DRAFT ENVIRONMENTAL IMPACT REPORT

for

KAREEKLOOF ENERGY PV AND BESS

On

Portion 1 of the farm Bas Berg 88, Portion 2 of the farm Koppy Alleen 83 and Portions 6, 11, 16 & 17 of the farm Karee Kloof 85

In terms of the

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

Prepared for Applicant: Kareekloof Energy (Pty) Ltd.

Date: 14 March 2024.

Author of Report: Dale Holder

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Report Reference: PIX796/05

Department Reference: 14/12/16/3/3/2/2448

Case Officer: Ms Mathlodi Mogorosi

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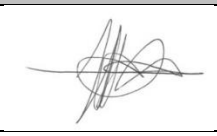
DOCUMENT TRACKING

DOCUMENT HISTORY

REVISION	DATE	AUTHOR
Draft Scoping Report	29 September 2023	Dale Holder
Final Scoping Report	13 November 2023	Dale Holder
Draft Environmental Impact Report	14 March 2024	Dale Holder
Draft Environmental Management Programme	14 March 2024	Dale Holder
Final Environmental Impact Report	Pending	
Final Environmental Management Programme	Pending	

APPROVAL FOR RELEASE

NAME	TITLE	SIGNATURE
Dale Holder	Senior Environmental Practitioner	

DISTRIBUTION

DISTRIBUTION LIST
Registered Interested and Affected Parties
Department of Forestry, Fisheries and the Environment
Kareekloof Energy (Pty) Ltd

SUBMISSION AND CORRESPONDENCE WITH COMPETENT AUTHORITY

SUBMISSION / CORRESPONDENCE	DATE
Pre-Application meeting request submitted	17 May 2023
Pre-Application meeting held	29 May 2023
Application form submitted	29 September 2023[1]
Application form acknowledged	09 October 2023
Draft Scoping Report submitted	29 September 2023
Draft Scoping Report acknowledged	09 October 2023
Competent Authority comment on Draft Scoping Report	06 November 2023
Final Scoping Report submitted	13 November 2023
Final Scoping Report acknowledged	21 November 2023
Competent Authority acceptance of Final Scoping Report	13 December 2023
Draft Environmental Impact Report submitted	14 March 2024
Draft Environmental Impact Report acknowledged	Pending
Competent Authority comment on Draft Environmental Report	Pending

[1] The 29 September submission was rejected by the Department, due to the pre application meeting minutes not attached to the Application form. The Application and DSR was resubmitted on 09 October 2023 and public comment period adjusted accordingly.

Final Environmental Impact Report Submitted	Pending

APPOINTED ENVIRONMENTAL ASSESSMENT PRACTITIONER:
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 20 years' experience as an environmental practitioner. **Registrations:** Registered Environmental Assessment Practitioner, EAPASA (2019/301)

PURPOSE OF THIS REPORT:
I&AP Review and Comment

APPLICANT:
Kareekloof Energy (Pty) Ltd

CAPE EAPRAC REFERENCE NO:
PIX796/05

DEPARTMENT REFERENCE:
14/12/16/3/3/2/2448

SUBMISSION DATE:
14 March 2024

DRAFT ENVIRONMENTAL IMPACT REPORT

in terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended) & Environmental Impact Regulations2014 (as amended)

Kareekloof Solar PV Facility and BESS

Portion 1 of the farm Bas Berg 88, Portion 2 of the farm Koppy Alleen 83 and Portions 6, 11, 16 & 17 of the farm Karee Kloof 85.

Submitted for:

Departmental Review

Report Issued by:

Cape Environmental Assessment Practitioners

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REPORT DETAILS

Title:	Draft Environmental Impact Report – Kareekloof Solar PV Facility and BESS
Purpose of this report:	The Draft Scoping Report (DSR) was made available to all registered and potential Interested and Affected Parties (I&APs) for review and comment and all comments received were incorporated into the Final Scoping Report that was submitted to and accepted by the competent authority. This DSR formed part of a series of reports and information sources that are being provided during the Scoping and Environmental Impact Reporting Process for the proposed Kareekloof Solar PV Facility and BESS project near De Aar in the Northern Cape Province. Registered I&APs will be given an opportunity to comment on the following reports as part of this environmental process: - Draft Scoping Report (complete), - Draft Environmental Impact Report; - All Specialist Studies, and - Draft Environmental Management Programme. In accordance with the regulations, the objectives of an environmental process are 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 was available to all registered and potential interested and affected parties for a 30-day review and comment period extending from 29 September 2023 – 10 October 2023[2]. This Draft Environmental Impact report is available for a further 30-day review and comment period extending from 14 March 2024 – 16 April 2024. All comments received during this comment period will be incorporated into the Final Environmental Impact Report that will be submitted to the DFFE for Decision making.
Prepared for:	Kareekloof Energy (Pty) Ltd
Published by:	Cape Environmental Assessment Practitioners (Pty) Ltd. (Cape EAPrac)
Authors:	Mr Dale Holder
Cape EAPrac Ref:	PIX796/05
DEA Case officer & Ref. No:	Ms Mathlodi Mogorosi - 14/12/16/3/3/2/2448
Date:	14 March 2024.

[2] Additional days were added to the public participation process to account for the resubmission of the Application Form and Draft Scoping Report on 09 September 2023.

To be cited as:	*Cape EAPrac,* 2024. Draft Environmental Impact Report for Kareekloof Solar PV Facility and BESS. Report Reference: PIX/796/05. George.

TECHNICAL CHECKLIST[3]

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

Project Name		**Kareekloof Energy PV and BESS**
Applicant Details	Applicant Name:	Kareekloof Energy (Pty) Ltd Kareekloof Energy (Pty) Ltd is a Special Purpose Vehicle (SPV) incorporated for the sole purpose of developing, constructing, and operating an up to 900MW solar PV facility including a Battery Energy Storage System (BESS) facility, located on Portion 1 of the farm Bas Berg 88, Portion 2 of the farm Koppy Alleen 83 and Portions 6, 11, 16 & 17 of the farm Karee Kloof 85 situated near De Aar in the Northern Cape Province.
	Company Registration Number:	2023 / 725974 / 07
	BBBEE Status:	Exempt Micro Enterprise
	Project Name:	Kareekloof Energy PV and BESS
Site Details		
Size of the property	Description and Size in hectares of the affected property (Size as per the Deed is in brackets).	PV/BESS Site: - Portion 1 of the farm Bas Berg 88: size1878.04 (1881.98) - Portion 2 of the farm Koppy Alleen 83: size 44.95 (38.10) - Portion 6 of the farm Karee Kloof 85: size 631.61 (630.34) - Portions 11 of the Farm Karee Kloof 85: size 576.63 (662.25) - Portion 16 of the Farm Karee Kloof 85: size 23.08 (23.00) - Portion 17 of the Farm Karee Kloof 85: size 357.60 (355.60)
Size of the study area	Size in ha of initial study area. (this is also the total of all the properties affected)	3512 ha (3591 ha)
Development Footprint	This includes the total footprint of PV panels, BESS auxiliary buildings, On-site Substation, Mini-substations, inverter stations and internal roads.	The Total Development area is 1530ha: including. - PV= 1498ha, (within the PV footprint of 1498ha: optional 3 x BESS 43ha, internal 4m wide roads 70ha, temporary lay downs 6ha, string inverters, mini subs,) - 3 x On-Site Substations =14ha, (The On-site Substations will be in areas of overlap of the PV/BESS and the EGI. The EGI will be a separate application.) - permanent auxiliary structures (buildings, permanent lay-down areas) =13ha and - access 7m wide roads =5ha. Total Fenced Area is 1787ha.

[3] Please refer to the site layout plan attached in appendix D which provides the spatial locations of the infrastructure depicted in this checklist.

Project Name		Kareekloof Energy PV and BESS
PV Technology Details		
Capacity of the facility	Capacity of the PV facility (in MW)	Net generation (contracted) capacity of up to 900MW_{AC}, which will consist of 18 stages or projects that may be developed singly or in groups in a phased-development approach. Each of the 18 x 50MW stages will be self-sufficient up to the point of an On-site Substation or a collective BESS.
Solar Technology selection	Type of technology	- Solar photovoltaic (PV) technology (mono-facial or bifacial) with single-axis tracking or fixed-tilt, or double axis tracking mounting structures, as well as associated infrastructure, which will include: - Laydown area; - Access and Internal Road network; - Auxiliary buildings (33kV switch room, gatehouse and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.); - Facility (IPP or On-Site) substation; - Inverter-station, transformers and internal electrical reticulation (underground cabling); - Rainwater Tanks; and - Perimeter fencing and security infrastructure.
	Structure height	PV panels with a maximum height of ± 4m above the ground
	Surface area to be covered (including associated infrastructure such as roads)	1498ha
	Structure orientation	Preferred technology - single axis track used in portrait orientation with strings of 1x ±30 panels. Mounting using hammered in uprights and stabilising cables (as a worst case there will be 400mm diameter holes). Alternative technologies: fixed-tilt: north-facing at a defined angle of tilt, single or double axis tracking: mounted in a north-south orientation, tracking from east to west.
	Laydown area dimensions	Approximately 2 ha temporary laydown area will be required for each development site of 50MW and will be situated within the assessed footprint. Temporary lay down area total at any one time will probably not exceed 12 ha due to development in stages.
BESS Technology Details		
BESS technology section	Capacity of BESS facility (in MWh)	3600 MWh
	Type of technology (preferred)	Redox Flow, for example Vanadium Redox Flow Battery (VRB)
	Type of technology (alternatives)	Lithium-Ion, Sodium-Ion, Solid State, Liquid Metal (https://ambri.com/) and other technology types will be considered
	Structure height	Containerised batteries less than 5m high except for lightening conductors and vent pipes. Storage tanks may be required for the VRB and could be 7m high, if the non-containerised type of VRB battery is installed.
	Surface area to be covered (including associated infrastructure such as roads)	43 ha (3 x ±14 ha) (including electrolyte storage tanks of 27 ha (3 x ±9 ha) for redox flow battery)
	Structure locations	Three BESS sites, each ± 14 ha near each of the 3 On-Site Substations-

The Applicant, Kareekloof Energy (Pty) Ltd, is proposing the construction of a photovoltaic (PV), and Battery Energy Storage System (BESS) energy facility (known as Kareekloof Solar PV Facility and BESS) located on

the Portion 1 of the farm Bas Berg 88, Portion 2 of the farm Koppy Alleen 83 and Portions 6, 11, 16 & 17 of the farm Karee Kloof 85 situated near De Aar in the Northern Cape Province.

The infrastructure associated with the up to 900MW PV facility includes:

- PV modules and mounting structures;
- Inverters and transformers;
- Cabling;
- Battery Energy Storage System (BESS);
- Site and internal access roads;
- Auxiliary buildings (33 kV switch room, gatehouse and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.);
- Perimeter fencing and security infrastructure;
- Rainwater tanks;
- Temporary and permanent laydown areas;
- Facility substation.
- Own-build grid connection solution, including on-site substations.

It must be noted that this application only includes the IPP Portion of the EGI (i.e. the on site substations) the remainder of the EGI (i.e. those components that will be transferred to Eskom – namely, the Eskom Side of the on-site substations and the Overhead powerlines to the MTS) has been assessed[4] as part of a separate Basic Assessment Process.

LOCATION OF PREFFERED ALTERNATIVE[5]

The following description provides the summary of the currently preferred footprint that forms part of this scoping process. The current footprint has been informed by specialist input but will be further refined in the Impact Assessment Phase of this Environmental Process.

The co-ordinates of the preferred alternative are reflected in the table below.[6]

Layout Alternative 2 - Preferred	Latitude	Longitude
Area 1	024° 19' 26.24" E	30° 17' 05.81" S
	024° 19' 08.48" E	30° 17' 00.86" S
	024° 19' 03.68" E	30° 16' 53.48" S
	024° 18' 15.28" E	30° 16' 53.41" S
	024° 18' 07.53" E	30° 16' 48.95" S
	024° 18' 10.42" E	30° 16' 43.92" S
	024° 18' 03.60" E	30° 16' 16.82" S
	024° 17' 59.34" E	30° 16' 16.82" S
	024° 17' 59.25" E	30° 16' 11.29" S

[4] In order to be able to assess the Electrical Grid Infrastructure Cumulatively with the PV facility, the same specialists used for the PV facility have undertaken assessments of the Electrical Grid Infrastructure.

[5] The footprint of Kareekloof Energy is not rectangular. The co-ordinates reflected in this table indicate the bend points of the PV Footprint for each of the spatially separated areas.

[6] This Environmental Assessment Process includes consideration and assessment of the IPP portion of the on-site substations only. The powerline and remainder of infrastructure needed to connect this facility to the national grid is being considered as part of a separate Basic Assessment Process.

