	Low	Water bodies	Low	Collisions
Bustard, Kori	*Ardeotis kori*	Near-threatened	Moderate	Open savanna	Moderate	Habitat loss/Disturbance Collisions
Roller, European	*Coracias garrulus*	Near-Threatened	Low	Open savanna	Moderate	Habitat loss/Disturbance

During the walking transects regular scans were made to detect any large flying birds to establish the presence of flight paths across the study site. Aside from the pair of Verreaux's Eagle seen soaring over the area at a height of approximately 150 to 200m, only Gabar Goshawk Melierax gabar was seen flying within the study area on one occasion. The Lanner Falcon was seen perched on the large

power line on the southern boundary of the site, possibly using the pylons as vantage points during hunting forays. This power line was also observed from the study area at various times during the day on three consecutive days to determine whether it is used by large raptors and vultures. No other red-listed species or any other large birds where seen using the pylon structures for roosting or hunting during the period of the site visit, although this does not exclude the possibility that birds may use these structures at other times of the year. No nest or communal nesting sites of red-listed species were found in the study area during the site visit, which could be due to the absence of suitably large trees in the area. These observations seem to suggest that red-listed or large communal species are not currently using the study area or parts thereof for roosting or nesting.

In essence, much of the avifauna within the study area appears similar to that found across the Kalahari bioregion of the Northern Cape. The apparent lack of red-listed species in the area could be attributed to their naturally low densities and large ranges (eagles and Secretarybird), the absence of suitable habitat (Black Stork and Burchell's Courser) and nesting/roosting trees (White-backed Vulture). However, certain species may use the study area on occasion as part of their large ranges, such as Martial Eagle and Kori Bustard, as well as the unreported Tawny Eagle and Secretarybird. However, since the study area appears not to directly support large and healthy populations of red-listed species, the sensitivity of the study area in general can be considered to be of medium significance with respect to avifauna.

9 SPECIALIST SCOPING STUDIES

This section provides an overview to the specialist studies that were commissioned as part of this scoping exercise. Please Refer to annexures E1 – E9 for copies of the full studies.

9.1 AGRICULTURAL POTENTIAL OF THE STUDY SITE

ADDITIONAL ACTIONS REQUIRED

A Detailed Agricultural Impact Assessment must be undertaken to assess the significance of the impacts identified in this scoping level study.

Mr Christo Lubbe, an agricultural specialist, undertook an agricultural potential study of the proposed Hotazel Solar from which the following is drawn. A full copy of the agricultural potential study is attached in **Annexure E3** of this report.

The objectives of Mr Lubbe's study were to consider the possibility of temporary and permanent impacts including cumulative impact of multiple facilities on agricultural production that may result from the construction and operation of the PV solar facility.

Geology and climate dictates the soil characteristics to be found in this location, which is a sandy textured soil with low cohesive structure .The soil will have a high base status due to low leaching that took place.

The soil and climate combination restricts cash crop production, due to low water retention, excessive drainage, low nutrient absorption with high fertilizer requirements and high susceptibility to wind erosion.

The arid conditions restrict choice of crops to be planted. Due to the limiting conditions set out above, the site is classified as Class VI capability, in terms of which it is unsuited for cultivation and restricts utilisation to grazing, woodland or wildlife.

The concentration of mines in the area increases the need for infrastructure to support the mining activities. These include urbanisation, railways, roads and electricity provision. These all impact on agricultural land.

Potential impacts of the PV development on the agricultural environment have been identified as:

9.1.1 Loss of agricultural land

The total size of the farm is 636 ha. With a carrying capacity of 13 ha /LSU 48 large stock units are the maximum animals allowed for sustained grazing on the farm. The proposed PV facility will have a footprint of 275 ha which means a loss of 21 large stock units. The current manageable area is down sized to 509 ha due to separation by the road and railway line. This allows only 39 LSU to graze which is not an economical unit on its own.

9.1.2 Erosion and change of drainage patterns

With the construction, the removal of vegetation makes the area vulnerable to wind erosion. Mitigating measures should be put in place to control possible erosion. Change of drainage patterns should be addressed although the flat slope and high infiltration rate ensure a low risk for it to happen.

9.1.3 Pollution

During construction of all the components may impact on the soil due to possible spillages of concrete and fuel. These three aspects will form the baseline of investigation during the impact assessment.

It may further contribute towards the cumulative effect of the increasing number of renewable energy facilities on the regional agricultural community.

9.2 ECOLOGICAL SENSITIVITY OF THE STUDY SITE

ADDITIONAL ACTIONS REQUIRED

A Detailed Ecology Impact Assessment must be undertaken to assess the significance of the impacts identified in this scoping level study.

Mr. Simon Todd, of 3 Foxes Biodiversity Solutions, conducted an Ecological Sensitivity Analysis of the entire property (see **Annexure E1** for full report), from which the following is drawn[8].

The sensitivity map for the Hotazel study area is illustrated above. There is not a lot of variation in sensitivity across the site, with the main driver of differences being the density of protected tree such as *Acacia erioloba* and *Acacia haematoxylon*. The majority of the site is considered medium low sensitivity and apart from the protected trees has a low abundance of other species of features of conservation concern. The west of the site as well as a small area in the eastern corner of the site are considered medium high sensitivity on account of the high tree density in these areas. No no-go or very high sensitivity areas were observed at the site and while it is considered broadly suitable for development, the potential impact on protected tree species is a concern. While it is pertinent to consider the number of individuals of protected trees impacted, the ultimate concern should be around the extent of habitat loss resulting from the development within habitats and vegetation types which support these species. When considered in this light, the 275ha of habitat loss is not considered to represent a large amount of habitat loss for *Acacia erioloba* and *Acacia haematoxylon* which are widely distributed. In terms of the two alternatives, these are not considered significantly different from an ecological perspective and either is considered acceptable.

[8] Much of the information in this section is also included in the section on site selection, but is reiterated here for context.

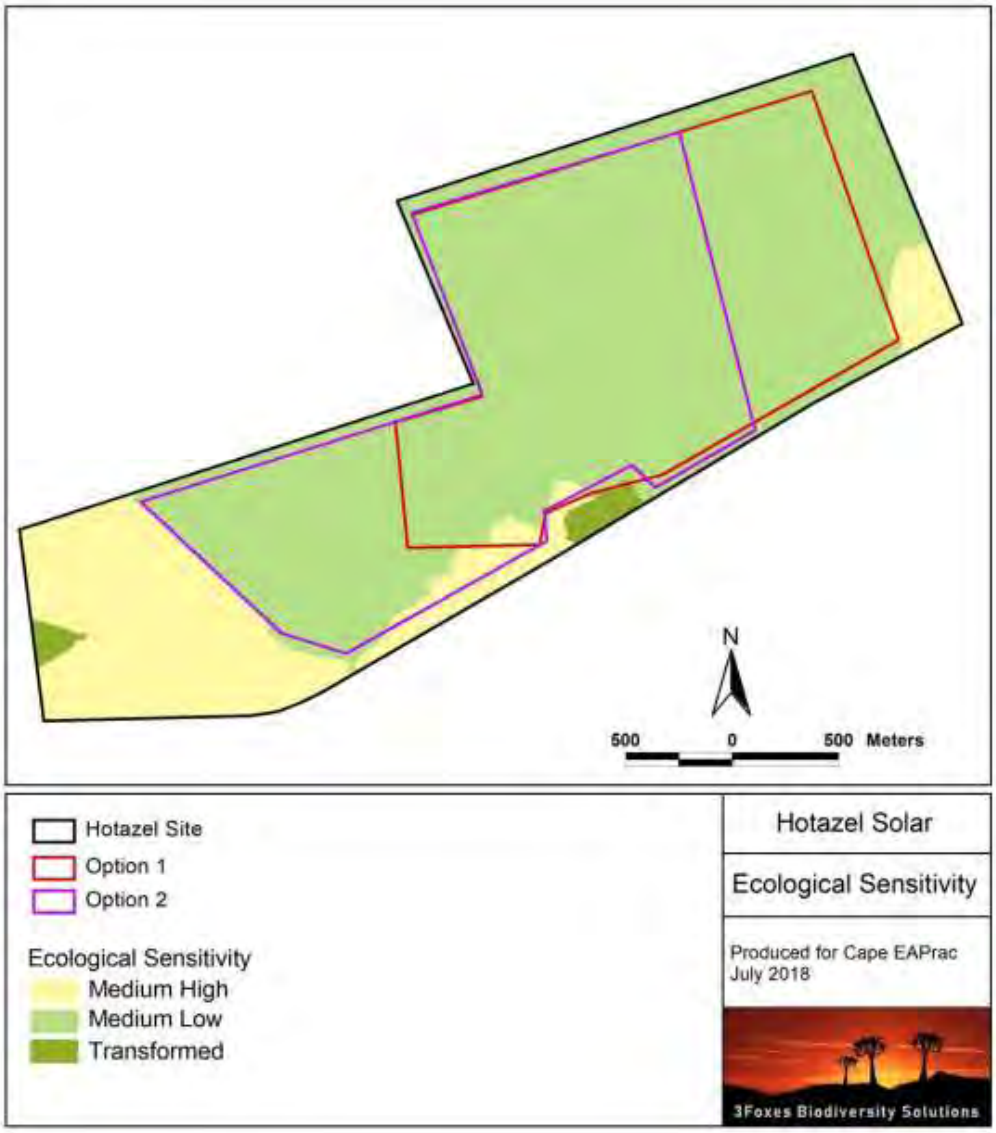

Figure 35: Sensitivity map for the Hotazel Solar project, showing the two alternative footprints (Todd, 2018)

9.3 AVIFAUNAL SENSITIVITY OF THE STUDY SITE.

ADDITIONAL ACTIONS REQUIRED

A Detailed Avifaunal Impact Assessment must be undertaken to assess the significance of the impacts identified in this scoping level study.

Mr Simon Todd and Mr Eric Herrmann undertook a site assessment of the entire property in order to develop a site sensitivity plan and to determine the baseline avifaunal composition of the site. Please refer to the Avifaunal scoping report attached in **Annexure E2**. The following relating to the Avian Sensitivity of the Study site is summarised from this report.

Important avian microhabitats in the study area play an integral role within the landscape, providing nesting, foraging and reproductive benefits to the local avifauna. In order to ensure that the development does not have a long term negative impact on the local avifauna, it is important to

delineate these avian microhabitats within the study area. To this end an avian sensitivity was generated by integrating avian microhabitats present on the site and avifaunal information collected during the site visit.

The site itself is considered to be of Medium sensitivity as it represents habitat hosting typical avifauna of the Kalahari bioregion. There are however extensive areas of low and very low sensitivity areas in the surrounding area represented by mining footprint areas, the town of Hotazel and the various access and railway roads which characterise the area. These additional disturbance and transformation footprints serve to reduce the overall sensitivity and significance of the area for avifauna. The development of a solar energy facility on a restricted portion of the study area would generate low impacts on the resident avifauna, provided that suitable mitigation measures are employed during construction and operation of the proposed facility. While the development would result in some habitat loss for avifauna of local significance, it will not necessarily impact negatively on red-listed avifaunal species, which appear to occur sparsely within the local area, probably as a result of all the disturbance the area experiences.

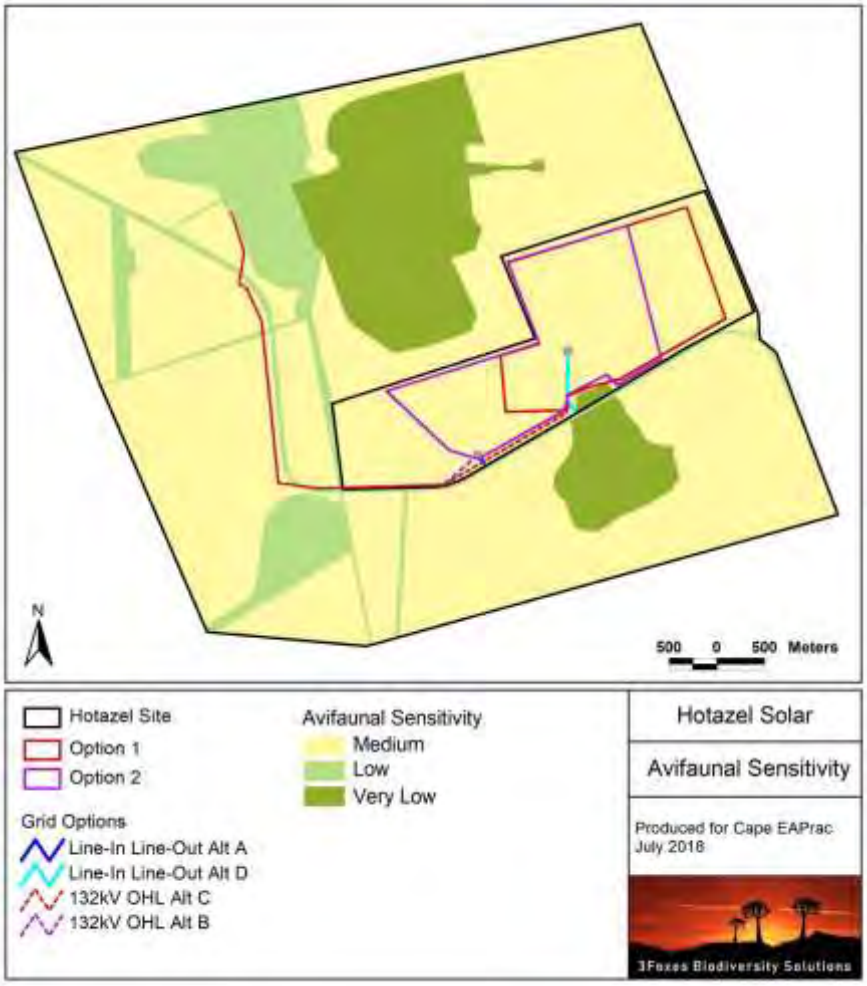

Figure 36: Sensitivity map for the Hotazel Solar project site and surrounding area, showing the two alternatives and the grid connection to the Hotazel substation to the north west of the site.