Layout Alternative 2 - Preferred	Latitude	Longitude
	024° 18' 05.53" E	30° 16' 02.81" S
	024° 18' 12.78" E	30° 16' 00.71" S
	024° 19' 09.99" E	30° 16' 19.17" S
	024° 19' 59.96" E	30° 16' 59.69" S
	024° 19' 41.89" E	30° 17' 03.00" S
	024° 19' 26.24" E	30° 17' 05.81" S
	024° 19' 34.73" E	30° 17' 54.63" S
	024° 18' 48.10" E	30° 17' 44.32" S
	024° 18' 48.37" E	30° 17' 34.27" S
	024° 18' 31.79" E	30° 17' 33.97" S
	024° 18' 33.11" E	30° 17' 11.11" S
	024° 18' 47.65" E	30° 17' 19.48" S
Area 2	024° 18' 50.47" E	30° 17' 19.43" S
	024° 18' 50.37" E	30° 17' 28.01" S
	024° 19' 01.72" E	30° 17' 27.76" S
	024° 19' 01.79" E	30° 17' 16.98" S
	024° 20' 04.62" E	30° 17' 05.80" S
	024° 19' 53.40" E	30° 17' 45.56" S
	024° 19' 34.73" E	30° 17' 54.63" S
	024° 18' 33.05" E	30° 18' 14.64" S
	024° 17' 59.41" E	30° 18' 14.47" S
	024° 17' 54.94" E	30° 17' 52.95" S
	024° 18' 10.62" E	30° 17' 39.64" S
	024° 18' 19.92" E	30° 17' 47.18" S
	024° 18' 23.10" E	30° 17' 52.99" S
Area 3	024° 18' 34.56" E	30° 17' 52.90" S
	024° 18' 44.13" E	30° 17' 46.73" S
	024° 19' 24.59" E	30° 17' 56.00" S
	024° 19' 16.38" E	30° 17' 59.12" S
	024° 19' 09.02" E	30° 18' 03.34" S
	024° 19' 03.09" E	30° 18' 09.97" S
	024° 18' 33.05" E	30° 18' 14.64" S
	024° 18' 31.36" E	30° 17' 10.10" S
	024° 18' 29.43" E	30° 17' 38.73" S
	024° 18' 15.00" E	30° 17' 38.55" S
	024° 18' 15.06" E	30° 17' 34.30" S
	024° 18' 04.11" E	30° 17' 27.96" S
	024° 18' 04.02" E	30° 17' 10.51" S
Area 4.	024° 17' 53.10" E	30° 17' 10.44" S
	024° 17' 52.82" E	30° 17' 21.25" S
	024° 17' 32.64" E	30° 17' 09.21" S
	024° 17' 38.86" E	30° 16' 46.93" S
	024° 17' 51.70" E	30° 16' 46.77" S
	024° 18' 31.36" E	30° 17' 10.10" S
Area 5.	024° 16' 46.92" E	30° 15' 51.84" S

Layout Alternative 2 - Preferred	Latitude	Longitude
	024° 16' 34.40" E	30° 15' 30.68" S
	024° 16' 34.58" E	30° 15' 16.11" S
	024° 17' 15.33" E	30° 14' 59.18" S
	024° 17' 23.40" E	30° 15' 13.35" S
	024° 17' 22.98" E	30° 15' 28.06" S
	024° 17' 25.24" E	30° 15' 32.18" S
	024° 17' 25.58" E	30° 15' 51.76" S
	024° 16' 46.92" E	30° 15' 51.84" S
Area 6	024° 16' 48.49" E	30° 15' 54.54" S
	024° 17' 24.79" E	30° 15' 54.66" S
	024° 17' 26.84" E	30° 15' 55.26" S
	024° 17' 26.92" E	30° 16' 00.39" S
	024° 17' 23.28" E	30° 16' 05.30" S
	024° 17' 23.23" E	30° 16' 07.82" S
	024° 17' 11.92" E	30° 16' 18.56" S
	024° 16' 58.44" E	30° 16' 11.02" S
	024° 16' 48.49" E	30° 15' 54.54" S
Area 7	024° 15' 57.60" E	30° 15' 39.97" S
	024° 16' 37.58" E	30° 16' 03.41" S
	024° 16' 37.94" E	30° 16' 10.57" S
	024° 16' 49.16" E	30° 16' 10.30" S
	024° 16' 55.37" E	30° 16' 13.87" S
	024° 16' 52.79" E	30° 16' 36.96" S
	024° 16' 41.58" E	30° 16' 47.68" S
	024° 15' 56.39" E	30° 16' 25.67" S
	024° 15' 37.22" E	30° 15' 57.75" S
	024° 15' 57.60" E	30° 15' 39.97" S
Area 8	024° 15' 10.85" E	30° 15' 12.41" S
	024° 15' 54.29" E	30° 15' 37.89" S
	024° 15' 35.28" E	30° 15' 54.49 S
	024° 15' 09.18" E	30° 15' 15.95" S
	024° 15' 10.85" E	30° 15' 12.41" S
Area 9	024° 15' 54.65" E	30° 15' 36.53" S
	024° 15' 11.48" E	30° 15' 11.21" S
	024° 15' 13.79" E	30° 15' 06.41" S
	024° 15' 54.29" E	30° 15' 06.21" S
	024° 15' 54.65" E	30° 15' 36.53" S
Area 10	024° 16' 06.18" E	30° 15' 43.25" S
	024° 16' 12.14" E	30° 15' 35.06" S
	024° 16' 25.14" E	30° 15' 35.04" S
	024° 16' 37.54" E	30° 15' 55.93" S
	024° 16' 37.65" E	30° 16' 01.61" S

Layout Alternative 2 - Preferred	Latitude	Longitude
	024° 16' 06.18" E	30° 15' 43.25" S

Access Road[7]	Latitude	Longitude
Access 1 (RAP 1)	024° 18' 28.70" E	30° 17' 43.62" S
Access 2 (RAP 2)	024° 20' 04.39" E	30° 17' 01.67" S
Access 3 (RAP 3)	024° 17' 40.06" E	30° 14' 55.92" S

IPP Substation[8]	Latitude	Longitude
Substation 1	24° 16' 42.60" E	30° 15' 55.81" S
Substation 2	24° 18' 29.80" E	30° 16' 57.26" S
Substation 3	24° 19' 04.38" E	30° 17' 05.68" S

BESS Area[9]	Latitude	Longitude
BESS 1	24° 16' 36.88" E	30° 15' 42.49" S
BESS 2	24° 18' 42.37" E	30° 17' 01.12" S
BESS 3	24° 18' 54.39" E	30° 17' 02.66" S

CONTENTS OF A DRAFT ENVIRONMENTAL IMPACT REPORT.

Appendix 3 of Regulation 982 of the 2014 EIA Regulations contains the required contents of an Environmental Impact Report. The checklist below serves as a summary of how these requirements were incorporated into this Impact Report.

Requirement	Details
(1) 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 - The EAP who prepared the report; and The expertise of the EAP, including, a curriculum vitae.	The details of the EAP are included at the beginning of this Final EIR (overleaf from the cover page). The EAP's declaration and CV is also included in Annexure G3.
(b) the location of the activity, including – The 21-digit Surveyor General code of each cadastral land parcel; Where available, the physical address and farm name; 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 on Portion 1 of the farm Bas Berg 88, Portion 2 of the farm Koppy Alleen 83 and Portions 6, 11, 16 & 17 of the Farm Karee Kloof 85 situated 50km northeast of De Aar within the Pixley Ka Seme District Municipality in the Northern Cape Province. <u>21-digit Surveyor General codes:</u> - Bas Berg 1/88: C05700000000008300002 - Koppy Alleen 2/83: C05700000000008300002 - Karee Kloof 6/85: C05700000000008500006 - Karee Kloof 11/85: C05700000000008500011 - Karee Kloof 16/85: C05700000000008500016 - Karee Kloof 17/85: C05700000000008500017

[7] This table depicts the position of the proposed road access points (RAP's) to the PV footprints. The Access Road from the R48 to the point where it enters the PV footprints is existing.

[8] This table depicts the approximate center point of the IPP portion of the on-site substations.

[9] This table depicts the approximate center-point of the proposed BESS Areas.

Requirement	Details
(c) a plan which locates the proposed activity, or activities applied for as well as the associated structures and infrastructure at an appropriate scale.	Detailed layout plans are attached in Appendix D.
(d) a description of the scope of the proposed activity, including - All listed and specified activities triggered and being applied for; and A description of the associated structures and infrastructure related to the development.	Sections 2 and 3.2 EIR.
(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 content.	Section 3 of this EIR.
(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.	Section 2.3 of this EIR.
(g) A motivation for the preferred development footprint within the approved site.	Section 2.4 and 2.5 of this EIR.
(h) A full description of the process followed to reach the proposed development footprint within the approved site, including - • Details of the development footprint alternatives considered; • Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; • 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; • The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; • The impacts and risks identified, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts - can be reversed; may cause irreplaceable loss of resources; (and can be avoided, managed or mitigated. • The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks; • 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; • The possible mitigation measures that could be applied and level of residual risk; • If no alternative development locations for the activity were investigated, the motivation for not considering such: and • A concluding statement indicating the preferred alternative development location within the approved site.	Sections 2.4, 2.5, and sections 9 of this EIR. Please also refer to Annexures F2, F4 and F5 for the evidence of the initial public participation that took place during the scoping phase. Details on public participation that has taken place during the Impact Assessment Phase will be included in the Final EIR that will be submitted to the competent authority for decision making.
(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 - A description of all environmental issues and risks that were identified during the environmental impact assessment process; and 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.	Please refer to the Plan of Study for EIA that Formed part of the Final Scoping Report. Also refer to section 7 of this EIR.
(j) An assessment of each identified potentially significant impact	Section 7 of this EIR

Requirement	Details
and risk, including - • Cumulative impacts; • The nature, significance and consequences of the impact and risk; • The extent and duration of the impact and risk; • The probability of the impact and risk occurring; • The degree to which the impact and risk can be reversed; • The degree to which the impact and risk may cause irreplaceable loss of resources; and • 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.	Section 8 of the EIR
(l) An environmental impact statement which contains – • A summary of the key findings of the environmental impact assessment; • 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 • A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	Sections 7.10 and 7.11 of this EIR. The Site Layout Plan attached in appendix D, includes the high sensitivity features identified by the participating specialists.
(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.	Appendix H and section 8 of this EIR.
(n) The final proposed alternatives which respond to the impact management measures, avoidance and mitigation measures identified through the assessment.	Section 8 of the EIR read in conjunction with sections 2.4 and 2.5.
(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.	Section 8 includes a table of all mitigation measures and identifies which mitigation is included in the EMPr and which should be included as conditions of authorisation.
(p) A description of assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.	Section 1.3 of this EIR.
(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.	Section 1.1 and 7.11 of this Final EIR.
(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.	Section 5.
(s) An undertaking under oath or affirmation by the EAP in relation to: • The correctness of the information provided in the reports; • The inclusion of comments and inputs rom stakeholders and I&APs; • The inclusion of inputs and recommendations from the specialist reports where relevant; and • Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	Annexure G3.
(t) Where applicable, details of any financial provisions for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts;	Not applicable.

Requirement	Details
(u) An indication of any deviation from the approved scoping report, including the plan of study, including – Any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and A motivation for the deviation.	No deviation from the plan of study for EIA has occurred
(v) Any specific information that may be required by the competent authority.	Refer to table below.
(w) Any other matters required in terms of section 24(4)(a) and (b) of the Act.	None.

COMPETANT AUTHORITY ACCEPTANCE OF FINAL SCOPING REPORT

The Competent Authority (DFFE: Chief Directorate: Integrated Environmental Authorisations) accepted the Final Scoping Report on 13 December 2024. This acceptance was subject to certain requirements which need to be included / considered in the Environmental Impact Reporting Phase of the Environmental Process. These are detailed in the table below.

Comment	Response
(a) Listed Activities	
(i) The EIAr must provide an assessment of the impacts and mitigation measures for each of the listed activities applied for.	Please refer to section 6 of the Draft EIR.
(ii)The listed activities represented in the EIAr, and the application form must be the same and correct.	Please refer to section 3.1.2. The activities reflected here and those assessed in section 6 of the Draft EIR are the same as those included in the application form.
(iii)Please also ensure that the potential impacts on the affected Critical Biodiversity Areas indicated in Listing Notice 3 are fully assessed in the EIAr.	Please refer to Appendix E1 for the Terrestrial Biodiversity Impact Assessment where the impacts on the CBA have been assessed in full.
(b)Public Participation	
(i)Please ensure that comments from all relevant stakeholders are submitted to the Department with the EIAr. This includes but is not limited to neighbouring property owners, the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development & Land Reform, Department of Water and Sanitation, Emthanjeni Local Municipality, Pixley ka Seme District Municipality, South African National Roads Agency Limited (SANRAL), Northern Cape Heritage Resources Authority, South African Heritage Resources Agency (SAHRA), Department of Transport and Public Works, The South African Square Kilometre Array, Department of Agriculture, Forestry and Fisheries: Biodiversity & Conservation Directorate, Department of Mineral Resources and Energy, Provincial Department of Agriculture, Eskom, Endangered Wildlife Trust (EWT) and Birdlife Africa.	All parties listed by the Department in this section will be given a further opportunity to comment on this Draft Environmental Impact Report. During the comment period on the Draft Scoping Report, the only party in this list that commented was the DFFE: Directorate Biodiversity Conservation.
(ii) Please ensure that all issues raised, and comments received on the draft SR and draft EIAr from registered I&APs and organs of state which have jurisdiction in respect of the proposed activity are adequately addressed in the final EIAr. Proof of correspondence with the various stakeholders must be included in the final EIAr. Should you be unable to obtain comments, proof must be submitted to the Department of the	Please note that there is no public participation plan that has been approved in respect of this project, as the regulation's requiring such a plan were appealed. Please refer to the comments and responses report attached F2. This will be updated on completion of the current public participation process. i.e. comment period on the Draft Environmental Impact Report.