9.4 FRESHWATER CONTEXT

ADDITIONAL ACTIONS REQUIRED
No further assessment of freshwater resources is required.

Scherman Colloty and Associates (SC&A) were appointed to assess the potential impact of the Hotazel Solar PV project on the aquatic environment. A copy of their findings are included in Annexure E7.

The specialist reviewed the available biodiversity assessments, project information, and has conducted assessments within the region in the recent past (July 2014- October 2017).

It was determined that the site and associated infrastructure, regardless of the alternatives or options, would not have any direct impact on local or regional aquatic waterbodies. This included, rivers, springs, depressions and floodplain wetlands.

It is however recommended that best practice principles are still applied with regard to the prevention of any erosion and sedimentation through the provision of adequate stormwater management, as well as that the proponent must make allowance for water conservation principles to reduce the water demand of the project (i.e. rain water harvesting as intended).

9.5 VISUAL CONTEXT

ADDITIONAL ACTIONS REQUIRED

The VIA baseline found that visual intrusion of the proposed PV project is unlikely to result in a significant loss of visual resources, and as such the proposed project should proceed to the EIA phase.

A Detailed Visual Impact Assessment must therefore be undertaken to assess the significance of the impacts identified in this scoping level study.

The impact assessment findings of the botanical specialist will need to be considered in the final VIA.

Mr Stephen Stead of Visual Resource Management Africa undertook a visual study of the proposed development from which the following is drawn. Please refer to **Annexure E9** for a full copy of this specialist report.

9.5.1 Project Visibility

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 was undertaken from the proposed, 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).

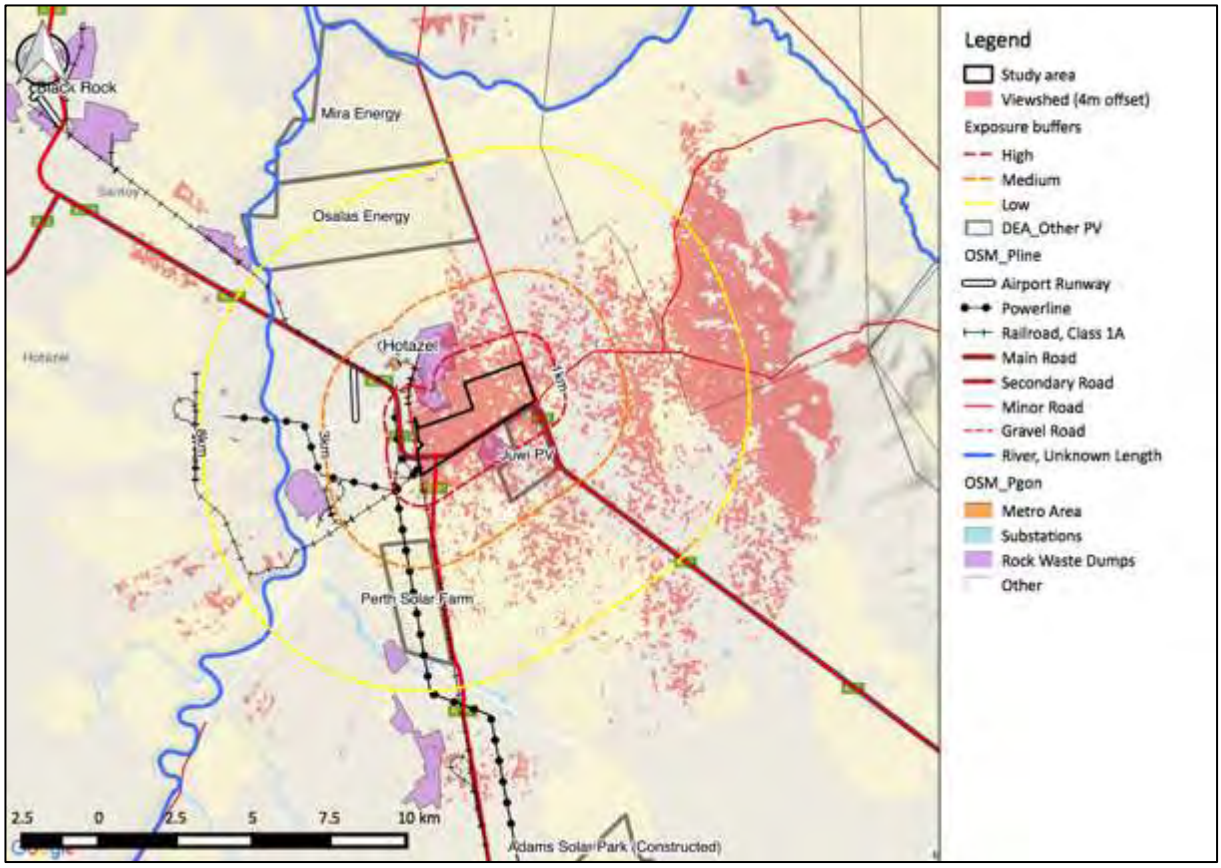

Figure 37: Approximate visibility map generated from a 4m Offset.

A viewshed analysis was undertaken for the site making use of ASTER 90m Digital Elevation Model data. It is important to note that the terrain model ***excludes vegetation and structural screening***. The Offset value was set at 4m above ground to represent the approximate height of the proposed PV panels.

As indicated in the figure above, within the high exposure 2km buffer area visible incidence is most likely as a result of the mainly flat terrain of the study area and immediate surrounds. Due to the medium sized Bushveld vegetation that is found in the area, it is likely that a 4m high structure would be partially visible to the surrounding receptors.

Within the medium to low distance zone, visibility is mainly to the east, with some fragmented views possible from higher ground to the west. Located in this eastern area are the northern extents of the Kuruman Hills. Located 10km to the east, views from this elevated location would be subjected to atmospheric influences reducing clarity of view. This area is also remote and has very few receptors.

Although the nature of the surrounding terrain is mainly flat, the Visual Extent is ***unlikely to extend beyond the foreground / middle-ground***. The contained visibility is mainly due to the Bushveld vegetation and the old Hotazel waste rock dump located to the northwest of the site, and as such the Zone of Visual Influence of a 4m PV type landscape modification is likely to be ***Local*** in influence.

The High Exposure areas (2km) receptors include the R31 Road for the proposed PV site. The small town of Hotazel is located within the Medium to High distance zone but is topographically screened by the waste rock dump located between the village and the site. Due to the close proximity of the R31 which is routed adjacent to the proposed project areas, the Visual Exposure to the R3 is rated ***High.***

9.5.2 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). This section of the VIA identified the main landscape features in the areas surrounding the proposed project that define the surrounding landscape character.

The following landscape dominates the character of the region:

- Mining and associated infrastructure;
- Renewable energy (proposed); and
- Other rural landuse.

9.5.2.1 Mining and associated infrastructure

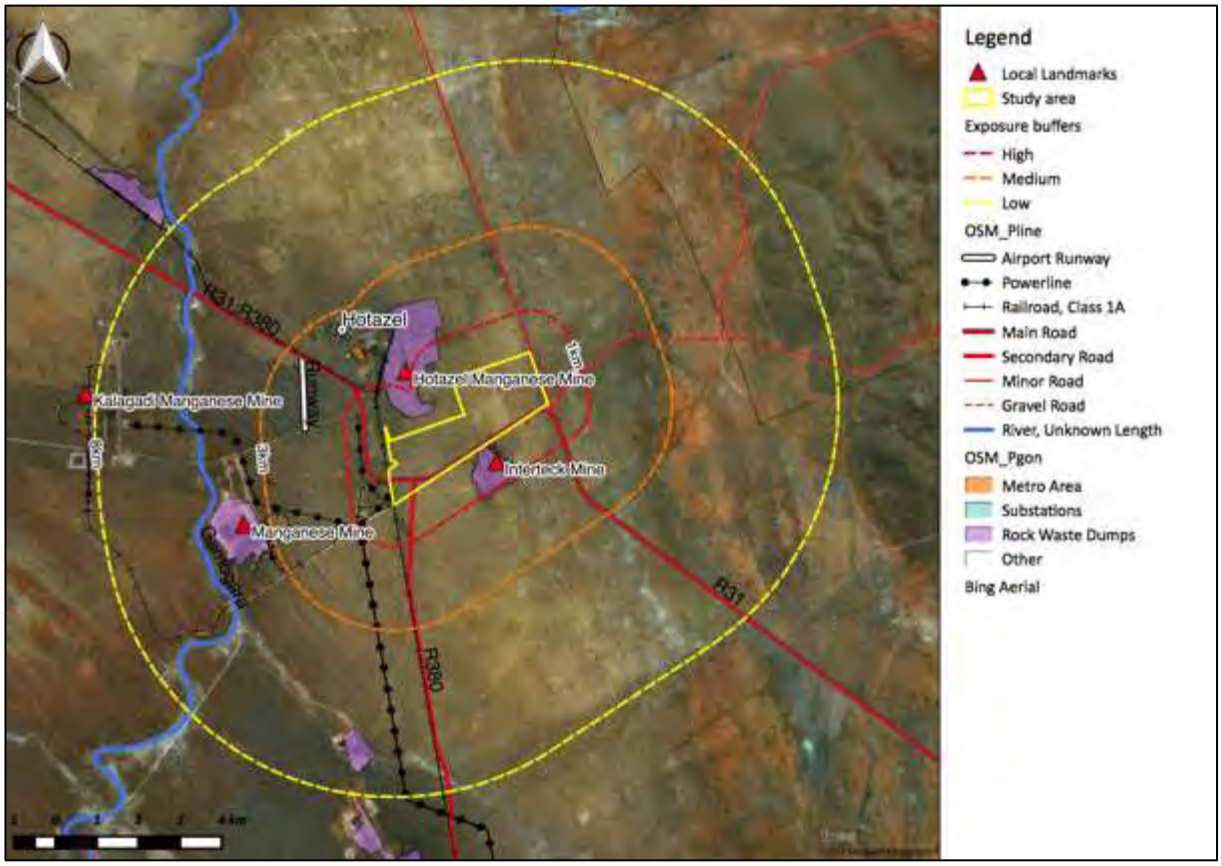

Figure 38: Key Landmarks and Infrastructure Map

A key factor influencing the regional landscape character is infrastructure that has been developed for the extraction of Manganese. As indicated by the purple areas in Figure 38 above, five large waste rock dumps are located within the vicinity of the proposed project associated with large Manganese Mines that require large structures and infrastructure. Also influencing the regional landscape is the associated electrical power and railway infrastructure required by the mines. These include two Eskom Substations (Hotazel and Umtu), multiple railway lines and multiple power lines. The Intertek Mine is an open pit type mine that is located directly west of the proposed PV study area. The mine is currently not operational. Located to the west of the power line study area is the Kalagadi Manganese Mine. As depicted in the photographs below, the mining structures and associated waste rock dumps are large in size and clearly dominate the attention of the casual observer. Due to the lower rainfalls of the area, rehabilitation of old rock dumps is limited and the dumps in the area do degrade the local landscape character.

The combination of the surrounding mining landscapes, which include large structures and waste rock dumps, in conjunction with the overhead railway structures and power lines, results in some

degradation of the general landscape. This is especially experienced when the mines and infrastructures are viewed in close proximity, a strong level of visual contrast results. Due to the close proximity of the study area to the Intertek Mine site, as well as large power line infrastructure, the value of the site visual resources are reduced.

Figure 39: Photograph of the Kalagadi Manganese Mine as seen from the mine access road.

Figure 40: Photograph from the R31 south towards the Intertek Mine that is located adjacent to the south of the proposed site.

Figure 41: Photograph of the strong levels of contrast created by the combined railway line and power line infrastructure as seen from the proposed Umtu Power Line Routing.