Comment	Response
attempts that were made to obtain comments. The Public Participation Process must be conducted in terms of the approved public participation plan and Regulation 39, 40, 41, 42, 43 & 44 of the EIA Regulations 2014, as amended.	
(iii) A comments and response trail report (C&R) must be submitted with the final EIAr. The C&R report must incorporate all comments (pre and post-submission of the draft EIAr) received for this development. The C&R report must be a separate document from the main report and the format must be in the table format which reflects the details of the I&APs and date of comments received, actual comments received, and response provided. Please ensure that comments made by I&APs are comprehensively captured (copy verbatim if required) and responded to clearly and fully. Please note that a response such as "Noted" is not regarded as an adequate response to I&APs comments.	Please refer to the comments and responses report attached F2. This will be updated on completion of the current public participation process. i.e. comment period on the Draft Environmental Impact Report.
(c) Alternatives	
(i) Please describe each of the preferred alternative types and provide a detailed motivation on why it is preferred.	Please refer to section 2.11 for details of the alternatives that were considered as well as the motivation as to why the selected alternative is preferred.
(ii) If no alternative locations for the activity were investigated, please motivate for not considering such.	Please refer to the site selection process outlined in section 2.10 for details on how the preferred location of the activity was determined.
(d) Project Scope and Coordinates	
(i)The EIAr must provide the following: - Clear indication of the envisioned area for the proposed Kareekloof Solar Photovoltaic Facility, as well as the BESS, and all associated infrastructure should be mapped at an appropriate scale. - Clear description of all associated infrastructure (locations, lengths, widths and/or capacities). This description must include, but is not limited to the following: - Ancillary infrastructure; and - Electrical and service infrastructure forming part of the application.	Please refer to the Site Layout Plan attached in Appendix D as well as the technical project details on pages vi – xii.
(ii)The EIAr must provide the corner coordinate points for the proposed development site, as well as the start, middle and end point of any linear activities.	The co-ordinates provided on pages x-xi include the bend points of all the PV areas as well as start, middle and end points of all linear infrastructure.
(e)Layout & Sensitivity Maps	
(i)A copy of the final preferred layout map. All available biodiversity information must be used in the finalisation of the layout map. Existing infrastructure must be used as far as possible e.g. roads. The layout map must indicate the following: - Permanent laydown area footprint; - Internal roads indicating width (construction period width and operation period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible);	Please refer to the Site Layout Plan attached in Appendix D. All details listed here are included in the Site Layout Plan. The plan also includes a grid reference which will allow the Department to comment on specific components reflected in the plan.

Comment	Response
- Wetlands, drainage lines, rivers, streams and water crossing of roads and cables indicating the type of bridging structures that will be used; - The location of sensitive environmental features on-site e.g. CBAs, heritage sites, wetlands, drainage lines etc. that will be affected by the facility and its associated infrastructure; - Substation(s) and/or transformer(s) sites including their entire footprint; - Location of access and service roads; - All existing infrastructure on the site, especially railway lines and roads; - Buffer areas; - Buildings, including accommodation; and - All "no-go" areas.	
(ii) An environmental sensitivity map indicating environmentally sensitive areas and features identified during the assessment process e.g., CBAs, heritage sites, wetlands, drainage lines etc. that will be affected by the facility and its associated infrastructure.	The preferred alternative overlayed onto the site sensitivity map is attached in Appendix D. Discussion on the site sensitivities is included in section 5.11 of this report.
(iii) A map combining the final layout map superimposed (overlain) on the environmental sensitivity map.	Appendix D.
(f) Specialist assessments	
(i) Please note that the Department considers a 'no-go' area, as an area where no development of any infrastructure is allowed; therefore, no development of associated infrastructure including access roads is allowed in the 'no-go' areas.	It is confirmed that the EAP's interpretation of a "no-go" area is the same as the Department.
(ii) Should the specialist definition of a 'no-go' area differ from the Department's definition; this must be clearly indicated. The specialist must also indicate the 'no-go' area's buffer if applicable.	All the specialists have defined the no go areas and buffers. The no go areas have been completely avoided by the preferred layout. These is some minor encroachment into the buffers of the no go areas by fencing infrastructure only. The specialists have confirmed this to be acceptable.
(iii) All specialist studies must be final, and provide detailed/practical mitigation measures for the preferred alternative and recommendations, and must not recommend further studies to be completed post EA.	All specialist studies are final and mitigation measures have been summarised in section 8 of this report and incorporated into the Environmental Management Programme.
(iv) Should the appointed specialists specify contradicting recommendations, the EAP must clearly indicate the most reasonable recommendation and substantiate this with defendable reasons; and where necessary, include further expertise advice.	No contradicting recommendation have been made all specialist recommendations are aligned.
(v) The Department's screening tool identified the requirement for a geotechnical and hydrology assessment. The final SR does not indicate if these assessments will be provided in the EIAr. Please ensure that these assessments are included in the EIAr. Alternatively, sufficient motivation must be provided for the assessment not being undertaken, including the site sensitivity verification required by the Protocols.	Please refer to the motivation attached in section 3.4.17.

Comment	Response
(g) Cumulative Assessment	
(i) Regarding cumulative impacts: - Clearly defined cumulative impacts and where possible the size of the identified impact must be quantified and indicated, i.e., hectares of cumulatively transformed land. - A detailed process flow must be provided to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project. - Identified cumulative impacts associated with the proposed development must be rated with the significance rating methodology used in the process. - The significance rating must also inform the need and desirability of the proposed development. - A cumulative impact environmental statement must be provided on whether the proposed development must proceed.	Please refer to the detailed assessment of cumulative impacts included in section 6.11
(h)General	
(i) The EIAr must provide the technical details for the proposed facility in a table format as well as their description and/or dimensions.	These are included in a Table format on pages vii – xi.
(ii)Details of the future plans for the site and infrastructure after decommissioning in 20-30 years and the possibility of upgrading the proposed infrastructure to more advanced technologies must be indicated.	These details are included in section 7 of the EMPr that is attached in appendix H
(iii)Should a Water Use License be required, proof of application for a license needs to be submitted.	Confluent Environmental has been appointed to facilitate the water use licence application. This water use licence application in in progress with the Department of Water and Sanitation (DWS). The DWS application reference number is WU35671.
(iv)The EAP must provide landowner consent for all farm portions affected by the proposed project, whether the project component is linear or not, i.e., all farm portions where the access road, solar PV modules and associated infrastructure are to be located.	Please refer to appendix G2 for the landowner consent for all affected land portions. Please note that the same landowner, Diedrick J Vermeulen, is the owner in respect of all of the affected portions.
The applicant is hereby reminded to comply with the requirements of Regulation 45 of GN R982 of 04 December 2014, as amended, with regard to the time period allowed for complying with the requirements of the Regulations.	These timeframes are known to the applicant and the Final Environmental Impact Report will be submitted within the allowable timeframes.
You are hereby reminded of Section 24F of the National Environmental Management Act, Act No. 107 of 1998, as amended, that no activity may commence prior to an environmental authorisation being granted by the Department.	The applicant is aware of this requirement and confirmed that no activities will commence until such time as an Environmental Authorisation is granted by the Department.

ORDER OF REPORT

Report Summary

Draft Environmental Impact Report – Main Report

Appendix A	:	Location, Topographical Plans
Appendix B	:	Biodiversity Overlays
Appendix C	:	Site Photographs
Appendix D	:	Solar Facility Layout Plans[10]
Appendix D1	:	Cluster Map showing proximity of Kareekloof Solar PV Energy Facility to other projects in the vicinity.
Appendix E	:	Supplementary Reports (Specialist Reports and Technical Reports)
Appendix E1	:	Terrestrial Biodiversity[11] Assessment (Enviro Insight, 2024)
Appendix E2	:	Avifaunal Assessment (Enviro Insight, 2024)
Appendix E3	:	Aquatic Biodiversity Assessment (Tate Environmental / Enviro Insight, 2024)
Appendix E4	:	Heritage Assessment (Beyond Heritage, 2024)
Appendix E5	:	Agricultural Assessment (Lanz, 2024)
Appendix E6	:	Visual Assessment (Stead, 2024)
Appendix E7	:	Battery Energy Storage System Risk Assessment (Mitchell, 2024)
Appendix E8	:	Social Impact Assessment (Barbour, 2024)
Appendix F	:	Public Participation Process
Appendix F1	:	I&AP Register
Appendix F2	:	Comments and Response Report
Appendix F3	:	Adverts & Site Notices
Appendix F4	:	Draft Scoping Report Notifications
Appendix F5	:	Draft Scoping Report Comments and Responses.
Appendix F6	:	Draft Environmental Impact Report Notifications (to be included in Final Environmental Impact Report)

[10] This includes a general plan of the currently preferred layout alternative (Layout Alternative 3) as well as this alternative overlayed onto the Environmental Sensitivity Map.

[11] This includes Terrestrial Biodiversity, Plant Species and Animal Species Themes but excludes Avifauna which are reported separately.

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NON-TECHNICAL SUMMARY

I. INTRODUCTION

Cape EAPrac has been appointed by Kareekloof Energy (Pty) Ltd, hereafter referred to as the Applicant, as the independent Environmental Assessment Practitioner (EAP), to facilitate the Scoping and Environmental Impact Reporting process required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed development of the Kareekloof Solar PV Facility and BESS (hereafter referred to as Kareekloof Solar PV) on Portion 1 of the farm Bas Berg 88, Portion 2 of the farm Koppy Alleen 83 and Portions 6, 11, 16 & 17 of the farm Karee Kloof 85 near De Aar in the Northern Cape Province of South Africa.

The total generation capacity of the solar facility will be up to 900MW for input into the national Eskom grid.

The project will feed into the National Grid via the proposed Eskom Krypton MTS. The grid connection to connect this project to the National Grid has been assessed as part of a separate environmental process[12]. This current application process only includes the IPP portion of the on-site substation.

The purpose of the **Draft Environmental Impact Report** (Draft EIR) is to describe the environment to be affected, the proposed project, to present the site constraints identified by the various specialist during their site assessments and identify and assess impacts of this development on the receiving environment. This information is presented to all registered and potential Interested and Affected Parties (I&AP's), organs of state, state departments and the competent authority for review and comment.

In compliance with Chapter 6 of the 2014 EIA regulations (as amended), Draft Scoping Report was available for a 41 **Day** period extending from **Friday 29 September 2023 – Thursday 09 November 2023.**

This Draft Environmental Impact Report is available for a further **30-day** review and comment period from **14 March 2024 – 16 April 2024.**

All comments received on the Draft EIR will be incorporated into the Final EIR that will be submitted to the Department of Forestry, Fisheries and the Environment (DFFE) for consideration and decision making.

II. RECOMMENDATION OF THIS DRAFT ENVIRONMENTAL IMPACT REPORT.

Neither the outcome of preceding scoping phase, nor this Impact Assessment phase, has identified any fatal flaws associated with the development of the proposed Kareekloof Energy PV and BESS Facility. All impacts identified during the scoping phase have been avoided or mitigated to acceptable levels and no high post mitigation impacts or risks are envisioned.

It is Cape EAPrac's reasoned opinion that the preferred Alternative (Layout Alternative 3) can be considered for approval by the competent Authority subject to the outcome of the public participation process and on condition that all the suggested mitigation measures are implemented, all other legislative approvals be obtained, and that the final EMPr be strictly adhered to.

Please refer to section 7 of this report for justification of this statement.

III. 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 of developing renewable energy generation in South Africa, Northern Cape

[12] It is important to note that in order to assess cumulative impacts of the facility and the EGI, the same specialist team undertook assessments for the EGI.

Province and globally is considered in section 1, while the project specific need and desirability is considered in section 2.8 of this report.

IV. ENVIRONMENTAL LEGISLATIVE REQUIREMENTS

The current assessment is being undertaken in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998)[13]. 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 Forestry, Fisheries and the Environment) based on the findings of an Environmental Assessment.

The proposed development entails a number of listed activities, which require a Scoping & Environmental Impact Reporting process to be followed. Such a process must be conducted by an independent registered EAP[14]. Cape EAPrac has been appointed to undertake this process.

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

Table 1: NEMA 2014 (As amended in April 2017) listed activities applicable to Kareekloof Solar PV.

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates. Ensure to include thresholds/area/footprint applicable.
11(i)	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;	The three On-Site Substations will have a capacity of up to 300MVA each. Three 132kV powerlines will be routed in an EGI corridor/servitude from the three on-site substations to the grid connection
12(ii)(c)	The development of— (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	Some of the project infrastructure, such as internal roads are within 32m of the Aquatic features identified by the aquatic specialist.
14	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	The BESS proposed will include the storage of dangerous goods in excess of the threshold of this activity.
28(ii)	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	The proposed PV and BESS Development constitutes Commercial / Industrial use and will occur on a property currently used for agricultural purposes.

[13] 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). These regulations came into effect on 08 December 2014 and replace the EIA regulations promulgated in 2006 and 2010.

[14] The EAP in this regard is registered with EAPASA under registration number 2019/301.

48	The expansion of— (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	Some of the project infrastructure, such as roads are routed within 32m of the freshwater resources identified by the aquatic specialist. .
Activity No(s):	**Provide the relevant Scoping and EIA Activity(ies) as set out in Listing Notice 2 of the EIA Regulations, 2014 as amended**	**Describe the portion of the proposed project to which the applicable listed activity relates. Ensure to include thresholds/area/footprint applicable.**
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.	The proposed Kareekloof Energy Project will have an Electricity Footprint of up to 900 megawatts.
4	The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.	The BESS proposed will include the storage of dangerous goods in excess of the threshold of this activity.
15	The clearance of an area of 20 hectares or more of indigenous vegetation.	The proposed Kareekloof Energy project will require the clearance of more than 20ha of indigenous vegetation.
Activity No(s):	**Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended**	**Describe the portion of the proposed project to which the applicable listed activity relates. Ensure to include thresholds/area/footprint applicable.**
18(g)(ii)(ii)	The widening of a road by more than 4m, or the lengthening of a road by more than 1km. g. Northern Cape ii. Outside urban areas: (ii) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland; or	The main and internal access roads will require that existing farm tracks be widened by more than 4m in some areas which are in proximity to the delineated watercourses. Existing Farm roads will be lengthened by more than 1km.

NOTE: Basic Assessment as well as S&EIR Activities are being triggered by the proposed development, the Environmental Application 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 competent authority, in this case the DFFE. Should the Department approve the proposed activity, the Environmental Authorisation does not exclude the need for obtaining relevant approvals from other Authorities who have a legal mandate in respect of the activity.

V. DEVELOPMENT PROPOSAL

The Applicant, Kareekloof Energy (Pty) Ltd, is proposing the construction of a photovoltaic (PV), and Battery Energy Storage System (BESS) energy facility (known as Kareekloof Solar PV Facility and BESS) located on Portion 1 of the farm Bas Berg 88, Portion 2 of the farm Koppy Alleen 83 and Portions 6, 11, 16 & 17 of the farm Karee Kloof 85 situated near De Aar in the Northern Cape Province.