9.5.2.2 Other Renewable Projects

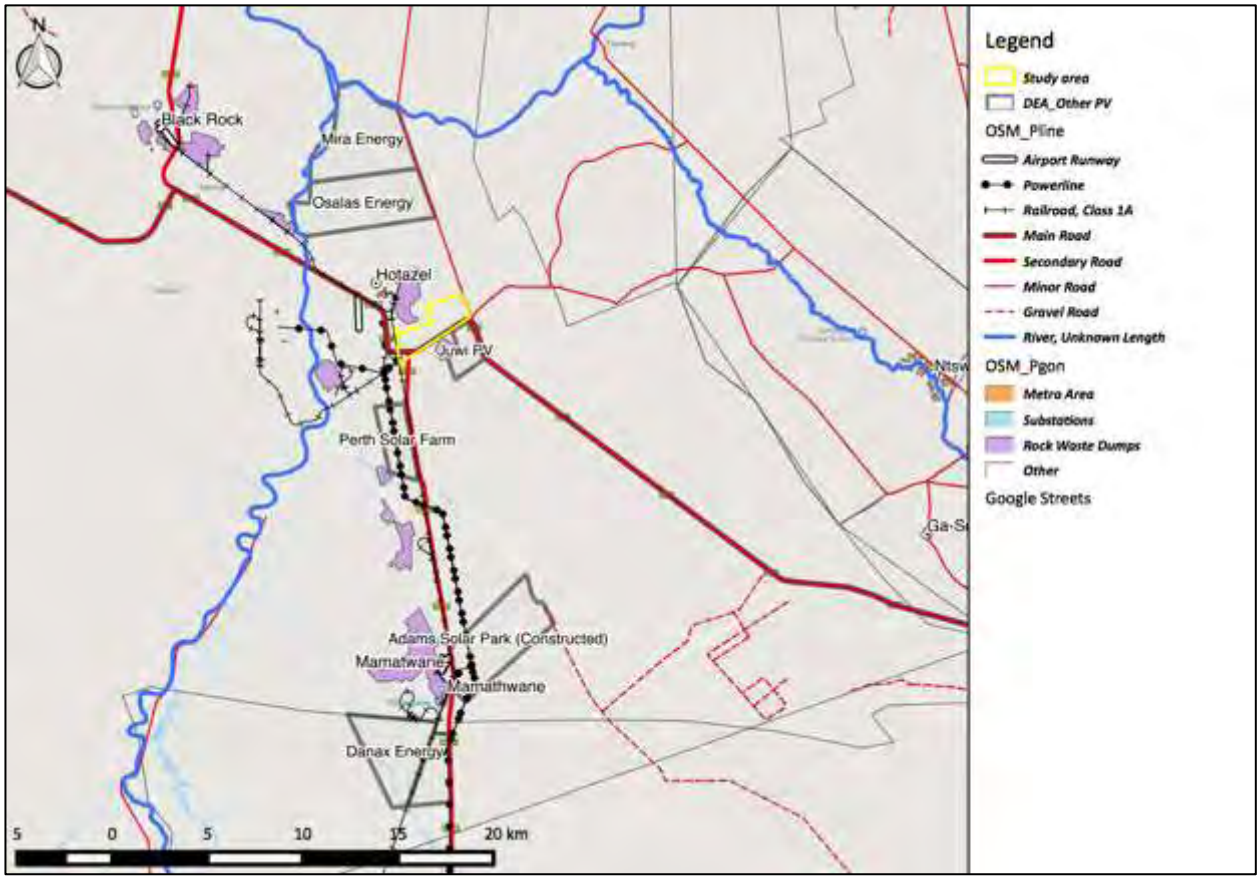

Figure 42: Map depicting the Renewable Energy mapping in relation to the approximate development area of the project.

A spatial query on the DEA Renewable Energy mapping found that there are six other projects proposed within 30 km. The two nearest developments are the Juwi PV, which is located directly to

the south, and Perth Solar Farm located approximately 4 km southwest of the study area. Of the six proposed projects, Adams Solar Park appears to be the only project that has been constructed. In terms of understanding cumulative effects, intervisibility of multiple PV projects has the potential to create a massing effect that is likely to dominate the attention of the casual observer. However, due to the surrounding bushveld vegetation that tends to localise the landscapes, cumulative negative effects from intervisibility degrading the regional landscape character is likely to be limited. As can be seen in the overlap incidence in the viewshed map in Figure 37, the close proximity of the proposed PV project to the Juwi site is likely to result in intervisibility between the two projects once constructed. Opportunities of retaining the existing bushveld trees along the R31 road could reduce this visual effect.

9.5.2.3 Other Rural Landuse

Other land use identified in the area includes limited residential / commercial landuse, and widespread cattle farming. The town of Hotazel was developed to house the workers of the adjacent Hotazel mining area and is located approximately four kilometres to the northwest of the PV study area. The town is small in size and does include some limited commerce. Views from the Hotazel residents towards the proposed study area are limited by the Bushveld vegetation, and by the location of the Hotazel Mine Waste Rock dumps between the town and the PV study site.

The Bushveld vegetation is well suited to cattle based agriculture. Due to the limited carrying capacity of the vegetation, farms are large in size and the farm dwellings are limited. Due to the Bushveld vegetation, views from the associated rural farmstead dwellings were limited. Also located in the area are game farms, which could offer some tourism potential. Other than possible game farming, no evidence of tourism activities were identified in the area.

Figure 43: Photograph of an isolated farmhouse as seen from the R31 which is located on the proposed property.

9.5.3 Site Landscape Character

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. The scenic quality is determined making use of the VRM scenic quality questionnaire (refer to addendum). In order to better understand the visual resources of the site, regional vegetation and terrain influences are described at a broad-brush level.

9.5.3.1 Vegetation

According to the South African National Biodiversity Institute (SANBI, 2012) Vegetation Map of South Africa, Lesotho and Swaziland, the vegetation biome, within which the study area is located, is defined as the Savanna Biome. Two main vegetation types were listed as intersecting with the study area: Gordonia Duneveld to the west, and Kathu Bushveld to the east (SANBI, 2012).

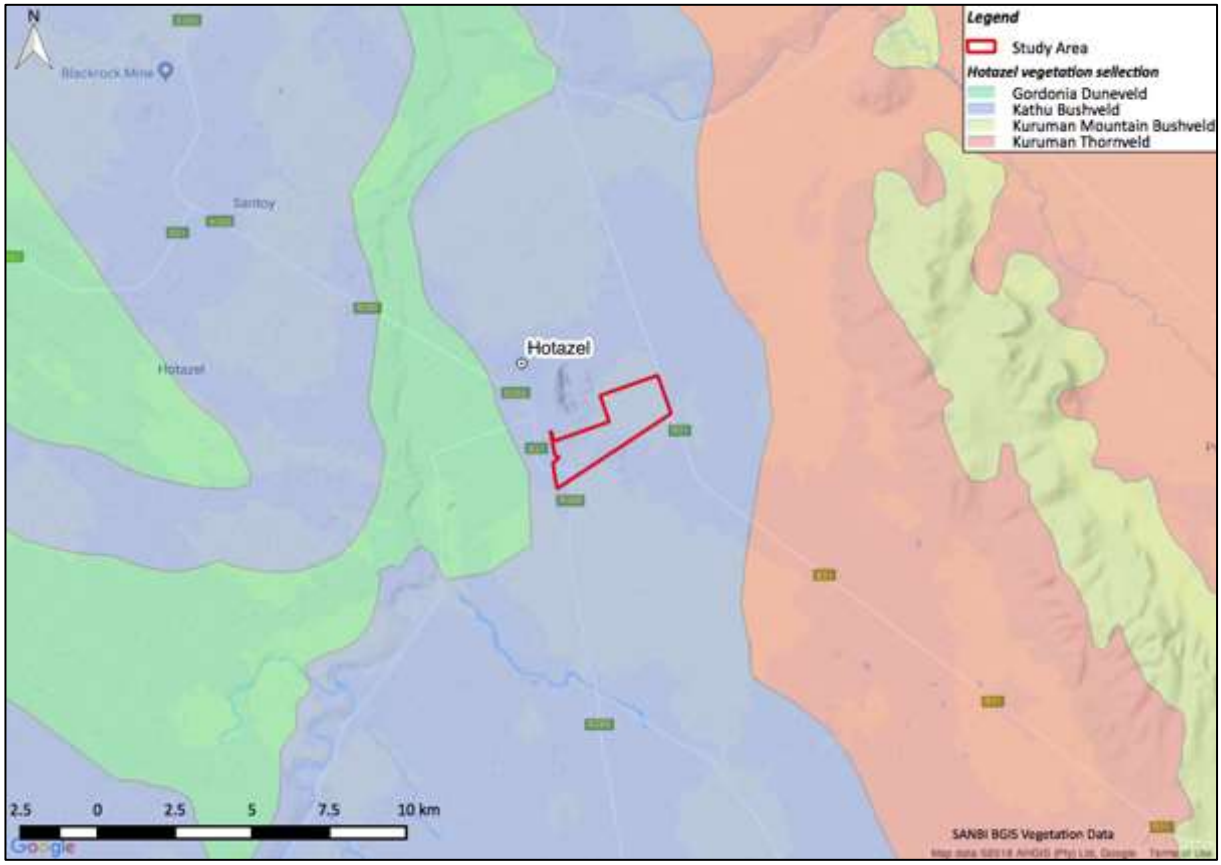

Figure 44: SANBI Vegetation Type Map (South African National Biodiversity Institute, 2012)

According to the SANBI website, "the Savanna Biome is the largest Biome in southern Africa, occupying 46% of its area, and over one-third of the area of South Africa. It is well developed over the Lowveld and Kalahari region of South Africa and is also the dominant vegetation in Botswana, Namibia and Zimbabwe". The advantage of this Biome is that it is characterized by "a grassy ground layer and a distinct upper layer of woody plants" which can assist in visual screening. The lack of rain tends to prevent the upper vegetation layer from dominating, which coupled with fires and grazing, keeps the grass layer dominant. "The shrub-tree layer may vary from 1 to 20m in height, but in Bushveld typically varies from 3 to 7m. The shrub-tree element may come to dominate the vegetation in areas which are being overgrazed" (SANBI, 2012). In the vicinity of the study area, medium height Bushveld vegetation was identified which, in relation to the flatter terrain, could assist in reducing the zone of visual influence.

Preliminary research by Simon Todd indicated that Acacia haematoxylon and Acacia erioloba are located on site with "the average density of Acacia haematoxylon is 25 trees/ha but up to 50 or more in some areas in the west especially. As these are protected trees. Preliminary visual recommendations are that the layout alternative that is less densly populated with these trees would be preferred. As there appears to be less tree vegetation on the eastern section of the site, it is likely that the eastern section would be the preferred visual location.

9.5.3.2 Site Photographs and Descriptions

In order to convey the landscape character of the proposed PV site, photographs that characterise the site landscape sense of place were taken as mapped in **Figure 45** below.

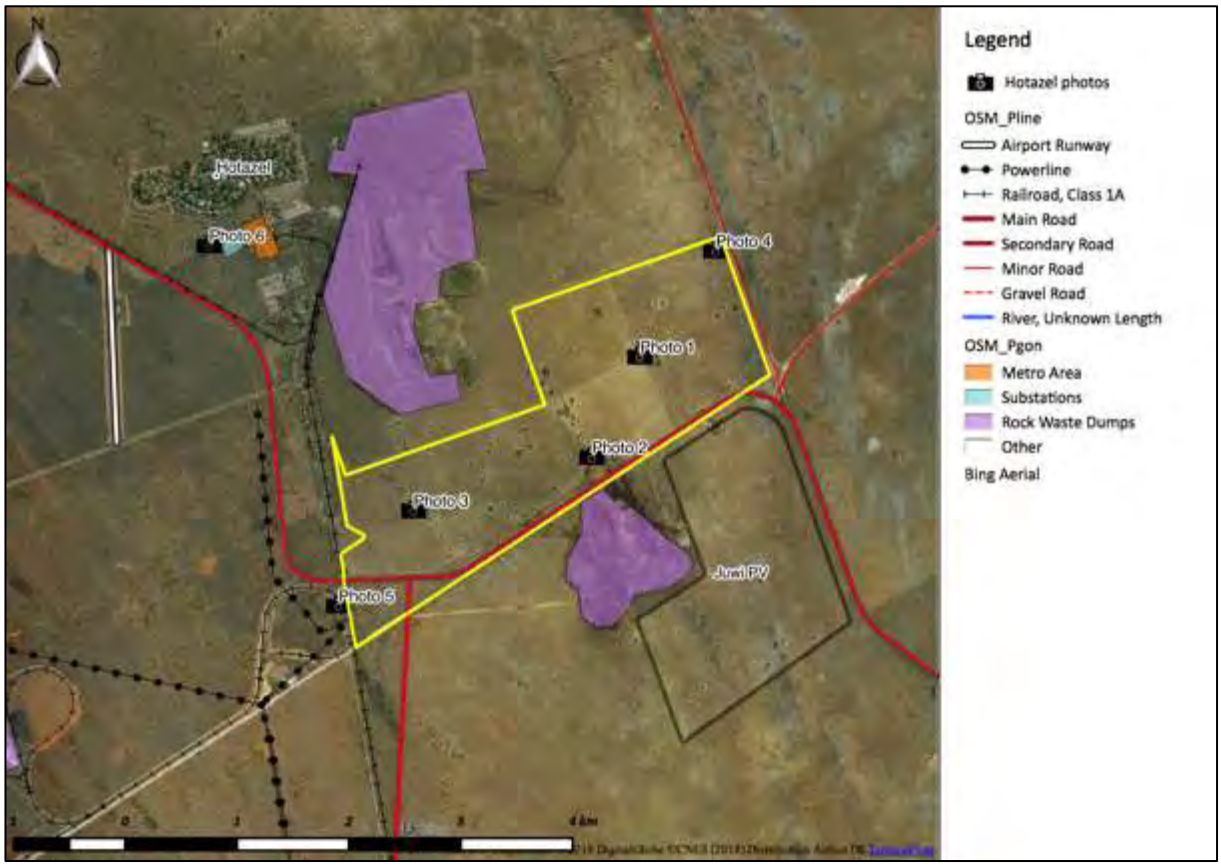

Figure 45: Proposed site photograph locality map.

Figure 46: View north from **Photo 1** of the grasslands and scattered bushveld trees with the old Hotazel Mine Waste Rock Dumps visible in the background.

Figure 47: View north from **Photo 2** of farm roads and more dense Kathu Bushveld trees.

Figure 48: View north from **Photo 3** of the higher bushveld vegetation.

Figure 49: View west from **Photo 4** of a similar bushveld vegetation.

Figure 50: View north from **Photo 5** of the existing power line and railway line infrastructure along which the proposed power line would be routed.

Figure 51: View west from **Photo 6** of the existing Hotazel Substation to which the proposed power line would be routed.

9.5.3.3 Scenic Quality and Receptor Sensitivity Ratings

The single landscape type defined as Rural Kathu Bushveld, was subjected to an analysis of its intrinsic value as a visual resource by quantifying Scenic Quality and Receptor Sensitivity to landscape change of the property.

The ***Scenic Quality*** scores are totalled and assigned an A (High scenic quality), B (Moderate scenic quality) or C (Low scenic quality) category based on the following split: *A= scenic quality rating of ≥19; B = rating of 12 – 18, C= rating of ≤11* (USDI., 2004). If applicable, the Cultural Modification can be assigned a negative value if the landscape is significantly degraded by human-made modifications. ***Receptor Sensitivity*** levels are a measure of public concern for scenic quality. Receptor sensitivity to landscape change is determined by rating the key factors relating to the perception of landscape change in terms of Low to High.

Table 6: Scenic Quality Rating Table

Aspect	Rating	Motivation
Landform	1	Generally flat terrain that has few or no interesting landscape features.
Vegetation	2	Some variety of vegetation, but only one or two major types.
Water	0	No presence of water was apparent on the site
Colour	2	Subtle colour variation created by the grey-green vegetation and the browns of the veld grasses.
Scarcity	2	Interesting within its setting but fairly common within the region.
Adjacent scenery	1	The dominance of the adjacent power lines, as well as the clear views of Intertek Mine and Hotazel Mine waste rock dumps located to south and west, reduce the scenic value of the adjacent scenery.
Cultural Modif.	2	Cultural modifications on site are limited to farm tracks and a single disused structure, which maintains the existing rural agricultural sense of place.

Table 7: Receptor Sensitivity Rating Table

Aspect	Rating	Motivation
Type user	Low	Due to the close proximity of the proposed site to the adjacent mines where waste rock dumps are visible, the local farming community are unlikely to be sensitive to landscape change.
Amount use	Medium	The site is located adjacent to the R31 District Road, but due to the remote locality of the site, traffic is limited and the site is partially screened due to the bushveld vegetation.
Public interest	Low	Given the strong mining landscape context of the site and the domination of mining within the local economy, it is likely that public interest in maintaining visual quality is low.
Adjacent land users	Low	Adjacent users are limited to mining activities are isolated farmers and are likely to have a low sensitivity to landscape change due to the mining activities located in close proximity to the site.
Special zoning	Medium	The property is currently zoned rural agricultural which restricts development to agricultural purposes. Acacia vegetation on the site is also protected.

9.5.3.4 Site Visual Resources

The BLM methodology defines 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

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. The Visual Inventory Classes are defined using the matrix below and with motivation, can be adjusted to Visual Resource Management Classes which take zoning and regional planning into consideration if applicable.

Table 8: Scenic Quality and Receptor Sensitivity Summary Table

Visual Resources	Scenic Quality									Receptor Sensitivity						VRM	
	A= scenic quality rating of ≥19; B = rating of 12 – 18, C= rating of ≤11									H = High; M = Medium; L = Low							
NAME	Landform	Vegetation	Water	Colour	Scarcity	Adjacent Landscape	Cultural Modifications	Sum	Rating	Type of Users	Amount of Use	Public Interest	Adjacent Land Uses	Special Areas	Rating	Visual Inventory Class	Visual Resource Management Class
Kathu Bushveld	1	2	0	2	2	1	2	11	**C**	L	M	L	L	M	**M**	**IV**	**III**

9.5.4 Scoping Level Findings

The specialist concluded the following as part of the scoping level study.

9.5.4.1 Landscape Context

The topography of the greater area surrounding the study area is relatively flat with the exception of the low hill range to the east. The main drainage of the greater region is to the north via the Gamogara River (approx. 7km west), which is a tributary of the larger Kuruman River located approximately 10km to the north. The only natural topographic feature within the greater area is the Kuruman Hills that are located approximately 15km to the southeast of the study site and rise approximately 100m above the generated terrain. Due to the distance between the site and the hill feature, landscape change on the site is thus highly unlikely to influence the Kuruman Hills sense of place.

A key factor also influencing the landscape character of the site is the close proximity to mining landscapes. These include four large Manganese Mines which require large structures and generate large waste rock dumps. Also influencing the regional landscape is the associated electrical power and railway infrastructure required by the mines. These include two Eskom Substations (Hotazel and Umtu), multiple railway lines and multiple power lines. A new 132kV Eskom power line is currently under construction on the property routed adjacent to the R31 road. The combination of the surrounding mining landscapes, which include large structures and waste rock dumps, in conjunction with the overhead railway structures and power lines, results in some degradation of the general landscape and increased the Visual Absorption Capacity of the landscape.

9.5.4.2 Project Visibility and Exposure

The Zone of Visual Influence of a 6m PV type landscape modification is likely to be ***Local*** in influence. The Visual Exposure to the proposed project is rated as ***High***.

9.5.4.3 Site Scenic Quality

The overall scenic quality of the site is rated as ***Medium to Low.*** .

9.5.4.4 Receptor Sensitivity

The overall Receptor Sensitivity to the site is the R31 located adjacent to the site, and receptor sensitivity is thus rated as ***Medium to Low.***

9.6 HERITAGE CONTEXT

ADDITIONAL ACTIONS REQUIRED

A Detailed Archaeology Impact Assessment (inclusive of a comprehensive foot survey) must be undertaken to assess the significance of the impacts identified in the scoping level study. No further assessment of impact on Palaeontology required, however, the recommendations of the palaeontology specialist must be incorporated into the EMPRr. An application in terms of section 38 of the HIA and supported by a detailed integrated heritage assessment, must be submitted to SAHRA via their SAHRIS portal.

Mr Stefan de Kock of Perception heritage consultants has been appointed to undertake an integrated heritage assessment (Annexure E6) of the proposed Hotazel Solar. The integrated specialist study will encompass 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)
- **Archaeology** – Dr Peter Nilssen
- **Palaeontology** – Dr John Almond (Natura viva)

The integrated heritage study will be provided to the competent heritage authority, SAHRA, to inform their decision making process in terms of the National Heritage Resources Act

9.6.1 Archaeological Heritage

The following section has been summarised from the Archaeological Scoping Study produced by Dr Peter Nilssen.

9.6.1.1 Terms of Reference for Desktop & Literature Review

The purpose of a desktop study and literature review is to gain an understanding of the archaeological and heritage background of the immediate surroundings and to establish the nature and type of archaeological remains that occur in the affected area, as well as the type of limitations and constraints encountered by specialists working in the area.

This author has work experience in the Northern Cape and is familiar with the main types of heritage resources and issues (e.g., Nilssen 2015a, 2015b, 2015c, 2016a, 2016b and 2016c). A desktop study and literature review was undertaken, which relied in part on this author's experience in the area and also focused on the SAHRIS database up to June 2018, which is by no means exhaustive (Figures 6 & 7). Previous heritage and archaeological studies in the immediate surroundings have already provided detailed descriptions of the history, heritage and archaeological record of the area (see for example and references in Beaumont & Morris 1990, De Jong & Van Schalkwyk 2010, Fourie 2015a, Fourie & van der Walt 2007a, Humphreys & Thackeray 1983, Hutten & Hutten 2013, Kruger 2015, 2016a, Küsel, U. *et al* 2009 and Webley & Halkett 2008). While giving a broad overview of the archaeological record presented in the above-named reports as well as those listed in the reference section below, the focus is on presenting key heritage concerns already identified in earlier studies and how they relate to the assessment being conducted here.

The desktop study also involved a detailed inspection of aerial imagery available through Google Earth. The main aim of examining aerial imagery was to determine which development activities encroached upon previously undisturbed and hence potentially sensitive areas, and to locate man-made structures or ruins for potential future investigation in the event that they were threatened by proposed development activities. Existing disturbances and developments were also located via aerial imagery and can be inspected on foot where necessary.

9.6.1.2 Terms of Reference for Archaeological Foot Survey

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 and management measures where necessary.

To assess the nature and significance of the archaeological record in the affected area, it is necessary to conduct a comprehensive foot survey. The latter will focus specifically on the preferred Hotazel Solar development footprint, associated infrastructure and access roads, as well as the various grid connection options linking the solar facility to the Hotazel Substation

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 is 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 excellent archaeological visibility and allow for a good understanding of the archaeological record in the area (Beaumont 2008, Orton 2016b, 2017). Due to good archaeological visibility, and based on the very sparse and low significance of archaeological occurrences identified during foot surveys on adjacent and nearby properties, survey walk tracks will be spaced initially between about 100 and 200m apart, but will be spaced more closely in the event that archaeological resources are more abundant than anticipated. 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 and digital audio notes of observations and a comprehensive, high quality digital photographic record will 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 development on such resources and to make recommendations in mitigation. Below is the grading system and recommended mitigation provided by SAHRA (2007). Note that heritage practitioners provide field ratings while the heritage authorities are responsible for grading heritage resources.

Table 9: Archaeological grading system to be used in Impact Assessment Phase.

Site Significance	Field Rating	Grade	Recommended Mitigation
High Significance	National Significance	Grade I	Site conservation / site development
High Significance	Provincial Significance	Grade II	Site conservation / site development
High Significance	Local Significance	Grade III	Site conservation or extensive mitigation prior to development / destruction
High / Medium Significance	Generally Protected A	Grade IV-A	Site conservation or mitigation prior to development or destruction
Medium Significance	Generally Protected B	Grade IV-B	Site conservation or mitigation / test excavation / systematic sampling / monitoring prior to or during development / destruction
Low Significance	Generally Protected C	Grade IV-C	On-site sampling, monitoring or no archaeological mitigation required prior to or during development / destruction

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.

9.6.1.3 Results of Desktop & Literature Review

A literature review of previous archaeological and heritage-related work in the surrounding area was conducted in part by using information from the Report Mapping Project of the SAHRA-APM Unit as well as SAHRIS. Most of the reports cited here were downloaded from the SAHRA web site (http://www.sahra.org.za/sahris/map/reports). At the time of this writing, and to the best of my knowledge, no archaeological research has been conducted in the immediate surroundings of Hotazel, but numerous heritage-related studies were undertaken for a variety of environmental applications including mining of mainly manganese, transport infrastructure, borrow pits, solar energy facilities, electrical infrastructure, and so on. A roughly circular area with a radius of between 10 and 20km from the proposed site for the Hotazel Solar facility was included during the literature search on SAHRIS (Figures 6 & 7). A total of 43 environmental application cases on SAHRIS were searched and 17 of these applications did not include heritage-related reports at the time of the search in June 2018. It follows that 26 of the 43 cases included heritage-related impact assessments which were reviewed for the study being conducted here. In addition to these are research papers and publications as well as impact assessments consulted during this author's work in this part of the

Northern Cape and North West Province. Cited and consulted literature is listed in the references section below.

Earlier heritage and archaeological research as well as impact assessments in the surroundings have already provided detailed accounts of the history, heritage and archaeological riches of this part of the Northern Cape (see for example and references in Beaumont & Morris 1990, De Jong & Van Schalkwyk 2010, Fourie 2015a, Fourie & van der Walt 2007a, Humphreys & Thackeray 1983, Hutten & Hutten 2013, Kruger 2015, 2016a, Küsel, U. *et al* 2009, Morris 2008a, Morris & Beaumont 2004, and Webley & Halkett 2008).

The most important heritage sites in the surroundings include, but are not limited to Kathu Pan and Kathu Townlands (Stone Age & Pastoralist), Wonderwerk Cave (Stone Age & Pastoralist), Dithakong (Late Iron Age), Gamohana Shelters (Stone Age and Rock Art), Blinklipkop (prehistoric mining of specularite), Moffat Mission Station and the Kuruman Mission (Historic settlement by colonists) and “Die Oog” (critical water source and point of settlement; Kruger 2015).

The site of Kathu Pan includes a cluster of important Stone Age sites and is situated on a tributary of the Kuruman River about 5km NW of the town of Kathu (Beaumont & Morris 1990, Morris 2008a, Morris & Beaumont 2004, Webley & Halkett 2008). Early Stone Age tools and the remains of now extinct animals were observed in the exposed profiles of a sink hole at Kathu Pan 1 in 1974 (Beaumont 1990, Webley & Halkett 2008). Beaumont excavated numerous sites in the Kathu Pan that contain a very long sequence of Stone Age occupation of the Northern Cape from Early through Middle to Later Stone Age times (Beaumont 1990). More recent research on Stone Age implements from Kathu Pan dated to about 500 000 years ago, suggests that archaic humans (probably *Homo heidelbergensis*) were hafting stone implements some 200 000 years earlier than previously thought (Wilkins *et al.* 2012). The recent publication of evidence for the use of ochre / haematite / pigment in the Kathu area between 300 000 and 500 000 years ago has dramatically changed the way we view the origins of modern humans and modern human behaviour (Watts *et al*. 2016).

In addition to Kathu Pan, other less known, but significant archaeological sites in the area include the Kathu Reserve and Kathu Townlands sites as well as the Uitkoms sites with Stone Age elements including Howiesons Poort, "Late Pietersburg", Wilton, Oakhurst, Fauresmith, Ceramic LSA, Iron Age ceramic scatters and Acheulean materials (Beaumont 2006a, 2006b, 2007a and Dreyer 2007).

Wonderwerk Cave, situated in the Kuruman Hills some 90km SE of the present study area, is probably the best known and most significant archaeological site in the Northern Cape (Beaumont & Vogel 2006; Chazan *et al*. 2008, Humphreys & Thackeray 1983). Excavations in this cave have revealed Early Stone Age (ESA; in excess of 780 000 years old), Fauresmith (270 000 to 500 000 years ago), Middle Stone Age (MSA; 70 000 to 220 000 years ago) and Later Stone Age (LSA; from about 1000 to 12 500 years ago) materials and it is thought that the ESA sediments may date back as far as 2 million years ago (Beaumont & Vogel 2006). Since 2004 an interdisciplinary team is re-dating the sequence and investigating the stone artefacts, faunal and botanical remains in the ESA sediments (Chazan *et al.* 2008). A more recent publication argues that early hominins were making and controlling fire as early as million years ago, and currently this is the earliest evidence for the controlled use of fire by human ancestors worldwide (Berna, F. *et al.* 2012). Conditions in Wonderwerk Cave have ensured excellent preservation of organic remains. The cave contains a 10 000 year long Later Stone Age sequence including; the Kuruman Industry (between 10 000 BP [Before Present] and 8 500 BP) that is dominated by large scarpers in dolomite and banded ironstone, and the Wilton Complex (starting around 8 500 BP) that includes a greater variety of formal tools made from chert, chalcedony and jasper (Webley & Halkett 2008). The walls of Wonderwerk Cave are adorned with paintings and rock engravings dating back to more than 10 000 years ago were discovered during excavations in the Later Stone Age horizons (Lewis-Williams & Dowson 1989).