The total project footprint will be approximately 1530ha and the infrastructure associated with the up to 900MW PV facility includes:

- PV modules and mounting structures with a footprint of approximately 1498ha; containing.
    - Inverters and transformers;
    - Cabling;
    - Battery Energy Storage System (BESS) with a footprint of approximately 43 ha
    - Access and internal access roads with a footprint of approximately 75 ha;
- Auxiliary buildings (33 kV switch room, gatehouse and security, control centre, office, warehouse, canteen & visitors centre, staff lockers, laydown areas etc.) with a footprint of approximately 13ha;
- Access roads 5ha

- Perimeter fencing and security infrastructure;
- Rainwater tanks;
- Temporary and permanent laydown areas;
- 3 Facility substations with a total footprint of approximately 14 ha.

The 900MW development consists of 18 stages that may be developed singly or in groups in a phased development approach. Each of the 18 x 50MW stages will be self sufficient up to the point of an on-site substation or collective BESS.

The Kareekloof Solar PV Facility intends to connect to the National Grid via the proposed Krypton Main Transmission Substation (MTS), located approximately 1.5km east of the proposed facility, by means of three double circuit 132kV conductor lines/powerlines, capable of evacuating or exporting the electricity output of from all 3 of the 300MVA On-Site Substations. The proposed connection will include an Electrical Grid Infrastructure (EGI) corridor for the three 132kV powerlines, from the On-Site Substations to the MTS.

It must be noted that this application only includes the IPP Portion of the EGI (i.e. the on site substations) the remainder of the EGI (i.e. those components that will be transferred to Eskom – namely, the Eskom Side of the on-site substations and the Overhead powerlines to the MTS) have been assessed as part of a separate Basic Assessment Process.

VI. PROFFESIONAL INPUT

The following professionals[15] have provided input into this environmental process:

1. Terrestrial Ecology	-	Enviro Insight
2. Plant Species	-	Enviro Insight
3. Animal Species	-	Enviro Insight
4. Avifaunal	-	Enviro Insight
5. Heritage	-	Beyond Heritage
6. Archaeology	-	Beyond Heritage
7. Agricultural	-	Mr Johann Lanz
8. Visual	-	Visual Resource Management Africa
9. Aquatic Biodiversity	-	Tate Environmental / Enviro Insight
10. Social	-	Tony Barbour
11. BESS Risk Assessment	-	ISHECON Ms Debbie Mitchell

VII. IMPACT SUMMARY AND STATEMENT

The table below summarises the status and significance of all impacts (with and without mitigation) as assessed in the sections above.

Table 46: Impact Summary of the proposed Kareekloof Energy PV & BESS and associated infrastructure.

Terrestrial Biodiversity Construction Phase		
Nature: Direct Loss of Habitat		
	Without Mitigation	**With Mitigation**

[15] 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.

Significance	**High**	**Medium**
Status	Negative	Negative
Nature: Establishment and Spread of Alien and Invasive Species		
	Without Mitigation	**With Mitigation**
Significance	**Moderate**	**Low**
Status	Negative	Negative
Nature: Erosion and Soil Compaction		
	Without Mitigation	**With Mitigation**
Significance	**High**	**Medium**
Status	Negative	Negative
Nature: Ecotoxicity associated with Chemical use.		
	Without Mitigation	**With Mitigation**
Significance	**High**	**Low**
Status	Negative	Negative
Terrestrial Biodiversity Operational Phase		
Nature: Loss of Habitat associated with the shading from PV panels and the Maintenance of vegetation.		
	Without Mitigation	**With Mitigation**
Significance	**High**	**Medium**
Status	Negative	Negative
Nature: Establishment and Spread of Alien and Invasive Species		
	Without Mitigation	**With Mitigation**
Significance	**Moderate**	**Low**
Status	Negative	Negative
Nature: Erosion and Soil Compaction		
	Without Mitigation	**With Mitigation**
Significance	**High**	**Medium**
Status	Negative	Negative
Nature: Ecotoxicity associated with Chemical use.		
	Without Mitigation	**With Mitigation**
Significance	**High**	**Low**
Status	Negative	Negative
Avifaunal Construction		
Nature: Direct Loss of Avifaunal Habitat		
	Without Mitigation	**With Mitigation**
Significance	**Medium**	**Low**
Status	Negative	Negative
Nature: Sensory Disturbance		
	Without Mitigation	**With Mitigation**
Significance	**Low**	**Low**
Status	Negative	Negative

Avifaunal Operation		
Nature: Direct Mortality through collision and electrocution		
	Without Mitigation	**With Mitigation**
Significance	**Medium**	**Low**
Status	Negative	Negative
Nature: Attraction of Commensal species to the facility.		
	Without Mitigation	**With Mitigation**
Significance	**Medium**	**Low**
Status	Negative	Negative
Nature: Ecotoxicity associated with chemical use.		
	Without Mitigation	**With Mitigation**
Significance	**Low**	**Low**
Status	Negative	Negative
Avifaunal Decomissioning		
Nature: Direct Loss of Avifaunal Habitat		
	Without Mitigation	**With Mitigation**
Significance	**Medium**	**Low**
Status	Negative	Negative
Nature: Sensory Disturbance		
	Without Mitigation	**With Mitigation**
Significance	**Low**	**Low**
Status	Negative	Negative
Heritage Construction		
Nature: Construction Phase Heritage Impacts associated with the damage to or destruction of archaeological sites.		
	Without Mitigation	**With Mitigation**
Significance	**Medium**	**Low**
Status	Negative	Negative
Nature: Construction Phase Impacts to graves associated with damage to or destruction of graves.		
	Without Mitigation	**With Mitigation**
Significance	**Low**	**Low**
Status	Negative	Negative
Visual Construction		
Nature: Short-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape		
	Without Mitigation	**With Mitigation**
Significance	**Medium - High**	**Medium**
Status	Negative	Negative
Visual Operation		
Nature: Short-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape (Loss of site landscape character due to the operation of the PV structures and associated infrastructure).		

	Without Mitigation	With Mitigation
Significance	**Medium**	**Medium - Low**
Status	Negative	Negative
Visual Decomissioning		
Nature: Short-term landscape change from the removal of the PV structures, followed by rehabilitation of the impacted areas back to agricultural lands.		
	Without Mitigation	**With Mitigation**
Significance	**Low**	**Low**
Status	Negative	Negative
Construction Phase Social Impacts		
Nature: Creation of employment and business opportunities during the construction phase		
	Without Mitigation	**With Enhancement**
Significance	**Medium Positive**	**Medium Positive**
Nature: Potential impacts on family structures and social networks associated with the presence of construction workers		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Nature: Potential impacts on family structures, social networks and community services associated with the influx of job seekers		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**
Nature: Potential risk to safety of scholars, farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Operational Phase Social Impacts		
Nature: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Nature: Potential noise, dust and safety impacts associated with construction related activities		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Nature: The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the project etc. will damage farmlands and result in a loss of farmlands for grazing.		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Nature: Development of infrastructure to improve energy security and support renewable sector		
	Without Mitigation	**With Mitigation**
Significance	**High Positive**	**High Positive**

Nature: Creation of employment and business opportunities associated with the operational phase		
	Without Mitigation	**With Enhancement**
Significance	**Low Positive**	**Medium Positive**
Nature: The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed etc.		
	Without Mitigation	**With Enhancement**
Significance	**Low Positive**	**Medium Positive**
Nature: Benefits associated with support for local community's form SED contributions		
	Without Mitigation	**With Enhancement**[16]
Significance	**Medium Positive**	**High Positive**
Nature: Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**
Nature: Potential impact of the Facility on local tourism		
	Without Mitigation	**With Enhancement / Mitigation**
Significance	**Low Negative**	**Low Negative**
Construction Phase Traffic Impacts		
Nature: Increase in Traffic		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Medium Negative**
Nature: Increase of Incidents with pedestrians and livestock		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Nature: Increase in Dust from gravel roads		
	Without Mitigation	**With Mitigation**
Significance	**High Negative**	**Medium Negative**
Nature: Increase in Road Maintenance		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Medium Negative**
Nature: Additional Abnormal Loads		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Operational Phase Traffic Impacts		
Nature: Increase in Traffic		
	Without Mitigation	**With Mitigation**

[16] Enhancement assumes effective management of the community trust.

Significance	**Low Negative**	**Low Negative**
Nature: Increase of Incidents with pedestrians and livestock		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**
Nature: Increase in Dust from gravel roads		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**
Nature: Increase in Road Maintenance		
Significance	**Low Negative**	**Low Negative**
Nature: Additional Abnormal Loads		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**
Closure and Decomissioning Traffic Impacts		
Nature: Increase in Traffic		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Nature: Increase of Incidents with pedestrians and livestock		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Nature: Increase in Dust from gravel roads		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**
Nature: Increase in Road Maintenance		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**
Nature: Additional Abnormal Loads		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**

As can be seen in the table above, all impacts associated with the proposed Kareekloof Energy PV and BESS range from high – positive to Medium – Negative. All High and very high negative Impacts have been avoided by the avoidance of sensitive features or mitigated to acceptable levels.

None of the participating specialists identified any impacts that remain high or very high after mitigation. The mitigated preferred layout (Layout Alternative 3) avoids the main sensitive features including visual setbacks, aquatic features and rocky outcrops.

The Terrestrial Biodiversity specialist concluded that there are no fatal flaws are evident for the proposed project and that the average post-mitigation impact significance for the project is moderately low.

The Avifaunal Specialist concluded that no fatal flaws were identified during the avifaunal assessment, but recommended monitoring protocols (post construction monitoring) be implemented during the lifecycle of the project.

The visual specialist has concluded that the proposed development can commence subject to the implementation of mitigation measures.

The Social specialist concluded that the proposed PV Facility and associated infrastructure will result in several social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phase. The project will also contribute to local economic development though socio-economic development (SED) contributions. In addition, the development will improve energy security and reduce the carbon footprint associated with energy generation.

As such there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. Based on the layout provided for the assessment, Kareekloof Energy PV and BESS can be supported from a terrestrial biodiversity, aquatic biodiversity, avifaunal, visual, social, heritage, agricultural and traffic point of view.

A map showing the proposed activity in relation to the key sensitive features is in attached in Appendix D. All sensitive features along with their appropriate buffers are shown in this plan. As required by the EMPr, all areas outside of the proposed development footprint are to be demarcated as no go areas.

It is Cape EAPrac's reasoned opinion that the mitigated preferred Alternative (Layout Alternative 3) can be approval by the competent Authority subject to the outcome of the public participation process and on condition that all the suggested mitigation measures are implemented, all other legislative approvals be obtained, and that the final EMPr be strictly adhered to.

VIII. CONCLUSIONS & RECOMMENDATIONS

This environmental process is currently being undertaken to present proposals to the public and potential I&APs and to identify and assess environmental impacts, issues and concerns raised as a result of the proposed development.

Cape EAPrac is of the opinion that the information contained in this Draft Environmental Report and the documentation attached hereto is sufficient to allow the I&APs to apply their minds to the potential negative and/or positive impacts associated with the development, in respect of the activities applied for. Kareekloof Energy PV and BESS has been analysed from Ecological, Agricultural, Heritage, Avifaunal, Social and Visual perspectives, and site constraints and potential impacts identified and assessed.

This environmental process has not identified any fatal flaws with the proposal and as such it is our reasoned view that the project should be considered for authorisation, subject to the outcome of the public participation process and on condition that all the mitigation measures outlined in section 7 of the report are adopted and implemented. All specialists concur that the development as proposed (Layout Alternative 3) can be considered for approval subject to the implementation of all mitigation measures. All impacts range from high positive to medium negative and all high, very high and critical negative impacts have been avoided by the risk adverse approach or mitigated to acceptable levels.

All stakeholders are requested to review the Draft EIR and the associated appendices, and provide comment, or raise issues of concern, directly to Cape EAPrac within the specified 30-day comment period. All comments received during this comment period will be considered, responded and included in the Final EIR that will be submitted to DFFE for decision making.

DRAFT ENVIRONMENTAL IMPACT REPORT

1 INTRODUCTION

Cape EAPrac has been appointed by Kareekloof Energy (Pty) Ltd, hereafter referred to as the Applicant, as the independent Environmental Assessment Practitioner (EAP), to facilitate the Scoping and Environmental Impact Reporting process required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed development of the Kareekloof Solar PV Facility and BESS (hereafter referred to as Kareekloof Solar PV) on Portion 1 of the farm Bas Berg 88, Portion 2 of the farm Koppy Alleen 83 and Portions 6, 11, 16 & 17 of the farm Karee Kloof 85 near De Aar in the Northern Cape Province of South Africa.

The total generation capacity of the solar facility will be up to 900MW for input into the national Eskom grid.

The project will feed into the National Grid via the proposed Eskom Krypton MTS. The grid connection to connect this project to the National Grid has been assessed as part of a separate environmental process. This current application process only includes the IPP portion of the on-site substation.

The purpose of the Draft Environmental Impact Report (Draft EIR) is to describe the environment to be affected, the proposed project, to present the site constraints identified by the various specialist during their site assessments and identify and assess impacts of this development on the receiving environment. This information is presented to all registered and potential Interested and Affected Parties (I&AP's), organs of state, state departments and the competent authority for review and comment.

In compliance with Chapter 6 of the 2014 EIA regulations (as amended), Draft Scoping Report was available for a 41 **Day** period extending from **29 September 2023 – 09 November 2023.**

This Draft Environmental Impact Report is available for a further 30-day review and comment period from **14 March 2024 – 16 April 2024**.

All comments received on the Draft EIR will be incorporated into the Final EIR that will be submitted to the Department of Forestry, Fisheries and the Environment (DFFE) for consideration and decision making.

1.1 RECOMMENDATION OF THE DRAFT ENVIRONMENTAL IMPACT REPORT

Neither the outcome of preceding scoping phase, nor this Impact Assessment phase, has identified any fatal flaws associated with the development of the proposed Kareekloof Energy PV and BESS Facility. All impacts identified during the scoping phase have been avoided or mitigated to acceptable levels and no high post mitigation impacts or risks are envisioned.

It is Cape EAPrac's reasoned opinion that the preferred Alternative (Layout Alternative 3) can be considered for approval by the competent Authority subject to the outcome of the public participation process and on condition that all the suggested mitigation measures are implemented, all other legislative approvals be obtained, and that the final EMPr be strictly adhered to.

Please refer to section 7 of this report for justification of this statement.

1.2 OVERVIEW OF ALTERNATIVE ENERGY IN SOUTH AFRICA AND THE NORTHERN CAPE[17]

[17] This section has been prepared with input from the social specialist.

The section below provides an overview of the potential benefits associated with the renewable energy sector in South Africa. Given that South Africa supports the development of renewable energy at national level, the intention is not to provide a critical review of renewable energy. The focus is therefore on the contribution of renewable energy, specifically in terms of supporting economic development.

The Renewable Energy Independent Power Producers Procurement Programmes (REIPPPP) [18] primary mandate is to secure electrical energy from the private from renewable energy sources.

The programme is designed to reduce the country's reliance on fossil fuels, stimulate an indigenous renewable energy industry and contribute to socio-economic development and environmentally sustainable growth. The REIPPPP has been designed not only to procure energy but has also been structured to contribute to the broader national development objectives of job creation, social upliftment and broadening of economic ownership.

By the end of June 2020, the REIPPPP had made the following significant impacts in terms of energy supply:

- 6 422MW of electricity had been procured from 112 Renewable Energy Independent Power Producers (IPPs) in seven bid rounds.
- 4 276 MW of electricity generation capacity from 68 IPP projects has been connected to the national grid.
- 49 461GWh of energy has been generated by renewable energy sources procured under the REIPPPP since the first project became operational in November 2013.

Renewable energy IPPs have proved to be very reliable. Of the 68 projects that have reached COD, 64 projects have been operational for longer than a year. The energy generated over the past 12-month period for these 64 projects is 11 079GWh, which is 93% of their annual energy contribution projections (P50) of 11 882GWh over a 12-month delivery period. Twenty-eight (24) of the 64 projects (38%) have individually exceeded their P50 projections.

In line with international experience, the price of renewable energy is increasingly cost competitive when compared with conventional power sources. The REIPPPP has effectively captured this global downward trend with prices decreasing in every bid window. Energy procured by the REIPPPP is progressively more cost effective and has approached a point where the wholesale pricing for new coal-and renewable-generated energy intersects.

The document notes that the REIPPPP has attracted significant investment in the development of the REIPPs into the country. The total investment (total project costs [19]), including interest during construction, of projects under construction and projects in the process of closure is R209.7 billion (this includes total debt and equity of R209.2 billion, as well as early revenue and VAT facility of R0.5 billion).

To date, the REIPPPP has attracted R41.8 billion in foreign investment and financing in the seven bid windows.

The REIPPPP also contributes to Broad Based Black Economic Empowerment and the creation of black industrialists. In this regard, Black South Africans own, on average, 33% of projects that have reached financial close (BW1-BW4), which is 3% higher than the 30% target. This includes black

[18] The Kareekloof Solar PV Facility may form part of the REIPPPP, or another State or Private Power Procurement process.

[19] Total project costs means the total capital expenditure to be incurred up to the commercial operations date in the design, construction, development, installation, and or commissioning of the project)

people in local communities that have ownership in the IPP projects that operate in or near their communities and represents the majority share of total South African Entity Participation.

On average, black local communities own 9% of projects that have reached financial close. This is well above the 5% target. In addition, an average of 21% shareholding by black people in engineering, procurement, and construction (EPC) contractors has been attained for projects that have reached financial closure. This is higher than 20% target. The shareholding by black people in operating companies of IPPs has averaged 24% (against the targeted 20%) for the 68 projects in operation (i.e. in BW1–4).

To date, a total of 52 603 job years[20] have been created for South African citizens, of which 42 355 job years were in construction and 10 248 in operations. These job years should rise further past the planned target as more projects enter the construction phase. Employment opportunities across all five active bid windows are 126% of the planned number during the construction phase (i.e. 33 707 job years), with 23 projects still in construction and employing people. The number of employment opportunities is therefore likely to continue to grow beyond the original expectations. By the end of June 2020, 68 projects had successfully completed construction and moved into operation. These projects created 33 449 job years of employment, compared to the anticipated 23 619. This was 42% more than planned.

The emission reductions for the programme during the preceding 12 months (June 2019-June 2020) is calculated as 11.5 million tonnes CO2 (MtonCO2) based on the 11 313 GWh energy that has been generated and supplied to the grid over this period. This represents 56% of the total projected annual emission reductions (20.5MtonCO2) achieved with only partial operations. A total of 50.2 Mton CO2 equivalent reduction has been realised from programme inception to date.

The Green Jobs Study notes that South Africa has one of the most carbon-intensive economies in the world, therefore making the greening of the electricity mix a national imperative. Within this context the study notes that the green economy could be an extremely important trigger and lever for enhancing a country's growth potential and redirecting its development trajectory in the 21st century.

The REIPPPP introduced in 2011, has by all accounts been highly successful in quickly and efficiently delivering clean energy to the grid. Increasingly competitive bidding rounds have led to substantial price reductions.

A 20-year sovereign guarantee on the power purchase agreement (PPA) and, especially, ideal solar power conditions, have driven the investment case for Renewable Energy in South Africa. In this regard South Africa has been identified as one of the worlds' leading clean energy investment destinations

[20] The equivalent of a full-time employment opportunity for one person for one year

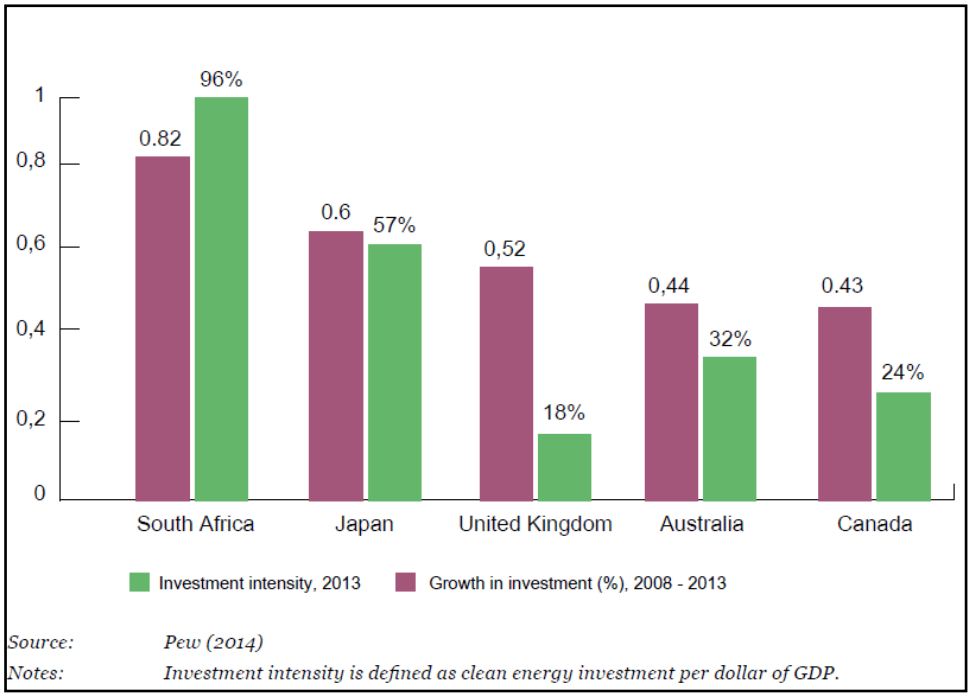


Figure 1: South Africa as a global lead clean energy investment destination.

With regard to local economic development, the REIPPPP sets out various local economic development requirements with stipulated minimum threshold and aspirational targeted levels, which each bidder must comply with. Based on the Broad-Based Black Economic Empowerment Codes, this requirement comprises the following components which make up a scorecard:

- Ownership by black people and local communities,
- Job creation,
- Local content,
- Management control,
- Preferential procurement,
- Enterprise development, and
- Socio-economic development.

1.3 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, most notably 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 it's resources, have been taken into account during the strategic planning for the area.
- It is assumed that all the relevant **mitigation and management 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 and Sanitation / Catchment Management Agency **will consider the submission of a water use application** necessary for allowing the use of water from any water resource on site. The assumption at this stage is made that water provision for construction and operations is to be obtained from the local municipality. A Water Use Licence Application Process for activities within the regulated zone of a watercourse is underway.
- It is assumed that Stakeholders and Interested and Affected Parties notified of the availability of this report will submit all relevant **comments within the designated 30-days** review and comment period, so that these can included in the Final Environmental Report to be timeously submitted to the competent authority, the Department of Forestry, Fisheries and the Environment, for consideration and decision making.

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

2. PROPOSED ACTIVITY

The Applicant, Kareekloof Energy (Pty) Ltd, is proposing the construction of a photovoltaic (PV), and Battery Energy Storage System (BESS) energy facility (known as Kareekloof Solar PV Facility and BESS) located on Portion 1 of the farm Bas Berg 88, Portion 2 of the farm Koppy Alleen 83 and Portions 6, 11, 16 & 17 of the farm Karee Kloof 85 situated near De Aar in the Northern Cape Province.

The total project footprint will be approximately 1530ha and the infrastructure associated with the up to 900MW PV facility includes:

- PV modules and mounting structures with a footprint of approximately 1498ha; containing.
    - Inverters and transformers;
    - Cabling;
    - Battery Energy Storage System (BESS) with a footprint of approximately 43 ha
    - Access and internal access roads with a footprint of approximately 75 ha;
- Auxiliary buildings (33 kV switch room, gatehouse and security, control centre, office, warehouse, canteen & visitors centre, staff lockers, laydown areas etc.) with a footprint of approximately 13ha;
- Access roads 5ha
- Perimeter fencing and security infrastructure;
- Rainwater tanks;
- Temporary and permanent laydown areas;
- 3 Facility substations with a total footprint of approximately 14 ha.

The 900MW development consists of 18 stages that may be developed singly or in groups in a phased development approach. Each of the 18 x 50MW stages will be self sufficient up to the point of an on-site substation or collective BESS.

The Kareekloof Solar PV Facility intends to connect to the National Grid via the proposed Krypton Main Transmission Substation (MTS), located approximately 1.5km east of the proposed facility, by means of three double circuit 132kV conductor lines/powerlines, capable of evacuating or exporting the electricity output of from all 3 of the 300MVA On-Site Substations. The proposed connection will include an Electrical Grid Infrastructure (EGI) corridor for the three 132kV powerlines, from the On-Site Substations to the MTS.

It must be noted that this application only includes the IPP Portion of the EGI (i.e. the on site substations) the remainder of the EGI (i.e. those components that will be transferred to Eskom –

namely, the Eskom Side of the on-site substations and the Overhead powerlines to the MTS) have been assessed as part of a separate Basic Assessment Process.

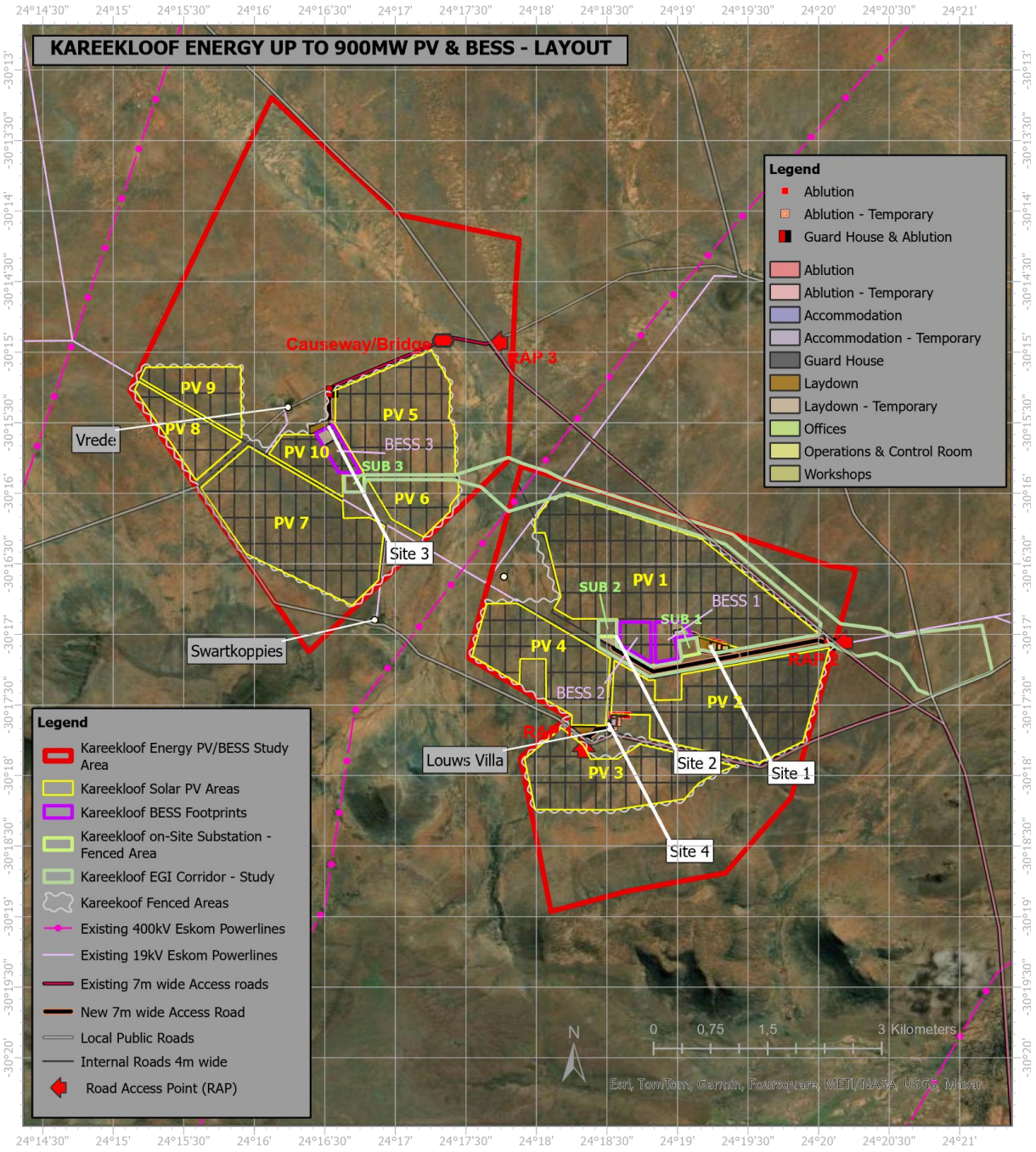


Figure 2: Plan depicting the key project infrastructure associated with the preferred layout (Layout Alternative 3) of the Kareekloof Energy PV and BESS (Please also refer to the full-scale plans attached in Appendix A and D)[21].