Combining the evidence and chronometrically dated sequences from Wonderwerk Cave and the archaeological sites surrounding Kathu, it has been possible to reconstruct a technological and

industrial sequence spanning nearly the entire span of hominin and human development in this part of Africa (Beaumont 2013).

Further afield, sites with rock engravings have been recorded at Beeshoek - about 10km NW of Postmasberg - and Bruce, and according to Morris, these sites were salvaged between the 1970s and 1990s as they were threatened by development and mining activities (Fock & Fock 1984, Morris 1992, Morris 2008a, Beaumont 1998). In addition to the rock art in Wonderwerk Cave, rock paintings occur in caves and rock shelters in the Kuruman Hills and the Ghaap Escarpment (Morris 1988). Rock engravings have also been recorded north of the town of Kuruman and are present in the larger landscape where suitable rocky outcrops occur (Kruger 2015a). Pecked engravings are more common north of the Orange River while scratched engravings are dominant to the south and in the Karoo (Morris 1988).

It turns out that mining in this part of South Africa is not restricted to the blooming of manganese extraction by colonists from the early-mid 1900s. Tsantsabane, better known as Blinkklipkop, is an ancient specularite mine approximately 5km NE of Postmasberg (Beaumont 1973, Thackeray *et al*. 1983). Specularite was mined from this site by indigenous peoples before colonial times, and the site was visited by many European travellers in the 19th century. The oldest archaeological sediments include the remains of sheep and/or goat, indicating that pastoralists were present in the Kuruman Hills by 1200 BP (Webley & Halkett 2008). Additional pre-historic specularite mines occur at Doornfontein north of Beeshoek and those at Lylyfeld, Demaneng, Mashwening, King, Rust en Vrede, Paling, Gloucester and Mount Huxley also contain Pottery LSA material as well as Fauresmith age stone implements (Beaumont & Boshier 1974, Beaumont 1973, Morris 2008a, Thackeray *et al*. 1983).

Iron Age farmers are known to have arrived in the Northern Cape after the 1600s with stone walling to the NE of Kuruman being the only archaeological evidence for their presence and settlement in the region (Humphreys & Thackeray 1983, Webley & Halkett 2008). Only Tswana speaking - Iron Age - people were occupying the area when the first colonists arrived and the primary Tswana settlement of Dithakong was situated NE of Kuruman, an area rich in fresh water springs (Webley & Halkett 2008).

The first colonists to arrive in this part of South Africa were missionaries, explorers, hunters and traders – including the better known names of Moffat, Burchell, Smith and Lichtenstein - who travelled through the area en route to Kuruman along what became known as the “missionary road”. As mentioned above, the only people present in the area at the arrival of colonists were the Tswana speakers. Kuruman has witnessed a 200 year long period of African-colonial interaction since the establishment of the Kuruman Mission by the London Missionary Society (LMS) in 1816. Robert Moffat (1795-1887) arranged with Chief Mothibi to relocate the Mission to the present position at Seodin in the valley of the Kuruman River, and it is now known as the Moffat Mission.

The Tswana areas were annexed by the British in 1885 and the Tswana were forced to live on reserves. The Tswana revolted against the British in 1895, but were quickly overthrown and their land taken by the British who then divided the land and granted it to colonist farmers (Snyman 1986 in van Schalkwyk 2016a, Fourie & van der Walt 2007b). The history of interaction – as in most parts of the colonized world – is one of conflict over land and territories.

The farms in the immediate surroundings were first surveyed in around 1914 by Wessels and Roos (Fourie 2015b). Much of the remainder of the history and human occupation of the Hotazel area involves live stock farming and the mining of manganese. The original mine, and point of origin for manganese mining in the area is at Black Rock, where a manganese outcrop is exposed at the surface some 15km NW of Hotazel (Küsel *et al.* 2009). In addition to open cast and sub-surface mining operations, the villages of Black Rock included housing for miners, shop(s) and transport infrastructure. Cemeteries are ubiquitous at human settlements and always present in close proximity to villages and homesteads. It has been proposed that, due to its significance in the history of manganese mining in South Africa, that Black Rock should be proclaimed as a National Heritage Site (Küsel *et al.* 2009).

Although the larger area surrounding Hotazel is rich in archaeological resources, these resources are not common in its immediate surroundings and are most commonly restricted to river banks, springs, pans, hills and rocky outcrops.

Archaeological finds made during heritage-related impact assessments in the immediate surroundings as shown in Figures 6 and 7 include:

Stone Age materials that are dominated by specimens of Later Stone Age and Middle Stone Age origin (Coetzee 2012, Dreyer 2012, Fourie 2015b, 2016a, Fourie & van der Walt 2007b, Hutten & Hutten 2013, Kruger 2015, Küsel *et al.* 2009, Nel 2008, Orton 2016b, Pelser & van Vollenhoven 2011, Pistorius 2006, van der Ryst 2009, Van Schalkwyk 2016a, Webley & Halkett 2008);

Historic period remains including farmsteads, structures, infrastructure, graves, dams, wells, boreholes, etc., (Coetzee 2012, Fourie 2015a, 2016a, Fourie & van der Walt 2007b, Hutten & Hutten 2013, Küsel *et al.* 2009, Orton 2016b, 2017, Webley & Halkett 2008); and

Historic period remains of mining activities (Fourie 2015a, Küsel *et al.* 2009, and Pistorius 2006).

Several of the heritage-related impact assessments documented the entire absence of heritage resources (Beaumont 2008, Becker 2012, 2013, De Jong & Van Schalkwyk 2010, Dreyer 2014, Fourie & van der Walt 2007a, Huffman & Schoeman 2001, Kruger 2014, 2016a, 2016b, Orton 2016a, 2017, Van Schalkwyk 2010 & 2016b).

Since the bulk of the archaeological record in the immediate surroundings is that of the Stone Age period, a brief overview of the technology associated with the development of archaic and modern humans during this era is given below.

Early Stone Age (ESA) materials including Acheulean hand axes, cleavers and chopping tools that may date from as early as 2.7 million years ago and come to end about 300 000 years ago is the earliest evidence for the tool-making human ancestors occupying this area. Such artefacts are usually found among alluvial gravels. While present, ESA artefacts are fairly rare and are usually found in disturbed or derived contexts where they are mixed with artefacts of more recent Stone Age times. No definitively ESA materials were identified in the present study area.

The Middle Stone Age (MSA) starts about 300 000 years ago and the interface between the ESA and MSA is sometimes marked by a stone tool industry known as the Fauresmith, where small hand axes appear to indicate the transition from archaic humans to *Homo sapiens*. In the main, however, MSA stone artefacts are characterised by flake and blade industries where evidence for core preparation - also known as the Levallois technique - is seen on prepared or faceted platforms of flakes and blades. Convergent flakes or points are also one of the markers of the MSA period. Like the ESA specimens, though more numerous, stone artefacts of MSA origin also occur among alluvial gravels and are commonly mixed with artefacts of Later Stone Age origin. Unfortunately, no other cultural materials or faunal remains are associated with these artefacts when found in exposed contexts.

The Later Stone Age (LSA) starts about 40 000 years ago and is characterised by substantial technological improvements over the MSA industries. Advancements on previous technologies and new technologies as well as cultural developments include the widespread occurrence of rock art (cave paintings and rock engravings), decorative objects (ostrich egg shell beads, marine shell pendants and beads, ochre), human burials with grave goods including painted stones, an expanded stone tool kit, microlithic stone tool industries (often associated with composite tools such as bow and arrow hunting), bone tools, tortoise carapace bowls, ostrich egg shell containers, fire making sticks and so on. Due to the non-preservation of organic remains in exposed contexts such as the affected environment, the archaeological traces of the LSA occupants is limited to stone artefacts. While LSA stone artefacts are present in the landscape, they occur in low densities - often in isolation, are sometimes mixed with MSA specimens and lack organic and cultural remains. As a result, these materials are generally of low scientific value.

The bulk of archaic human (ESA) and human (MSA to recent) occupation of this area involves the Stone Age era, and therefore, the most significant cultural layer in this area involves the pre-colonial cultural landscape and its sense of place (see UNESCO 2008 for definitions, significance and preservation of cultural landscapes). Overlying the Stone Age cultural layer is the Iron Age and KhoeKhoe layer which accounts for the earliest farmers in the Northern Cape. The most recent cultural layer in the landscape is that of colonists who initially occupied the land as live stock farmers, but their most recent use of the land is for the mining of manganese and for the farming of solar energy.

9.6.2 Palaeontological Heritage

Dr John Almond from Natura viva undertook a desktop paleontological assessment of the proposed Hotazel Solar PV Energy facility from which the following is summarised. A copy of this assessment is included in **Annexure E5**.

9.6.2.1 Geological Background

The Hotazel Solar project area on the Remaining Extent of York A 279, as well as the associated 132 kV distribution line corridor options, are all situated in very flat-lying, sandy, semi-desert terrain at *c*. 1070 m amsl. They lie within the southern Kalahari Region lying between the Korannaberg in the west and the Kurumanheuwels in the East. The sandy terrain here is fairly featureless Kalahari thorn veld. This region is drained by the Ga-Mogara River, a southern tributary of the Kuruman River that runs *c*. 5 km to the west of the project area, and by its tributaries. In general, bedrock exposure is extremely limited in the region due to the thick cover by Kalahari Group sediments. Existing manganese mines are situated to the northwest and south of the PV facility project area.

The geology of the area around and to the southeast of Hotazel is outlined on the 1: 250 000 scale geological map 2722 Kuruman. A brief sheet explanation is printed on the map. The Hotazel PV Facility project area (including the overhead distributiom line corridor options) is entirely underlain by Pleistocene to Recent aeolian sands of the **Gordonia Formation** (**Kalahari Group**). The geological map as well as recent field studies in the region (Almond 2013a, 2013b) show that the Kalahari sands here are extensively underlain by hardpan calcretes, some of which at least can be assigned to the **Mokalanen Formation** of the Kalahari Group. Subdued linear sand dunes trending NW-SE as well as pale calcrete exposures along the Ga-Mogara River and nearby pans are clearly visible outside the present project area on satellite images. No major drainage lines or pans are visible on satellite images within the present project area but calcretes are expected here at depth beneath the cover sands.

The following account of the geology of the Hotazel region has largely been abstracted from previous PIA reports by Almond (2103a, 2013b, 2016). Ancient bedrocks of the Transvaal Supergroup and other Precambrian sediments in the Hotazel area are mantled by a thick succession of **superficial sediments** of probable Late Caenozoic (*i.e.* Late Tertiary or Neogene to Recent) age, most of which are assigned to the **Kalahari Group**. The geology of the Late Cretaceous to Recent Kalahari Group is reviewed by Thomas (1981), Dingle *et al.* (1983), Thomas & Shaw 1991, Haddon (2000) and Partridge *et al.* (2006). Other superficial sediments whose outcrop areas are often not indicated on geological maps include colluvial or slope deposits (scree, hillwash, debris flows *etc*), sandy, gravelly and bouldery river alluvium, surface gravels of various origins, as well as spring and pan sediments. The colluvial and alluvial deposits may be extensively calcretised (*i.e.* cemented with pedogenic limestone), especially in the neighbourhood of dolerite intrusions or overlying Ghaap Group carbonate rocks.

Calcretes or **surface limestones** in the southern Kalahari Region are pedogenic limestone deposits that reflect seasonally arid climates in the region over the last five or so million years. They are briefly described by Truter *et al.* (1938) as well as Visser (1958) and Bosch (1993). The surface limestones may reach thicknesses of over 20 m, but are often much thinner, and are locally conglomeratic with clasts of reworked calcrete as well as exotic pebbles. The limestones may be secondarily silicified and

incorporate blocks of the underlying Precambrian carbonate rocks. The older, Pliocene - Pleistocene calcretes in the broader Kalahari region, including sandy limestones and calcretised conglomerates, have been assigned to the **Mokalanen Formation** of the **Kalahari Group** and are possibly related to a globally arid time period between 2.8 and 2.6 million years ago, *i.e.* late Pliocene (Partridge *et al.* 2006).

Large areas of unconsolidated, reddish-brown to grey aeolian (*i.e.* wind-blown) sands of the Quaternary **Gordonia Formation** (**Kalahari Group** are mapped in the southern Kalahari study region. According to Bosch (1993) the Gordonia sands in the Kimberley area reach thicknesses of up to eight meters and consist of up to 85% quartz associated with minor feldspar, mica and a range of heavy minerals. The Gordonia dune sands are considered to range in age from the Late Pliocene / Early Pleistocene to Recent, dated in part from enclosed Middle to Later Stone Age stone tools (Dingle *et al*., 1983, p. 291). Note that the recent extension of the Pliocene - Pleistocene boundary from 1.8 Ma back to 2.588 Ma would place the Gordonia Formation almost entirely within the Pleistocene Epoch. Reworked and diagenetically altered sands of probable aeolian origin in the Kimberley area are often referred to as Hutton Sands.

9.6.2.2 Palaeontological Occurrences

The palaeontological record of the rock units represented in the Hotazel region has been reviewed by Almond (2013a, 2013b) as well as in the desktop study by Groenewald (2013). Fossil biotas recorded from each of the main rock units mapped here are briefly reviewed in Table 1 (based largely on Almond & Pether (2008) and references therein) where an indication of the inferred palaeontological sensitivity of each rock unit is also given. Pervasive calcretisation and chemical weathering of many near-surface bedrocks in the Northern Cape has compromised their original fossil heritage in many areas.