[21] The Abbreviation "RAP" in figure 2 refers to Road Access Point

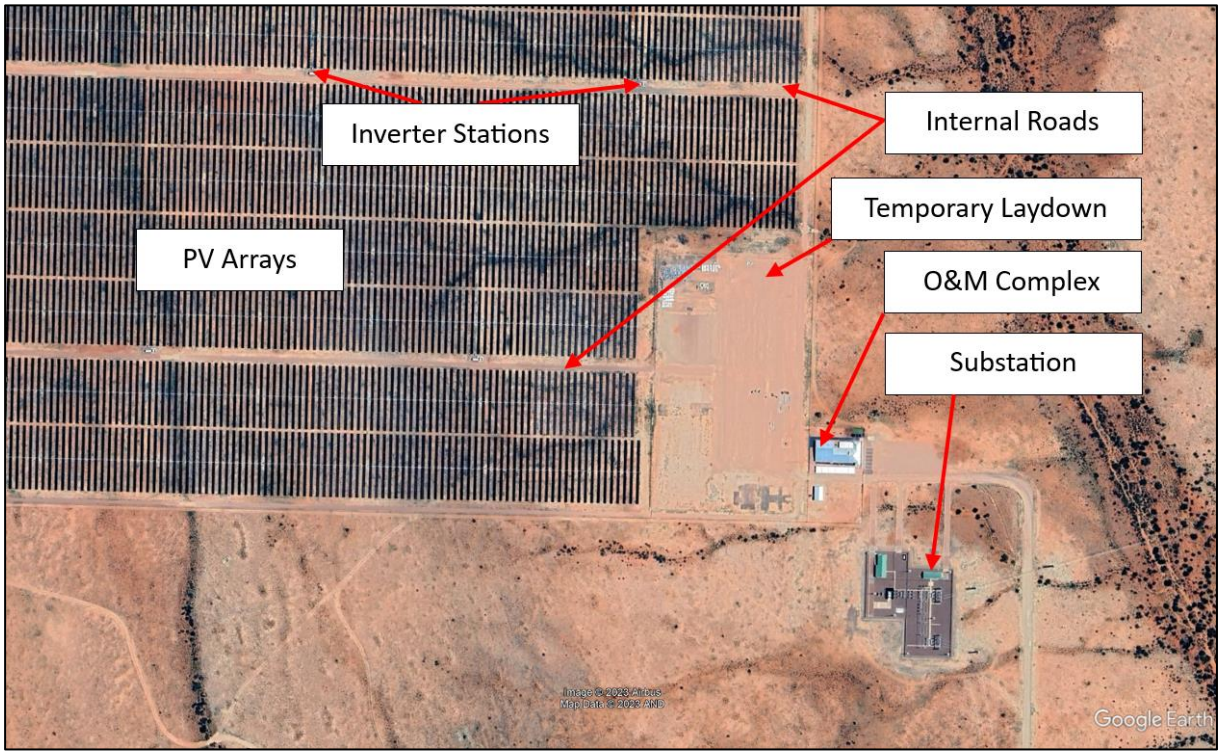


Figure 3: Typical configuration of a Solar PV Energy Facility.

The Kareekloof Solar PV facility will have a net generating capacity of up to 900 MW with an estimated total maximum footprint of ± 1530 ha.

The approximate area that each component of the Kareekloof Solar PV Facility will occupy is summarised in the table below.

Table 2: Component Areas and % of Total Project Area

SEF Component	Estimated Area	% of Total Property (3590ha)
PV Footprint – including inverters and internal roads.	± 1498 ha	40%
Auxiliary Structures	± 14 ha	0.3%
Access roads	± 8 ha	0.2%
Substation	± 14 ha	0.3 %
BESS	±43 ha	1.1%

2.1 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.

2.2 MOUNTING STRUCTURES

Various options exist for mounting structure foundations, which include cast/ pre-cast concrete, driven/ rammed piles, or ground/ earth screws mounting systems. Typical examples of these are shown in the images below.

Figure 4: Example of cast concrete mounting systems (BVI International 2023)

Figure 5: Example of Earth Screw Mounting Technology (HQ, Mount 2023)

The impact on of these options are considered to be similar, however concrete is least preferred due the extensive mitigation required during construction (in terms of run off and spillage prevention) and effort required at a decommissioning phase in order to remove the concrete from the soil.

Kareekloof Solar PV will therefore aim to make the most use of predrilling and backfilling of holes prior to either driven/ rammed piles, or ground/ earth screws mounting systems, and only in certain instances resort to concrete foundations should geotechnical studies necessitate this.

The images below show typical examples of the preferred mounting technology during and after installations (Photos: Cape EAPrac).

Figure 6: Pre-drilling of holes prior to the ramming of steel piles.

Note that the vegetation is not completely removed prior to the drilling and installation of the piles.

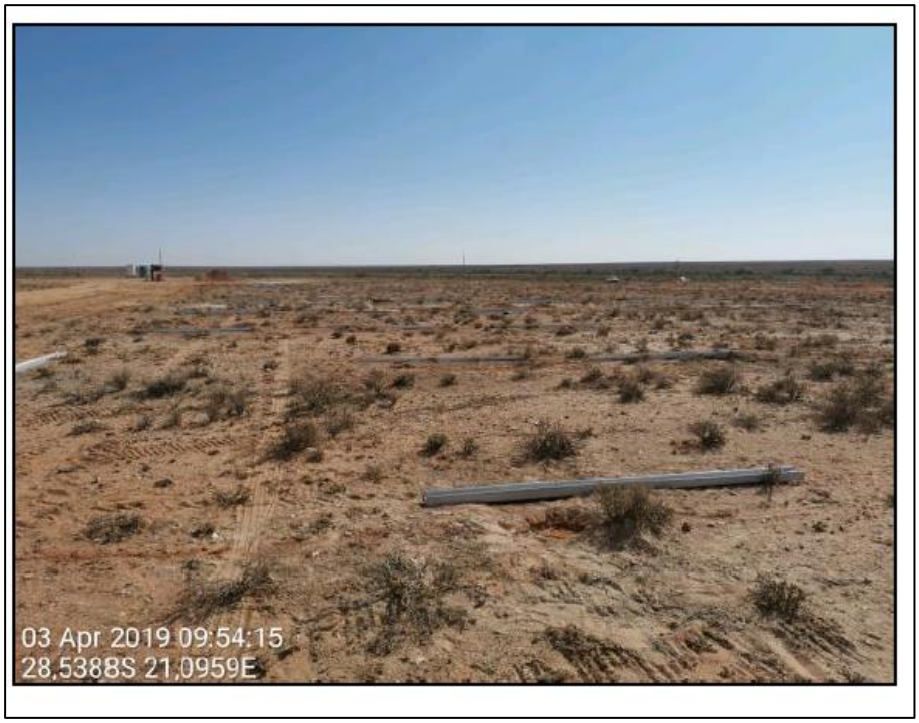


Figure 7: pre-drilled holes are backfilled with a wet sand mixture and steel piles placed in position ready for ramming.

The predrilled holes are backfilled on a continuous basis to ensure that no fauna is trapped in the holes.

Figure 8: Ramming of steel piles into the pre-drilled / backfilled holes.

Note that the ramming machines follow the same entry and exit routes as the drilling rigs in order to reduce the impacts of trampling and compaction.

Figure 9: Completed ramming and assembly showing vegetation remaining intact beneath the modules.

Figure 10: Showing vegetation re-establishing along the driplines of the arrays within weeks after installation.

2.3 AUXILIARY BUILDINGS

The auxiliary buildings will comprise of the following as a minimum:

- 33 kV switch room;
- Control building/ centre;
- Offices;
- Warehouses;
- Canteen & visitors centre;
- Staff lockers & ablution; and
- Gatehouse and security.

2.4 GRID CONNECTION AND CABLING

Kareekloof Solar PV intends to connect to the proposed Krypton MTS (400/132 kV) located ± 1.5km to the East of Kareekloof Solar PV.

The three proposed Kareekloof Solar PV On-Site Substations will each be up to 4.5ha (IPP component) and feature a step-up transformer/s to transmit electricity via a 132 kV Overhead Powerline between Eskom side of the substation/ switching station and onto the proposed Krypton MTS.

The Eskom side of the Substation and the grid connection (powerline)to the proposed Krypton MTS is assessed as part of a Separate Environmental Process. In order to understand and effectively assess cumulative impacts, the same specialist team that undertook assessments in terms of this application also undertook the assessments for the Electrical Grid Infrastructure.

2.5 BATTERY ENERGY STORAGE SYSTEM

A BESS Health, Safety and Environment Risk Assessment has been compiled by ISHECON and is attached in **Appendix E7** of this Environmental Impact Report.

Renewable energy can currently achieve lower costs than fossil fuels. By incorporating energy storage systems (BESS) into renewable energy facilities, electricity can be stored during generation peaks and supplied during demand peaks.

The proposed Kareekloof Solar PV BESS will have a maximum footprint of up to 43 ha and will be centrally situated adjacent to the on-site substations,

The table below outlines the BESS Technology Alternatives that will be considered and assessed as part of this Environmental Process.

Table 3: Details of the Proposed BESS that will be considered and assessed as part of the Kareekloof Solar PV Facility.

Capacity of BESS facility (in MWh)	3600 MWh
Type of technology (preferred)	Redox Flow, for example Vanadium Redox Flow Battery (VRB)
Type of technology (alternatives)	Lithium-Ion, Sodium-Ion, Solid State, Liquid Metal (https://ambri.com/) and other technology types will be considered
Structure height	Containerised batteries less than 5m high except for lightening conductors and vent pipes. Storage tanks may be required for the VRB and could be 7m high, if the non-containerised type of VRB battery is installed.

Surface area to be covered (including associated infrastructure such as roads)	43 ha (3 x ±14 ha) (including electrolyte storage tanks of 27 ha (3 x 9 ha) for redox flow battery)
Structure locations	Three BESS sites, each ± 14 ha near each of the 3 On-Site Substations- refer to the map's appendix

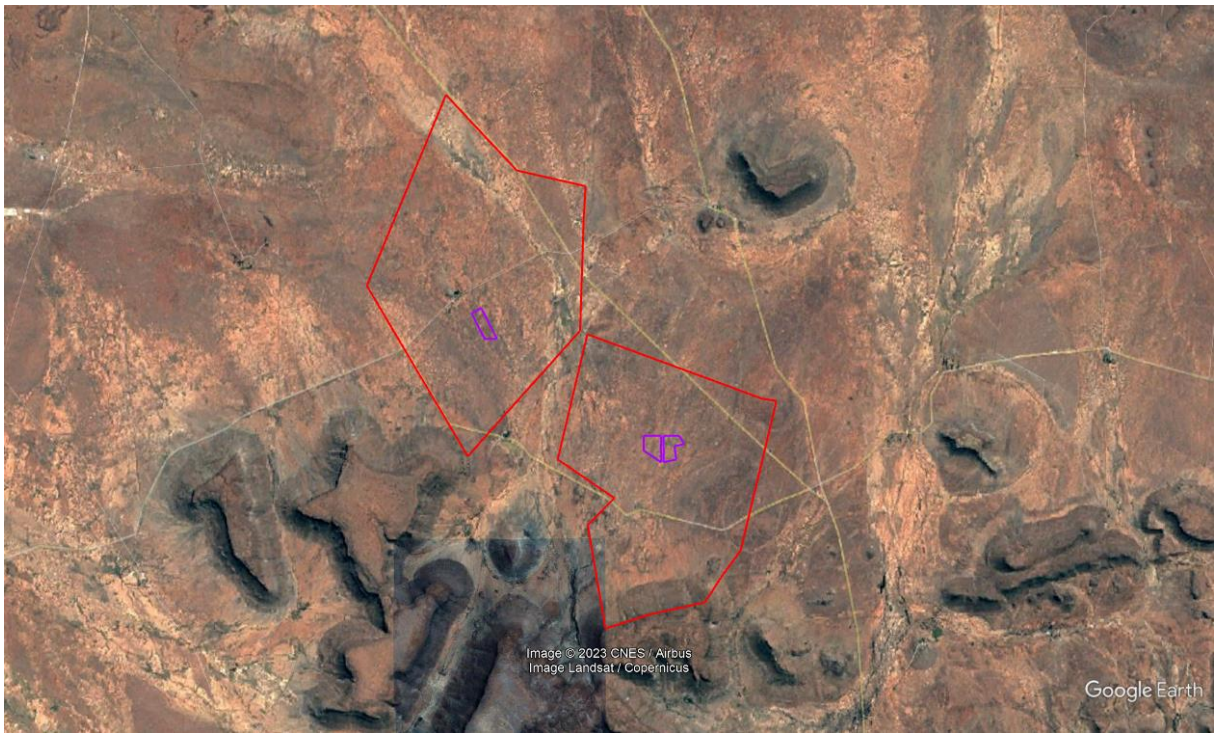


Figure 11: Showing the proposed position of the BESS within the Study Site[22].

Three key battery technologies have been assessed in this Environmental Assessment Process (Please Refer to the BESS Risk Assessment Attached in Appendix E7). These technologies have been described by the specialist as follows.

2.5.1 Solid State Batteries

One type of battery technology being considered for the BESS would be a Solid-State Battery which consists of multiple battery cells that are assembled together to form modules. Each cell contains a positive electrode, a negative electrode and an electrolyte which is mostly solid but can contain a small amount of liquid/polymer. The BESS will comprise of multiple battery units or modules housed in shipping containers and/or an applicable housing structure which is delivered pre-assembled to the project site. Containers are usually raised slightly off the ground and layout out is rows. They can be stacked if required although this may increase the risk of events in one container spreading to another container. Supplementary infrastructure and equipment may include substations, power cables, transformers, power converters, substation buildings & offices, HV/MV switch gear, inverters and

[22] This is the proposed position as per the preferred layout alternative (Layout Alternative 3) and has been assessed by the specialist as part of the BESS risk Assessment.

temperature control equipment that may be positioned between the battery containers. The solid-state batteries that are being considered are Lithium-ion systems.

Figure 12: Example of Solid State batteries (ISHECON,2024)

2.5.2 Redox Flow Batteries

One of the types of battery technology being considered for the Battery Energy Storage System (BESS) would be Redox Flow Batteries, typically Vanadium chemistry based (VRFB). These energy storage systems can be supplied either as containerized units or as a fixed installation within a building etc. In order to highlight the maximum differences between the possible technology types, this study is based on the assumption that redox flow batteries (typically vanadium based chemistry) would most likely be installed within a building using bulk tanks, while solid state batteries (typically lithium based chemistry) would be installed in shipping containers that have hundreds of individual batteries combined into packs. Redox flow batteries can be installed in containers where the individual quantities of electrolyte involved would be smaller but still significant. For this project (900 MW) there could be up to 1 350 containers, each with six 25m^3 tanks of electrolyte within the containers, hence approximately 2 025 000 m^3 of electrolyte in the entire project. Each container acts as bund (secondary containment) able to hold at least the volume of one tank.

Figure 13: Example of Redox Flow Batteries (ISHECON, 2024)

:

2.5.3 Molten Metal Batteries

One of the types of battery technology being considered for the Battery Energy Storage System (BESS) would be Molten Metal batteries, typically the AMBRI Technology. These energy storage systems can be supplied as containerized units.

The liquid metal battery is comprised of a liquid calcium alloy anode, a molten salt electrolyte and a cathode comprised of solid particles of antimony.

2.6 ACCESS ROUTES AND INTERNAL ROADS.

The proposed project site is accessible via the provincial R48 road situated to the South of the Site.

The internal road network will follow existing farm tracks for the most part and will consist of gravelled roads, up to 5 m in width.

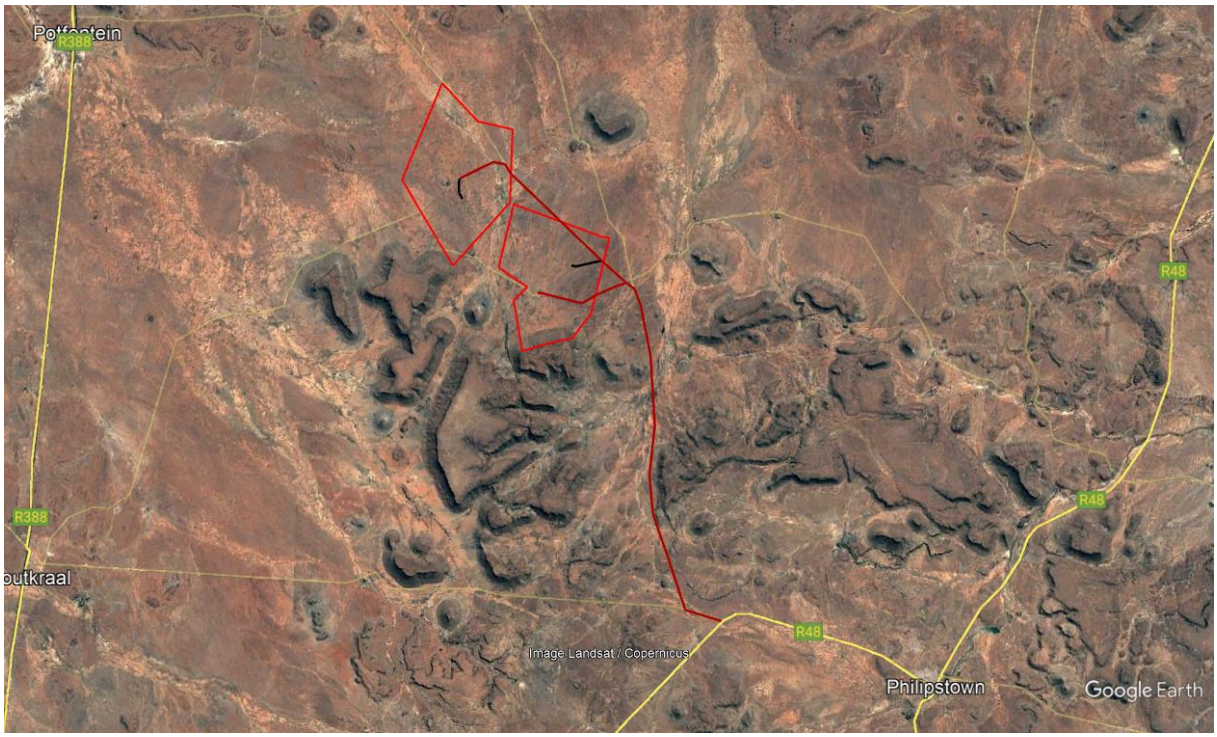


Figure 14: Showing the position of the main access roads within the Study Site.

A detailed transport and traffic impact study will form part of the Environmental Impact Reporting phase of this environmental process. 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.

2.7 TRANSPORT OF COMPONENTS AND STAFF

It is anticipated that the following vehicles will access the site during construction:

- Conventional trucks within the freight limitations to transport building material to the site;
- 40ft container trucks transporting solar panels, frames and the inverter, which are within freight limitations;
- Light Differential Vehicle (LDV) type vehicles transporting workers from surrounding areas to site;
- Drilling machines and other required construction machinery being transported by conventional trucks or via self-drive to site; and
- The transformers and BESS infrastructure will be transported as abnormal loads.

There are two viable options for the port of entry for imported components - the Port of Ngqura in the Eastern Cape and the Port of Saldanha in the Northern Cape. A third option, the Port of Cape Town, could be considered for smaller components.

It is envisaged that most materials, water, plant, services and people will be procured within a 120km radius from the proposed site; however, this would be informed by the procurement requirements.

2.8 SERVICES REQUIRED

The services required for the construction and operation of the proposed Kareekloof Solar PV Facility are outlined below.

2.8.1 Solid Waste

Solid waste during the construction phase will mainly be in the form of construction material, excavated substrate and domestic solid waste. All waste generated during construction will be separated into recyclable components and removed from site by a licenced recycling service provider. All non recyclable waste will be disposed of in scavenger proof bins and temporarily placed in a central location for removal by the contractor. Any other waste and excess material will be removed once construction is complete and disposed of at a registered waste facility. Excess excavation material will either be spoiled offsite at a registered facility or used for landscaping berms[23] within the overall PV footprint.

2.8.2 Sewerage.

During the construction phase, chemical ablution facilities will be utilised. These ablution facilities will be maintained, serviced and emptied by an appointed contractor, who will dispose of the effluent at a licensed facility off site.

Once construction is complete, the chemical ablution facilities will be removed from the site. A conservancy tank which will be regularly emptied by a registered service provider will be installed at the Operations & Maintenance building and on-site/ facility substation and the BESS control room.

2.8.3 Hazardous substances

During the construction phase, use of the following hazardous substances is anticipated:

- Cement associated with piling activities and construction of buildings and inverter station plinths;
- Petrol/ diesel for construction plant;
- Electrolytes associated with the BESS and
- Limited amounts of lubricants and transformer oils.

Temporary storage and disposal of hazardous waste will be done in compliance with relevant legislation (i.e., stored in covered containers with appropriate bunding). Refuelling areas to be in designated positions, with suitable mitigation to reduce the risk of hydrocarbon spills. In Terms of the EMPr, Spill kits will be available on site to clean up any minor spillages.

[23] If any landscaped berms are constructed around infrastructure, these must be done in such a way as to comply with the overall Stormwater design philosophy of maintaining sheet flow.

Figure 15: Hydrocarbon Spill Kits must be in place within the site camp and in the field within 500m of any drilling or ramming activity.

2.8.4 Water Supply

Water required during the construction and operation phases will be sourced from (in order of priority):

1. The Local Municipality - Specific arrangements will need to be agreed with the Emthanjeni Local Municipality in a Service Level Agreement (SLA). Most likely the water will be either trucked in, or otherwise made available for collection at their Water Treatment Plant via a metered standpipe.
2. Investigation into a third-party water supplier which may include a private services company.
3. The investigation of drilling a borehole on site, which includes complete geohydrological testing, groundwater census and a Water Use License Application (WULA) in terms of section 21a of the National Water Act, 1998.

2.9 PROJECT NEED AND DESIRABILITY

In keeping with the requirements of an integrated Environmental Impact process, the DEA&DP *Guidelines on Need and Desirability (2010 & 2011)*[24] 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.

[24] The Western Cape Guidelines were considered in this regard, as no guidelines are available for the Northern Cape Province.

The section above (overview to alternative energy in South Africa and the Northern Cape) 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.

This section however considers the need and desirability of this specific project at this point in time.

2.9.1 Feasibility consideration

The commercial feasibility for the proposed up to 900MW$_{AC}$ Kareekloof Solar PV to be built on private land near De Aar, has been informed by its contextual location, and economic, social and environmental impacts and influence. The project will gather sufficient information and conduct studies of the site and the region to make qualified and reliable assumptions on the project's various impacts (This will take place during the Environmental Impact Reporting Phase of this Environmental process).

2.9.2 Solar Resource & Energy Production

The economic viability of a solar PV facility is directly dependent on the annual solar irradiation at the site.

Emthanjeni receives relatively high Global Horizontal Irradiation (GHI). The GHI for the site is in the region of approximately 2186 kWh/m^2/annum. The irradiation level is an important factor in a highly competitive bidding environment; the economic viability of a project is a critical success factor.

Figure 16: Global Horizontal Irradiation of the Kareekloof Solar PV Facility (Solar Atlas.2023)

2.9.3 Access to Grid

The proposed Krypton Main Transmission Substation (MTS) is located approximately 1.5 km east of the Kareekloof Solar PV site[25].

Ease of access into the Eskom electricity grid is vital to the viability of a solar PV facility. Projects which are in close proximity to a connection point and/or demand centre are favourable, and reduce the losses associated with power transmission.

In addition, Eskom's '2040 Transmission Network Study' has drawn on various scenarios to determine the grid's development requirements, as well as to identify critical power corridors for future strategic development, of which the Central corridor[26] is one of these.

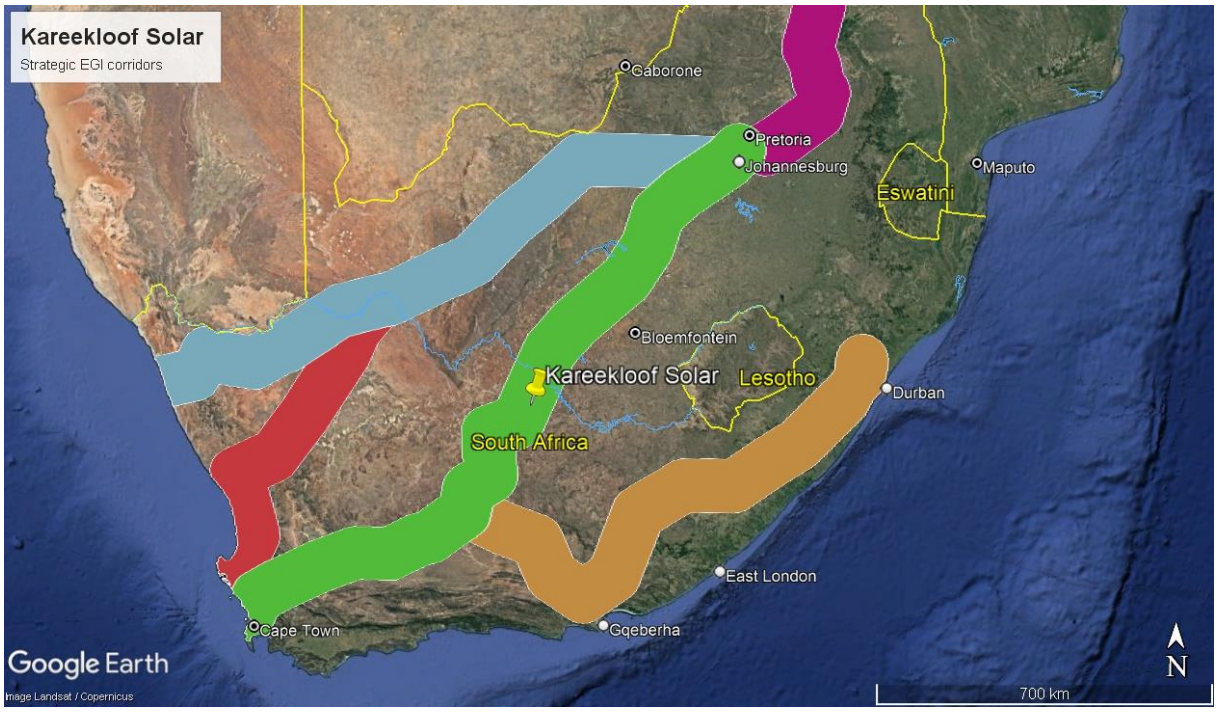


Figure 17: Plan showing Kareekloof Solar PV within the Central Strategic Electrical Grid Corridor.

2.9.4 Site Suitability

Among the positive characteristics of the Kareekloof Solar PV site is its flat nature, and accessible location, facilitating the delivery of infrastructure, and the construction and assembly process.