Fossils within the Kalahari Group: The fossil record of the **Kalahari Group** is generally sparse and low in diversity. 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 the underlying bedrocks (including, for example, dolerite) 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*) and shells of land snails (*e.g. Trigonephrus*) (Almond 2008, Almond & Pether 2008). Other fossil groups such as freshwater bivalves and gastropods (*e.g. Corbula, Unio*) and snails, 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 (Du Toit 1954, Dingle *et al*., 1983). 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 of the **Mokolanen Formation** 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 such as pans) may be occasionally expected within Kalahari Group sediments and calcretes, notably those associated with ancient, Plio-Pleistocene alluvial gravels.

Table 10: Fossil heritage of rock units represented in the Hotazel study region

GEOLOGICAL UNIT	ROCK TYPES & AGE	FOSSIL HERITAGE	PALAEONT-OLOGICAL SENSITIVITY	RECOMMENDED MITIGATION
OTHER LATE CAENOZOIC TERRESTRIAL DEPOSITS OF THE INTERIOR (Most too small to be indicated on 1: 250 000 geological maps)	Fluvial, pan, lake and terrestrial sediments, including diatomite (diatom deposits), pedocretes, spring tufa / travertine, cave deposits, peats, colluvium, soils, surface gravels including downwasted rubble MOSTLY QUATERNARY TO HOLOCENE (Possible peak formation 2.6-2.5 Ma)	Bones and teeth of wide range of mammals (*e.g.* mastodont proboscideans, rhinos, bovids, horses, micromammals), reptiles (crocodiles, tortoises), ostrich egg shells, fish, freshwater and terrestrial molluscs (unionid bivalves, gastropods), crabs, trace fossils (*e.g.* termitaria, horizontal invertebrate burrows, stone artefacts), petrified wood, leaves, rhizoliths, diatom floras, peats and palynomorphs. calcareous tufas at edge of Ghaap Escarpment might be highly fossiliferous (*cf* Taung in NW Province – abundant Makapanian Mammal Age vertebrate remains, including australopithecines)	LOW Scattered records, many poorly studied and of uncertain age	Any substantial fossil finds to be reported by ECO to SAHRA
Gordonia Formation (Qs) KALAHARI GROUP *plus* SURFACE CALCRETES (Tl / Qc)	Mainly aeolian sands *plus* minor fluvial gravels, freshwater pan deposits, calcretes PLEISTOCENE to RECENT	Calcretised rhizoliths & termitaria, ostrich egg shells, land snail shells, rare mammalian and reptile (*e.g.* tortoise) bones, teeth Freshwater units associated with diatoms, molluscs, stromatolites *etc*	LOW	Any substantial fossil finds to be reported by ECO to SAHRA

Palaeontological fieldwork at several sites some 10 to 15 km south of Hotazel (Almond 2013a, 2013b) indicated that the Gordonia sands and underlying calcretes here are very sparsely fossiliferous. The only fossil remains recorded from these sediments in the wider study region are locally abundant, low-diversity invertebrate burrows as well as casts of plant rootlets and of reedy vegetation preserved in subsurface calcrete hardpans. These trace fossils were probably associated with damp *vlei* settings within largely abandoned river channels. Such trace fossils are of widespread occurrence within the Kalahari region so impacts on fossil heritage here are likely to be of low conservation significance and special mitigation measures to protect them are not considered warranted.

The overall palaeontological sensitivity of the entire Hotazel PV Facility project area is assessed as LOW. Pockets of locally HIGH sensitivity along drainage lines and around pans are not expected here, although their presence cannot be entirely discounted. Plio-Pleistocene calcretised gravels and finer-grained alluvium in such settings might contain mammalian remains such as bones, teeth and horn cores in addition to abundant, low-diversity trace fossil assemblages.

9.6.2.3 Palaeontological Conclusions & Recommendations

The overall palaeontological sensitivity of the entire Hotazel Solar project area, including both site options as well as the various 132 overhead distribution line corridor options to Hotazel Substation, is assessed as LOW. Small pockets of locally HIGH sensitivity might occur along drainage lines and around any pans but these are not anticipated on the basis of satellite imagery. Plio-Pleistocene calcretised gravels and finer-grained alluvium in these last settings may contain mammalian remains such as bones, teeth and horn cores in addition to abundant, low-diversity trace fossil assemblages.

It is concluded that the overall impact significance (pre-mitigation) of the proposed Hotazel PV Facility is VERY LOW (-). This assessment applies equally to the core PV facility project area on the Remaining Extent of Farm York A 297 itself, as well as the proposed distribution lines and other infrastructure (internal road network, access road from the R380, IPP substation, perimeter fencing *etc*). There is no preference on palaeontological heritage grounds for either one of the two solar facility site or substation options or any particular distribution line route options among those under consideration.

As shown on the SAHRIS webite, there are numerous ongoing and proposed mining, railway and other developments located in the immediate vicinity of Hotazel and the present solar park project. To the author's knowledge, the only palaeontological impact assessments submitted for these projects are those by Almond (2013a, 2013b, 2016) as well as Groenewald (2013). In all four cases, the impact significance of the proposed developments were assessed as low. Given the very large outcrop area of the sparsely fossiliferous Kalahari Group sediments involved here, the cumulative impact of the proposed alternative energy developments around Hotazel is assessed as LOW. The No-Go option (no PV facility) would have a neutral impact on local fossil heritage resources.

The following mitigation measures to safeguard fossils exposed on site during the construction phase of the development are proposed:

- The ECO responsible for the development must remain aware that all sedimentary deposits have the potential to contain fossils and he/she should thus monitor all deeper (> 1 m) excavations into sedimentary bedrock for fossil remains on an on-going basis. If any substantial fossil remains (*e.g.* vertebrate bones, teeth) are found during construction SAHRA should be notified immediately (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). This is in order that that appropriate mitigation (*i.e.* recording, sampling or collection) by a palaeontological specialist can be considered and implemented, at the developer's expense.
- A chance-find procedure should be implemented so that, in the event of fossils being uncovered, the ECO/Site Engineer will take the appropriate action, which includes:
- Stopping work in the immediate vicinity and fencing off the area with tape to prevent further access;
- Reporting the discovery to the provincial heritage agency and/or SAHRA;
- Appointing a palaeontological specialist to inspect, record and (if warranted) sample or collect the fossil remains;
- Implementing further mitigation measures proposed by the palaeontologist; and
- Allowing work to resume only once clearance is given in writing by the relevant authorities.
- During maintenance and servicing of infrastructure, if excavation is required, it shall be limited to the disturbed footprint as far as practicable. Should bulk works exceed the existing disturbed footprint, SAHRA shall be notified.
- If the mitigation measures outlined above are adhered to, the residual impact significance of any construction and operational phase impacts on local palaeontological resources is considered to be very low.
- The mitigation measures proposed here should be incorporated into the Environmental Management Plan (EMP) for Hotazel PV Facility project.

- The palaeontologist concerned with mitigation work will need a valid collection permit from SAHRA. All work would have to conform to international best practice for palaeontological fieldwork and the study (*e.g.* data recording fossil collection and curation, final report) should adhere to the minimum standards for Phase 2 palaeontological studies recently published by SAHRA (2013).

The above mentioned recommendations of the palaeontology specialist must be incorporated into the EMPRr

9.7 POTENTIAL SOCIAL IMPACT OF THE PROPOSED DEVELOPMENT

The following potential impacts on the social environment were identified by the social specialist. This section must be read in conjunction with the social scoping study (Annexure E8) and the section above outlining the regional socio economic context

9.7.1 Construction Phase Impacts

Table 11: Potential construction phase impacts on the social environment (Savannah, 2018)

Impact Creation of direct and indirect employment opportunities and skills development. **Desktop Sensitivity Analysis of the Site:** No sensitivity identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Construction of the project will result in the creation of a number of direct and indirect employment opportunities, which will contribute towards lessening the unemployment levels within the area and aid in skills development of communities in the area.	Positive – The creation of employment opportunities will assist to an extent in alleviating unemployment levels within the area.	The impact will occur at a local, regional, and national level.	None identified.
Description of expected significance of impact At its peak, the construction is likely to result in the creation of approximately 400 employment opportunities. Of those employment opportunities available, approximately 60% will comprise opportunities for low skilled workers, 25% for semi-skilled workers, and 15% for skilled workers. Skills developed through experience in the construction of the facility will be retained by the community members involved. The impact is likely to be positive, local to national in extent, short-term, and of medium significance			
Gaps in knowledge and recommendations for further study » Information on the exact direct and indirect employment opportunities and skills development opportunities likely to be created during construction.			
Impact Economic multiplier effects. **Desktop Sensitivity Analysis of the Site:** No sensitivity identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Economic multiplier effects	Positive – There are likely to	The impact will occur at a	None identified.

from the use of local goods and services during the construction phase.	be opportunities for local businesses to provide goods and services during the construction phase of development.	local, and regional level.	

Description of expected significance of impact

Economic multiplier effects from the use of local goods and services opportunities include, but are not limited to, the provision of construction materials and equipment, provision of workforce essentials such as services, safety equipment, ablution, accommodation, transportation and other goods. The increase in demand for goods and services may stimulate local business and local economic development (however locally sourced materials and services may be limited due to availability). There is likely to be a direct increase in industry and indirect increase in secondary businesses. The impact is likely to be positive, local to regional in extent, short-term, and of medium significance.

Gaps in knowledge and recommendations for further study

» Information on capital expenditure to be spent on local goods and services.

Impact

In-migration of people (non-local workforce and jobseekers).

Desktop Sensitivity Analysis of the Site:

No sensitivity identified.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Increased pressure on infrastructure and basic services, and social conflicts during construction as a result of in-migration of people.	Negative – The in-migration of job seekers to the area could result in increased pressure being placed on infrastructure and basic services, and a rise in social conflicts.	The impact will occur at a local level.	None identified.

Description of expected significance of impact

The in-migration of people to the area as either non-local workforce and / or jobseekers could result in increased pressure being placed on infrastructure and basic services on the local population (rise in social conflicts). An influx of people into the area, could lead to a temporary increase in crime levels, cause social disruption, and put pressure on basic services. An influx of people looking for economic opportunities could result in pressure on the local population such as rise in social conflicts and change in social dynamics, increase in HIV, pregnancies and drug abuse. Adverse impacts could occur if a large in-migrant workforce, which is culturally different from the local population, is brought in during construction. The impact is likely to be negative, local in extent, short-term[9], and of medium significance due to the number of jobs expected to be created, and the proportion of which would accrue to the non-local workforce.

Gaps in knowledge and recommendations for further study

» Information on the exact number of employment opportunities likely to accrue to the local labour force, versus the number of employment opportunities likely to accrue to the non-local workforce and jobseekers.

» Mechanisms for employment of local labour and minimisation of in-migration.

Impact

Safety and security impacts.

Desktop Sensitivity Analysis of the Site:

No sensitivity identified.

Issue	Nature of Impact	Extent of Impact	No-Go Areas

[9] While the extent of the impact may be short-term (i.e. people are only likely to move into the area in search of employment prior to and possibly during the construction period), the implications thereof may be long-term, as people are likely to have settled in the area, and are unlikely to leave immediately after the completion of construction.

Temporary increase in safety and security concerns associated with the influx of people during the construction phase.	Negative – The in-migration of job seekers to the area could be perceived to result in increased criminal activity.	The impact will occur at a local level.	None identified. No workers should be allowed to reside on-site during construction.
Description of expected significance of impact The perception exists that an influx of jobseekers, and / or construction workers to an area is a contributor to increased criminal activities in an area, such as increased safety and security risk for neighbouring properties and damage to property, increased risk of veld fire, stock theft, and crime etc. The impact is likely to be negative, local in extent, short-term, and of medium significance due to the number of jobs expected to accrue to the non-local workforce.			
Gaps in knowledge and recommendations for further study » Information on existing crime levels within the area. » Mechanisms for employment of local labour and minimisation of in-migration.			
Impact Impacts on daily living and movement patterns. **Desktop Sensitivity Analysis of the Site:** No sensitivity identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Temporary increase in traffic disruptions and movement patterns during construction.	Negative – An increase in traffic due to construction vehicles and heavy vehicles could create short-term disruptions and safety hazards for current road users.	The impact will occur at a local level.	None identified.
Description of expected significance of impact Increased traffic due to construction vehicles and heavy vehicles could cause disruptions to road users and increase safety hazards. The use of local roads and transport systems may cause road deterioration and congestion. The impact is likely to be negative, local in extent, short-term, and of low significance given the proximity of the project to existing mining operations within the area.			
Gaps in knowledge and recommendations for further study » Number of vehicle trips anticipated during construction.			
Impact Nuisance impacts (noise and dust). **Desktop Sensitivity Analysis of the Site:** No sensitivity identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Nuisance impacts in terms of temporary increase in noise and dust, and wear and tear on access roads to the site.	Negative – The impact will negatively impact sensitive receptors, and could cause disruptions for neighbouring properties.	The impact will occur at a local level.	None identified.
Description of expected significance of impact Impacts associated with construction related activities include noise, dust and disruption or damage to adjacent properties. Site clearing activities increase the risk of dust and noise being generated, which can in turn negatively impact on adjacent properties. The impact is likely to be negative, local in extent, short-term, and of low significance given the proximity of the project to existing mining operations within the area, which are also likely to be associated with nuisance impacts.			
Gaps in knowledge and recommendations for further study			

» Impact of the mining operations on surrounding landowners.			
Impact Visual and sense of place impacts. **Desktop Sensitivity Analysis of the Site:** No sensitivity identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Intrusion impacts from construction activities will have an impact on the area's "sense of place".	Negative – The project could alter the area's sense of place which could negatively impact on sensitive receptors.	The impact will occur at a local level.	None identified.
Description of expected significance of impact Intrusion impacts such as aesthetic pollution (i.e. building materials, construction vehicles, etc.), noise and light pollution, and other impacts could impact the "sense of place" for the local community. The impact is likely to be negative, local in extent, short-term, and of low significance; given the proximity of the project to existing mining operations and waste rock dumps.			
Gaps in knowledge and recommendations for further study » Potential sensitive visual receptors need to be identified. » Visual impact assessment to inform impact on sense of place.			

9.7.2 Operation Phase Impacts

Table 12: Potential operational phase impacts on the social environment (Savannah, 2018)

Impact Direct and indirect employment opportunities and skills development. **Desktop Sensitivity Analysis of the Site:** No sensitivity identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Creation of direct and indirect employment, and skills development opportunities and skills development as a result of the operation of the project.	Positive – The creation of employment opportunities and skills development will assist to an extent in alleviating unemployment levels within the area.	The impact will occur at local, regional, and national levels.	None identified.
Description of expected significance of impact During operation a maximum of approximately 60 employment opportunities will be created. Of those employment opportunities created approximately 70% will comprise opportunities for low-skilled workers, 25% will comprise opportunities for semi-skilled workers, and approximately 5% will comprise opportunities for skilled workers. Employment opportunities include safety and security staff, operation and monitoring; and maintenance crew. Maintenance activities will be carried out throughout the lifespan of the project, and include washing of solar panels, vegetation control, and general maintenance around the solar energy facility. The impact is likely to be positive, local-to-national in extent, long-term, and of medium significance.			
Gaps in knowledge and recommendations for further study » Information on exact direct and indirect employment opportunities and skills development programmes likely to be created during operation.			
Impact			

Development of non-polluting, renewable energy infrastructure.

Desktop Sensitivity Analysis of the Site:

No sensitivity identified.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Development of non-polluting, renewable energy infrastructure.	Positive – Increasing the contribution of the RE sector to the local economy would contribute to the diversification of the local economy and provide greater economic stability.	The impact will occur at local, regional, and national levels.	None identified.

Description of expected significance of impact

The generation of renewable energy will contribute to South Africa's electricity market, and may contribute to the diversification of the local economy. The growth in the RE sector as a whole could introduce new skills and development into the area. The impact is likely to be positive, local-to-national in extent, long-term, and of medium significance.

Gaps in knowledge and recommendations for further study

» Information on the proposed project's contribution towards diversifying the local economy.

Impact

Contribution to local economic development and social upliftment.

Desktop Sensitivity Analysis of the Site:

No sensitivity identified.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Benefits to the local area from Socio-Economic Development (SED) / Enterprise Development (ED) programmes and community trusts from REIPPPP social responsibilities.	Positive – The creation of employment opportunities, skills development, and the proposed projects contributions to local economic development will assist to an extent in both alleviating unemployment levels within the area, and improving the quality of life.	The impact will occur at local, regional, and national levels.	None identified.

Description of expected significance of impact

Under the REIPPPP renewable energy projects are required to contribute to local economic development in the area. Awarded projects are required to spend a certain amount of their generated revenue (as defined in the agreement with DoE) on Socio-Economic Development (SED) and Enterprise Development (ED) and share ownership in the project company with local communities. The impact is likely to be positive, local-to-national in extent, long-term, and of high significance.

Gaps in knowledge and recommendations for further study

» Information on the project's proposed contributions.

Impact

Visual and sense of place impacts.

Desktop Sensitivity Analysis of the Site:

No sensitivity identified.

Issue	Nature of Impact	Extent of Impact	No-Go Areas

Sense of place impacts from a social perspective associated with the operation phase of the solar energy facility and associated infrastructure.	Negative – The project could alter the areas sense of place which could negatively impact on sensitive receptors.	The impact will occur at a local level.	None identified.
Description of expected significance of impact The presence of the solar energy facility could impact the "sense of place" for the local community. The impact is likely to be negative, local in extent, long-term, and of low significance.			
Gaps in knowledge and recommendations for further study » Potential sensitive visual receptors need to be identified. » Visual impact assessment to inform impact on sense of place.			
Impact Impacts associated with the loss of agricultural land. **Desktop Sensitivity Analysis of the Site:** No sensitivity identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
The development footprint on which the solar energy facility will be developed will be removed from agricultural production.	Negative – Impacts associated with loss of agricultural land due to occupation of land by the solar energy facility.	The impact will occur at a local level.	None identified.
Description of expected significance of impact The development of the proposed project on an agricultural property would result in the an area of land required to support the development footprint being removed from potential agricultural production. In the event that the land on which the project is proposed is being productively utilised for agricultural purposes this could have a negative impact on agricultural jobs, and implications in terms of food production and security. The impact is likely to be negative, local in extent, long-term, and of low significance. The applicability of this impact would need to be determined following the completion of a soils, land use, land capability, and agricultural potential impact assessment.			
Gaps in knowledge and recommendations for further study » The current land use and agricultural potential of the area likely to be removed from agricultural production needs to be determined.			

9.7.3 Conclusion and Recommendations

This SIA Scoping Report focused on the collection of available secondary information in order to provide a social baseline against which potential social impacts which may be associated with the development of Hotazel Solar could be identified.

A number of potential positive and negative social impacts have been identified for the project, which require further investigation as part of the EIA phase. Based on the findings of this SIA Scoping Report, no red flags or fatal flaws have been identified from a social perspective which could preclude the development of Hotazel Solar and associated infrastructure on the Remaining Extent of the Farm York A 279, in the Joe Morolong Local Municipality, of John Taolo Gaetsewe District, Northern Cape Province, pending the successful completion of the EIA and the receipt of Environmental Authorisation (EA) from the Department of Environmental Affairs (DEA).

10 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.

10.1 IDENTIFICATION AND NATURE OF POTENTIAL ECOLOGICAL 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.

Potential ecological impacts resulting from the development of the Hotazel Solar 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:

10.1.1 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 and exploration activities for site establishment may have a negative impact on biodiversity if this is not conducted in a sensitive manner.

10.1.2 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.
- 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.

10.1.3 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 require 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.

10.1.4 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.

10.2 IDENTIFICATION AND NATURE 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 Hotazel Solar 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 area.

This scoping study has shown that archaeological resources do occur in the surrounding environment and also on the properties in question. 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 minimise 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.

Based on results from previous archaeological research and heritage impact studies in the surrounding environment it seemed likely that significant archaeological sites could be identified during the AIA.

10.3 IDENTIFICATION AND NATURE OF POTENTIAL VISUAL IMPACTS.

The visual specialist has confirmed that the overall visual impact of the facility is regarded to be low. Further visual assessment will take place during the impact assessment phase, particularly with regards to landscape context associated with the Kathu Bushveld.

10.4 IDENTIFICATION AND NATURE OF POTENTIAL FRESHWATER IMPACTS.

The Freshwater specialist has confirmed that the proposed Hotazel Solar will not affect any freshwater resources.

10.5 IDENTIFICATION AND NATURE OF POTENTIAL AGRICULTURAL IMPACTS.

The site has been found to have an overall low potential for agricultural activities. .

10.6 IDENTIFICATION AND NATURE OF AVIFAUNAL IMPACTS.

Potential avifaunal impacts resulting from the development of Hotazel Solar 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:

10.6.1 Preconstruction Phase

- Human presence and uncontrolled access to the site may result in negative impacts on the avifauna through poaching and uncontrolled collection of fauna and flora for traditional medicine or other purpose.

- Site clearing and exploration activities for site establishment may have a negative impact on biodiversity if this is not conducted in a sensitive manner.

10.6.2 Construction Phase

- Vegetation clearing for the PV field, access roads, site fencing and associated infrastructure will impact the local avifauna directly through habitat loss. Vegetation clearing will therefore lead potentially to the loss of avifaunal species, habitats and ecosystems as birds are displaced from their habitat.
- 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 fauna collecting and other forms of disturbance such as fire.

10.6.3 Operational Phase

- The operation of the facility will generate noise and disturbance which may deter some avifauna from the area, especially red-listed avifaunal species which are less tolerant of disturbances.
- Mortality among the local avifauna may result due to direct collisions with solar panels (Kagan et al., 2014) or entrapment along the fenced boundaries of the facility (Visser, 2016).
- The areas inside the facility will require 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 (Jenkins et al., 2010).

10.6.4 Cumulative Impacts

- 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. This is particularly a concern with regards to species and ecosystems with limited geographical distributions (Rudman et al., 2017).

10.7 IDENTIFICATION AND NATURE OF SOCIO ECONOMIC IMPACTS

A number of potential Socio Economic Impacts have been identified that will require further specialist assessment in the Impact assessment phase of the environmental process. These are:

10.7.1 Construction Phase Impacts

- Creation of direct and indirect employment opportunities and skills development.
- Economic multiplier effects.
- In-migration of people (non-local workforce and jobseekers).
- Safety and security impacts.
- Impacts on daily living and movement patterns.
- Visual and sense of place impacts.

10.7.2 Operation Phase Impacts

- Direct and indirect employment opportunities and skills development.
- Development of non-polluting, renewable energy infrastructure.
- Contribution to local economic development and social upliftment.
- Visual and sense of place impacts.

- Impacts associated with the loss of agricultural land.

11 CONSIDERATION OF POTENTIAL CUMULATIVE IMPACTS

When considering South Africa's irradiation distribution, the Northern Cape Province 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 a number of energy related projects that are being proposed in the vicinity of the proposed Hotazel Solar development.

The cumulative footprint of these is however small in comparison with the iron and manganese mines in the area, which are currently the major driver of habitat loss and transformation in the area.

There are several authorised developments in close vicinity to the Hotazel site. This raises the potential for cumulative impact in the area. However, the overall development pressure in the wider area is still low and the proximity of the current development and those on the adjacent properties as well as those of active mining activity means that the site is not likely to be of high significance for landscape connectivity.

Consequently, the overall extent of cumulative impact due to the solar energy development in the area is seen to be relatively low and the contribution of the current development to cumulative impact is seen as low and of local significance only.

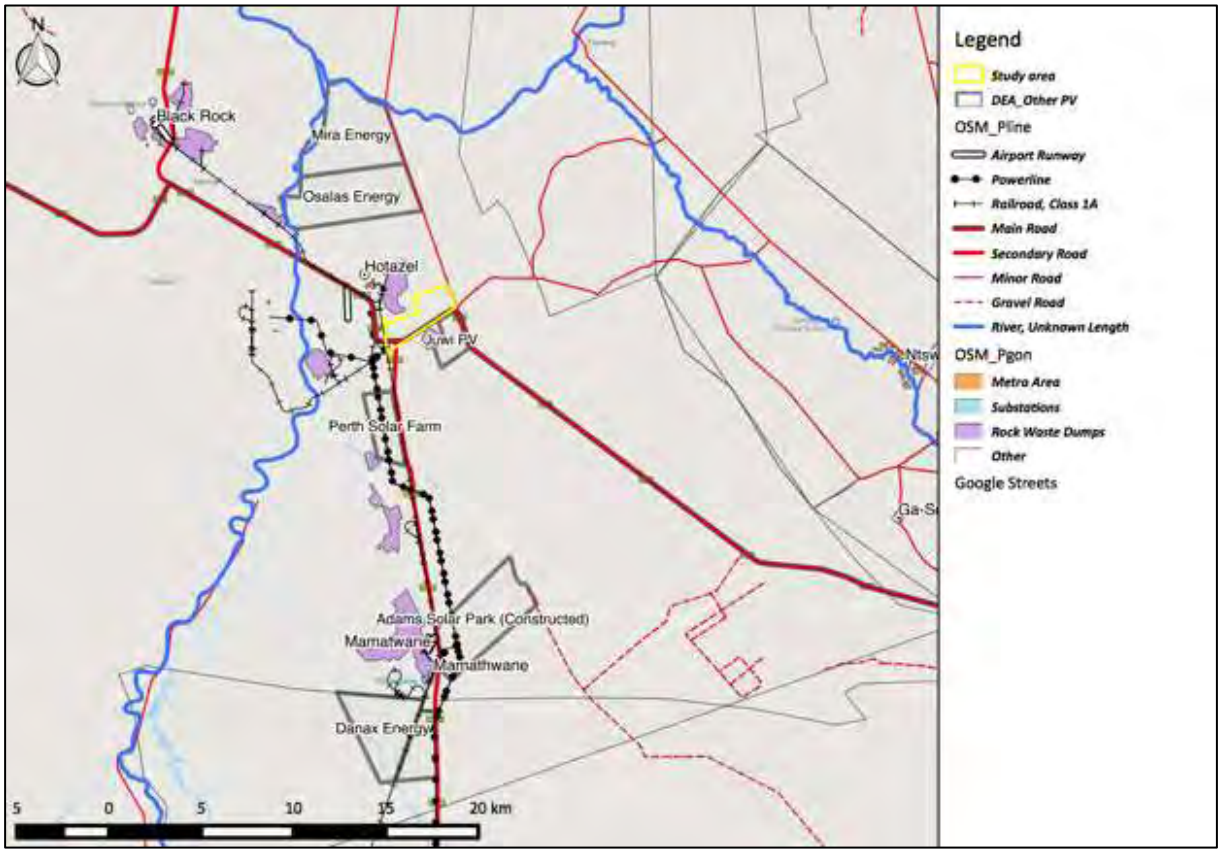

Figure 52: Other potential land use transformations in the vicinity of Hotazel Solar that will be used to assess cumulative impact.

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

12 SUMMARY OF SITE CONSTRAINTS AND POTENTIAL RISKS & IMPACTS

The following spatial site-specific constraints were identified by various specialists during the initial stage of the environmental process. The constraints identified by specialists thus far have been used to **refine the proposed development alternatives** (i.e. avoidance of the medium - high sensitivity botanical and avifaunal features) and are **reflected** in the proposed development layout (both alternatives).

Table 13: Summary of potential site constraints identified during the initial phase of the Environmental Process

Specialist Discipline	Site Constraints
Flora:	High sensitivity vegetation in the west and south east of the property
Fauna	High sensitivity terrestrial habitat in the west and south east of the property
Avifauna	High sensitivity avifaunal habitat in the west and south east of the property
Agricultural	No specific spatial constraints identified.
Heritage	No specific spatial constraints have been identified to date.
Visual	Slightly higher visual exposure of western alternative (Footprint alternative 1).

The participating specialists identified various potential impacts that will require further consideration and assessment

Table 14: Key issues/concerns identified during the pre-application scoping phase.

Specialist Discipline	Specialist Input
Ecological	<u>Impacts on vegetation and protected plant species</u> Several protected species occur at the site which may be impacted by the development, most notably Acacia erioloba and A.haematoxylon. 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 as this is when the impact will occur, although the consequences will persist for a long time after construction. <u>Direct faunal impacts</u> 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. <u>Reduced ability to meet conservation obligations & targets</u> 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. 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 type for an arid area and is therefore vulnerable to cumulative impact. This impact is therefore assessed in light of the current development as well as any other developments in the surrounding area which would also contribute to cumulative impacts.

Specialist Discipline	Specialist Input
	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 is assessed.
Freshwater	No Further Assessment Required.
Heritage	Undertake a phase two Heritage Impact incorporating a deatailed archaeology foot survey in order to identify and assess the impact on tangible heritage resources.
Agricultural Potential	Assess the agriculture impact of the proposed development in terms of: • Loss of agricultural land • Erosion and change of drainage patterns • Pollution.
Avifaunal	The following Impacts need to be assessed in detail by the avifaunal specialist: Preconstruction Phase • Human presence and uncontrolled access to the site may result in negative impacts on the avifauna through poaching and uncontrolled collection of fauna and flora for traditional medicine or other purpose. • Site clearing and exploration activities for site establishment may have a negative impact on biodiversity if this is not conducted in a sensitive manner. Construction Phase • Vegetation clearing for the PV field, access roads, site fencing and associated infrastructure will impact the local avifauna directly through habitat loss. Vegetation clearing will therefore lead potentially to the loss of avifaunal species, habitats and ecosystems as birds are displaced from their habitat. • 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 fauna collecting and other forms of disturbance such as fire. Operational Phase • The operation of the facility will generate noise and disturbance which may deter some avifauna from the area, especially red-listed avifaunal species which are less tolerant of disturbances. • Mortality among the local avifauna may result due to direct collisions with solar panels (Kagan et al., 2014) or entrapment along the fenced boundaries of the facility (Visser, 2016). • The areas inside the facility will require 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 (Jenkins et al., 2010). Cumulative Impacts • 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. This is particularly a concern with regards to species and ecosystems with limited geographical distributions (Rudman et al., 2017).
Social	Undertake a full EIA level Social Impact Assessment (SIA) to assess the following: • Review comments pertaining to social impacts received from members of the public, key stakeholders, and any organ of state during the public review of the Scoping Report. Where applicable, comments received from the

Specialist Discipline	Specialist Input
	Department of Environmental Affairs (DEA) on the Final Scoping Report (FSR), which may pertain to social impacts or have relevance to the SIA, will also be reviewed. • Collect primary data during a site visit. Interview directly affected and adjacent landowners, and key stakeholders to obtain primary information related to the project site, social environment, and to gain their inputs on the proposed project and its perceived social impact (positive and /or negative). • Update the baseline information with information received during the site visit, as well as any additional information received from the client, or updates to the project description. • Assess impacts identified for the project in terms of their nature, extent, duration, magnitude, probability, status, and significance; as well as the degree to which the impact can be reversed, may cause irreplaceable loss of resources, and can be mitigated. • Identify mitigation measures with which to reduce negative impacts, and enhance positive impacts for inclusion in the Environmental Management Programme (EMPr). As far as possible the mitigation hierarchy of "avoid, minimise, and reduce" will be followed in the mitigation of potential negative impacts. • Identify any conditions for inclusion in the Environmental Authorisation (EA). • Identify any monitoring requirements for inclusion in the EMPr or EA. • Provide a reasoned opinion regarding the acceptability of the project, and whether the proposed project should be authorised. • Prepare a SIA Report for inclusion in the EIA Report to be prepared for the project. • Subject the SIA Report prepared for the project for inclusion in the EIA Report to external peer review.
Traffic	Undertake a detailed traffic impact assessment to assess the suitability of the proposed access roads and to assess the component transport requirements for the project..
Stormwater Management	Undertake a detailed stormwater management plan for the project..

13 PUBLIC PARTICIPATION PROCESS

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.

Table 15: Public participation requirements in terms of S41 of R982

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 G2.** The proposed grid connection is deemed to constitute a linear activity and as such not required to obtain landowner consent. Land owners of the Remainder of the Farm 280 as well as Portion 11 of Farm York A 279 have been automatically registered as interested and affected parties and given an opportunity to comment on this scoping report.
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 -	

Regulated Requirement	Description
(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 (ii) any alternative site;	A site notice was placed at two positions along the R31. Photographic evidence of these notices is attached in **Annexure F3**.
(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 tenants at the existing dwelling on the property were personally visited by the EAP and a notification letter regarding this environmental process provided to them. It is important to note that the existing homestead on the property has been excluded from the development footprint.
(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 Joe Morolong municipality (Planning and Technical Services) have 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;	DEA will be given an opportunity to comment on this Draft Scoping Report and any other requirements highlighted by them will be complied with.
(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;	An advert calling for registration of I&APs was placed in the Kathu Gazette. 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 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	Adverts were not placed in provincial or national newspapers, as the potential impacts will not extend beyond the borders of the 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;	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.

Regulated Requirement	Description
(ii) disability; or (iii) any other disadvantage.	
(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 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.	This will be complied with if final reports are produced later on in the environmental process.
(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	All reports that are submitted to the competent authority will be subject to a public participation process. These include: - Draft Scoping Report - Plan of Study for Environmental Impact Report - Environmental Impact Report - Environmental Management Plan - All specialist reports that form part of this

Regulated Requirement	Description
(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.	environmental process.

13.1 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. Copies and proof of these notifications are included in **Appendix F4**. A list of key stakeholders registered for this process included in the table below.

Table 16: 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 and Sanitation
All parties registered as having prospecting rights on Remainder of Farm 279	Joe Morolong Municipality: Municipal Manager	Department of Science and Technology
Joe Morolong: Ward 4 Councillor	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
Endangered Wildlife Trust.	Department of Mineral Resources	SENTECH
Department of Environmental Affairs, Biodiversity Directorate.	Birdlife Africa.	Land Owner of the Remainder of Farm 280
Land Owner of Portion 11 of Farm 279		

13.2 NOTIFICATION OF AVAILABILITY OF DRAFT SCOPING REPORT

Automatically registered I&AP's as well as those who responded to the Advert or Site notice will be notified of the availability of the Draft Scoping Report for review and comment. A digital copy of the report will be placed on the Cape EAPrac website and Hard copies of the Draft Scoping Report will also be available at the Hotazel Library in Wesseliet St, Hotazel. In order to facilitate effective comment, all State Departments and Key stakeholders listed are provided with digital copies of the report on CD.

13.3 COMMENTS AND RESPONSES ON DRAFT SCOPING REPORT

All comments received on this Draft Scoping Report will be considered, responded to and included in the Final Scoping Report that will be submitted to DEA for decision making.

13.4 AVAILABILITY OF DRAFT SCOPING REPORT

The Draft Scoping Report is made available for a 30 day comment period extending from **02 August 2018 – 03 September 2018** Copies of the report were available at the following locations:

- Cape EAPrac Website: www.cape-eaprac.co.za
- Hotazel Library: Wesseliet Street, Hotazel;

In order to facilitate effective comment amongst stakeholders, all key stakeholders, State Departments and Organs of State were provided with a copy of the Scoping report on CD.

14 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.

14.1 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:

- Footprint Alternatives (Alternatives 1 & 2);
- Grid Connection Alternatives (Alternative a, b, c &d); and
- No Go Alternative.

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

14.2 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.

14.3 ASPECTS TO BE ASSESSED BY SPECIALISTS;

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

- Faunal – Mr Simon Todd;
- Avifaunal – Mr Simon Todd;
- Botanical – Mr Simon Todd;

- Visual – Mr Stephen Stead (VRMA) ; and
- Archaeological – Dr Peter Nilssen.
- Agricultural – Mr Christo Lubbe
- Socio Economic – Savanah Environmental
- Traffic and Transportation – To be appointed
- Stormwater Management – To be appointed

The following additional specialists that provided input into this scoping report have confirmed that there is no further assessment required in their respective disciplines:

- Paleontological – Dr John Almond; and
- Freshwater Ecology – Dr Brian Colloty

Please refer to **sections 8 and 10 - 15** of the report where the aspects to be assessed by each discipline are discussed in more detail.

14.4 ASSESSMENT METHODOLOGY

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

14.4.1 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.

14.4.2 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.

14.4.3 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.

14.4.4 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.

14.4.5 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:

14.4.6 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.

14.4.7 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.

14.4.8 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.

14.5 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 17: Summary of terms of reference for specialist assessments.

Specialist Study	Aim of the Study / Input	Terms of Reference
Ecological / Biophysical	Determine the impacts that the construction, operation and decommissioning of the proposed Hotazel Solar PV Energy Facility, substation / auxiliary building site, distribution line and associated infrastructure will have on vegetation and fauna with particular focus on the impact on NFA protected trees The above assessment must include the NO-GO alternative and include a cumulative assessment.	• Approximately 275ha will be disturbed during construction and shaded during operation. • A six metre wide access road will be required to access the facility. Impacts from dust, collisions and habitat loss needs to be assessed. • 4m wide internal road network will need to be constructed to and between the PV panel arrays. Impact on habitat loss and traffic collisions with fauna need to be assessed. • An on-site substation as well as auxiliary buildings. Impact on habitat needs to be assessed • A distribution line of maximum 7km from the on-site substation to the Hotazel substation will be required and needs to be assessed. • Based on the findings of the Scoping Ecological

Specialist Study	Aim of the Study / Input	Terms of Reference
		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.
Heritage	Assess the proposed Hotazel Solar PV Energy Facility and associated infrastructure (on-site substation, auxiliary buildings, distribution 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 Hotazel Solar PV Energy Facility and associated infrastructure (on-site substation, auxiliary buildings, distribution line, roads etc.) during construction, operation and decommissioning on Archaeological Resources and provide recommendations for avoidance &/ mitigation.	• 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 - Completed	• 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 Joe Morolong 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 Hotazel Solar 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.
Socio Economic	Undertake a Socio Economic Impact Assessment for the proposed project.	A full EIA level Social Impact Assessment (SIA) be conducted as part of the EIA phase. The following activities should be undertaken as part of this process: • Review comments pertaining to social impacts received from members of the public, key stakeholders, and any organ of state during the public review of the Scoping Report. Where applicable,

Specialist Study	Aim of the Study / Input	Terms of Reference
		comments received from the Department of Environmental Affairs (DEA) on the Final Scoping Report (FSR), which may pertain to social impacts or have relevance to the SIA, will also be reviewed. • Collect primary data during a site visit. Interview directly affected and adjacent landowners, and key stakeholders to obtain primary information related to the project site, social environment, and to gain their inputs on the proposed project and its perceived social impact (positive and /or negative). • Update the baseline information with information received during the site visit, as well as any additional information received from the client, or updates to the project description. • Assess impacts identified for the project in terms of their nature, extent, duration, magnitude, probability, status, and significance; as well as the degree to which the impact can be reversed, may cause irreplaceable loss of resources, and can be mitigated. • Identify mitigation measures with which to reduce negative impacts, and enhance positive impacts for inclusion in the Environmental Management Programme (EMPr). As far as possible the mitigation hierarchy of "avoid, minimise, and reduce" will be followed in the mitigation of potential negative impacts. • Identify any conditions for inclusion in the Environmental Authorisation (EA). • Identify any monitoring requirements for inclusion in the EMPr or EA. • Provide a reasoned opinion regarding the acceptability of the project, and whether the proposed project should be authorised.
Freshwater	No further assessment necessary	- None

14.5.1 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.
- Specialists where necessary need to engage with specialists in the same discipline who undertook studies on nearby projects in order to properly understand and assess cumulative impact of the numerous facilities in the area.

- 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.

14.6 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:

- Submission of application form and engagement on the contents of the application form;
- Provided with a copy of Scoping report for review and decision making;
- 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.

14.7 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.

14.8 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 Hotazel PV will consider and comply with the legislated requirements.

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

As shown in this scoping report, the proposed Hotazel Solar 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;
- Open Space Management Plan; and
- Avifaunal Management Plan.

14.10 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.

15 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. Hotazel Solar has been analysed from ecological, avifaunal, freshwater agricultural potential, heritage, socio-economic and visual perspectives, and site constraints and potential impacts identified.

This Draft Scoping report summarises the process to date, reports on the findings of relevant baseline studies.

Cape EAPrac is of the opinion that the information contained in this Draft 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.

All stakeholders are requested to review this Draft Scoping Report and the associated appendices, and provide comment, or raise issues of concern, directly to *Cape EAPrac* within the specified 30-day comment period.

15.1 REMAINDER OF ENVIRONMENTAL PROCESS.

The following process is to be followed for the remainder of the environmental process:

- This Draft Scoping Report is made available for public review and comment for a period of 30 days. Comments received on this document will be responded to and included in the Final Scoping Report which will be submitted to DEA for decision making.
- 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.

16 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
DSR	Draft Scoping Report
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
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
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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