The proximity of the site to the R48 decreases the impact on secondary roads from the traffic going to and from Kareekloof Solar PV during construction and operations.

The very close proximity of the proposed Krypton MTS also allows for connection via a short distribution line. As the site is not used for intensive agricultural purposes, Kareekloof Solar PV will therefore not significantly interfere with the agricultural productivity of the area.

2.9.5 Social and Economic impact

[25] The grid connection and associated infrastructure has been assessed as part of a separate environmental process.

[26] The Kareekloof Solar PV and the associated grid connection falls within this Central EGI Corridor.

A social impact assessment will be undertaken During the Environmental Impact Assessment Phase of the Environmental Process.

2.9.6 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.

Kareekloof Energy PV and BESS will have a positive impact on local employment. According to the Social Specialist the project will likely employ between 300 and 350 individuals during the construction phase of the project and many of these opportunities will be from the local market.

During operations, Kareekloof Energy PV and BESS is expected to have up to 30 employment opportunities area ranging from security staff to administration and artisans[27].

2.9.7 Need (time)

In accordance with the guidelines on need and desirability, a project should be able to answer a series of questions to demonstrate need. These are highlighted in the table below:

Table 4: Project Need Analysis

Need	Discussion	
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	One of the Key Transitions per sector as proposed by Northern Cape Infrastructure Framework is to promote the development of renewable energy plants in the province and associated manufacturing capability.
Should the development occur here at this point in time?	Yes	The proposed Kareekloof Solar PV energy facility is to be located outside the De Aar urban edge, but within a legislated EGI corridor, and would promote diversification to the local economy as well as serve as a catalyst for further expansion in the stream of sustainable renewable energy development within this Corridor.
Does the community / area need the activity and the associated land use concerned?	Yes	The Emthanjeni Local Municipality identified the opportunity for renewable energy projects through their SDF and IDP processes, which include public participation. The proposed Kareekloof Solar PV 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. The proposed Kareekloof Solar PV development will contribute electricity to the constrained Northern Cape and National electrical network, contributing

[27] These estimated figures have been provided by the Social Specialist (Appendix E9).

Need	Discussion	
		to a provincial and national need. The BESS Component of the project provides much needed continuous and resilient electricity supply.
Are the necessary services with adequate capacity currently available?	partially	Kareekloof Solar PV requires the installation of an overhead power line to connect to the proposed Krypton Substation (feed into the national grid system), as well as part of the access road to the development site from the R48 (following existing farm tracks for most part). The cost of supplying the new infrastructure will be covered by the Applicant, and the impacts thereof have been assessed in this environmental process and the additional process to be initiated. The water required for the construction and operation of Kareekloof Solar PV will be sourced from the Emthanjeni Municipality (preferred option) and will be supplemented by stored rainwater. The applicant may at a later stage consider the utilisation of groundwater to supplement this supply, this will however be subject to approval in terms of the National Water Act. Construction waste (general waste) will be disposed of at the existing licensed landfill sites. Defunct and damaged modules and BESS infrastructure identified during construction and operations will be returned to the supplier for recycling and/or disposal.
Is this development provided for in the infrastructure planning of the municipality?	Yes	Yes. Attracting private investment and the employment opportunities associated with renewable energy development are identified a strategy 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). The Applicant is one such IPP which intends to generate up to 900MW of electricity from the proposed Kareekloof Solar PV, for input into the national grid via the proposed Krypton Substation). The proposed Kareekloof Solar PV is also situated within a legislated strategic EGI Corridor.

2.9.8 Desirability (place)

In accordance with the guidelines on need and desirability, a project should be able to answer a series of questions to demonstrate desirability. These are highlighted in the table below:

Table 5: Project Desirability Analysis

Desirability	Discussion	
Is the development the best practicable environmental option for this land / site?	Yes	The target property is outside the De Aar Urban Edge, within a legislated EGI Corridor. The property has a poor agricultural potential due to the arid climate and other limiting factors. These factors have rendered the property with limited land use option alternatives. Considering these factors, it is very unlikely to be considered for an alternative land use such as urban development.
Would the approval of this application compromise the	No	The Emthanjeni IDP aligns with the National Development Plan which

Desirability	Discussion	
integrity of the existing approved and credible municipal IDP and SDF?		states that at least 20 000 MW of renewable energy should be contracted by 2030. The IDP identifies renewable energy investment as a strategic objective for the region.
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 2018, the solar development site lies within vegetation types all classified as least threatened.
Do location factors favour this land use at this place?	Yes	The region has been identified as being viable areas for solar energy generation due to the following factors: • Good solar radiation; • Close to existing main transport routes and access points; • Very close to connection points to the local and national electrical grid; and The proposed site is furthermore situated within a legislated Strategic EGI Corridor and as such has been subjected to a detailed Strategic Environmental Assessment in which highly sensitive landscapes were already excluded from these areas. The ecological sensitive areas on and surrounding the solar site have informed the optimal location and layout for the proposed solar project, in order to minimise the impact on 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?	Yes	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 culturally 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?	Yes	The site is located outside of the De Aar Urban Edge and as a result is unlikely to impact negatively on the community's health and wellbeing. The closest populated settlement is approximately from the site (The owner of this settlement has however consented to the development.
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 development site does not have any significant agricultural value and has not been utilised for any intensive agricultural purposes. The development of the proposed solar facility would constitute the loss of approximately 1500ha 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 Kareekloof Solar PV are within acceptable bounds if one considers the minimal demand on the resources.
Will the proposed land use result in unacceptable	Unlikely.	The sites are within the legislated Strategic EGI corridors which have been

Desirability	Discussion	
cumulative impacts?		identified as an area with high potential for Electrical Grid Infrastructure. The potential for further, renewable energy developments in the area cannot be discounted (as several have already been approved or are in progress). The significance of the cumulative impacts will be assessed in detail in the Environmental Impact reporting Phase of this environmental Process.

2.10 SITE SELECTION PROCESS

The site selection process followed a two-stage approach; firstly, to select the property for the proposed development (Portion 1 of the farm Bas Berg 88, Portion 2 of the farm Koppy Alleen 83 and Portions 6, 11, 16 & 17 of the farm Karee Kloof 85) and secondly, to select the footprint of the proposed development within the farm portion.

2.10.1 Property Selection

The following criteria were taken into account by the applicant when selecting the property for the proposed development of the Kareekloof Solar PV Facility.

2.10.1.1 Proximity to towns with a need for socio-economic upliftment

The proposed Kareekloof Solar PV facility is situated approximately 50 km Northeast of De Aar in the Northern Cape Province.

According to the Emthanjeni IDP there are already 8 renewable energy facilities established within the municipality and further diversification of these is noted as desirable.

To this extent the proposed Kareekloof Solar PV Facility is situated in close proximity to the De Aar town. Consequently, local labour would be easy to source, which fits in well with the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) economic development criteria for socio-economic upliftment.

2.10.1.2 Access to grid

Eskom's 2040 Transmission Network Study' has drawn on various scenarios to determine the grid's development requirements, as well as to identify critical power corridors for future strategic development.

The National EGI corridors consisting of five transmission power corridors of 100 km in width have been gazetted by the DFFE following the outcome of the Strategic Environmental Assessment (SEA) which aimed to identify environmentally acceptable routes. The Kareekloof Solar PV Facility falls into the Western Corridor (see figure 16 above). The proposed Kareekloof Solar PV facility is furthermore situated very close to a point of connection, via the proposed Krypton Substation.

2.10.1.3 Current land use

The Agricultural specialist has confirmed that the cropping potential of the site is severely limited by the combination of climate and soil constraints. The rainfall is low and consequently very marginal for crop production. The soils are very shallow and consequently have very low water and nutrient holding capacity. The low water holding capacity, in combination with the rainfall, provides an insufficient moisture reservoir to reliably carry a crop through the season. The climate and soil constraints mean that the assessed area is not suitable for continuous, profitable crop production.

2.10.1.4 The solar irradiation

The economic viability of a solar PV facility is directly dependent on the annual solar irradiation at the site. As outlined in the above section the solar irradiation is favourable for commercial energy generation from PV.

2.10.1.5 Proximity to access road for transportation of material and components

The proximity of the site to the R48 decreases the impact on secondary roads from traffic during the construction and operation phases.

2.10.1.6 Landowner support

The selection of a site where the landowner is supportive of the development of renewable energy is essential for ensuring the success of the project. The landowners do not view the development as a conflict with their current land use practices. The landowners have provided written consent for the proposed Kareekloof Solar PV.

The site selection process was taken into account numerous criteria to determine the best position for the facility and numerous other sites that did not meet the required criteria were rejected prior to initiation of this environmental process. This Environmental process will therefore not consider site alternatives any further.

2.10.2 Footprint selection

The selection of the proposed study area within the affected properties 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.

Please refer to the section below detailing the layout progression and the alternatives that were considered.

2.11 CONSIDERATION OF ALTERNATIVES

Kareekloof Solar PV will consist of solar PV technology with fixed, single or double axis tracking mounting structures, with a net generation (contracted) capacity of up to 900MW_{AC} as well as associated infrastructure including BESS.

In terms of the of the guidelines on consideration of alternatives, alternatives can include:

- Site Alternatives (please refer to the site selection process detailed in section 2.10).
- Technology Alternatives (please refer to section 2 where technology alternatives are discussed in further detail).
- Layout Alternatives (discussed below).

In compliance with the regulations, as a minimum, the No-Go Alternative must be considered and assessed.

2.11.1 Layout Alternatives

The following layout alternatives have been considered thus far in this environmental process. Further refinement of the Preferred Layout Alternative (Layout Alternative 2) will take place during the Environmental Impact Reporting Phase.

2.11.1.1 Initial Assessment Area / Study site

Portion 1 of the farm Bas Berg 88, Portion 2 of the farm Koppy Alleen 83 and Portions 6, 11, 16 & 17 of the farm Karee Kloof 85 situated near de Aar in the Northern Cape Province, was identified for the development of the proposed Kareekloof Solar PV (see the site selection process outlined in section

2.10). The initial study area consisted of the entire extent of these properties as shown in the map below.

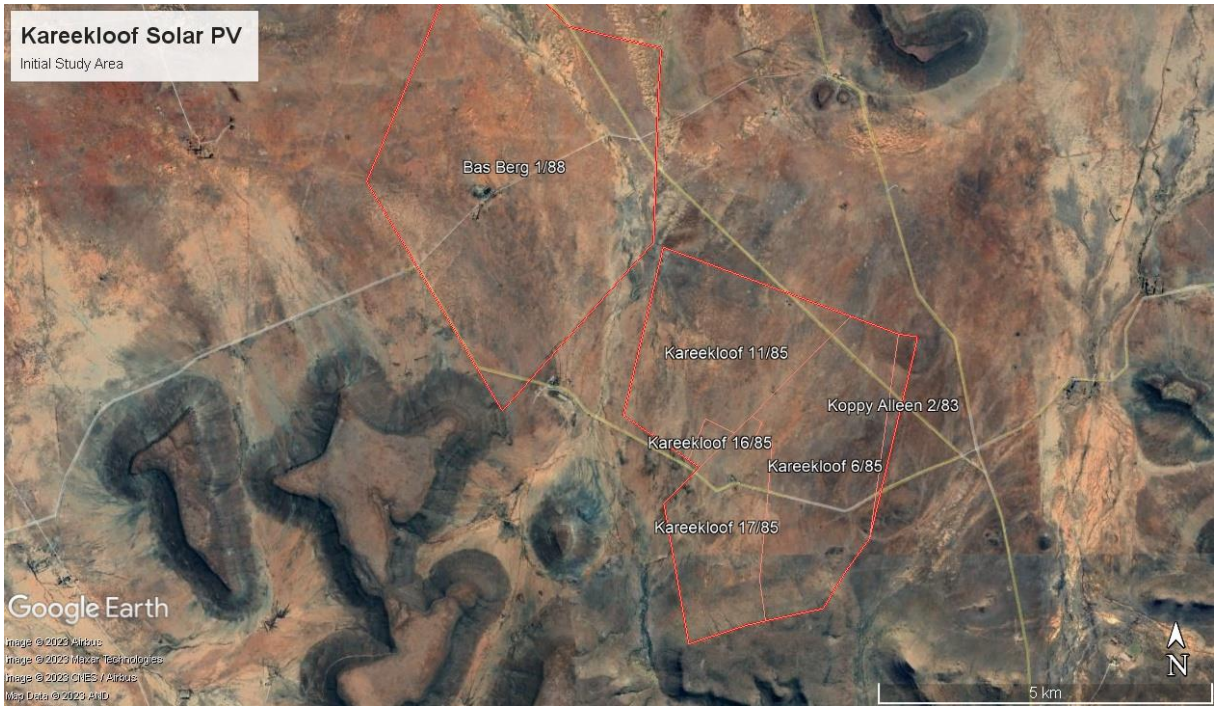


Figure 18: Initial Assessment Area / Study Site

The initial study area did not consider any environmental sensitive areas and was driven primarily by its proximity to the proposed Krypton Main Transmission Substation (MTS), located ± 1.5 km to the East.

2.11.1.2 Site Sensitivity Assessment

Following the identification of the initial assessment area / study site, the following specialists undertook Site sensitivity verifications of the of the Study Site[28]:

- Visual – Mr Stephen Stead of Visual Resource Management Africa (VRMA)
- Botanical – Enviro Insight
- Terrestrial Biodiversity – Enviro Insight
- Animal Species – Enviro Insight
- Avifauna – Enviro Insight
- Aquatic Biodiversity – Enviro Insight
- Heritage – Mr Jaco van der Walt of Beyond Heritage.
- Agriculture – Mr Johann Lanz
- BESS Risk – Ms Debbie Mitchell of ISHECON

These participating specialists spatially mapped the sensitivities of the site according to their specific disciplines. These sensitivities are depicted in the maps below.

[28] It must be noted that the site sensitivity assessment was undertaken prior to the development of Layout Alternative 2 (Preferred Layout), which was developed specifically in response to the various sensitivities.

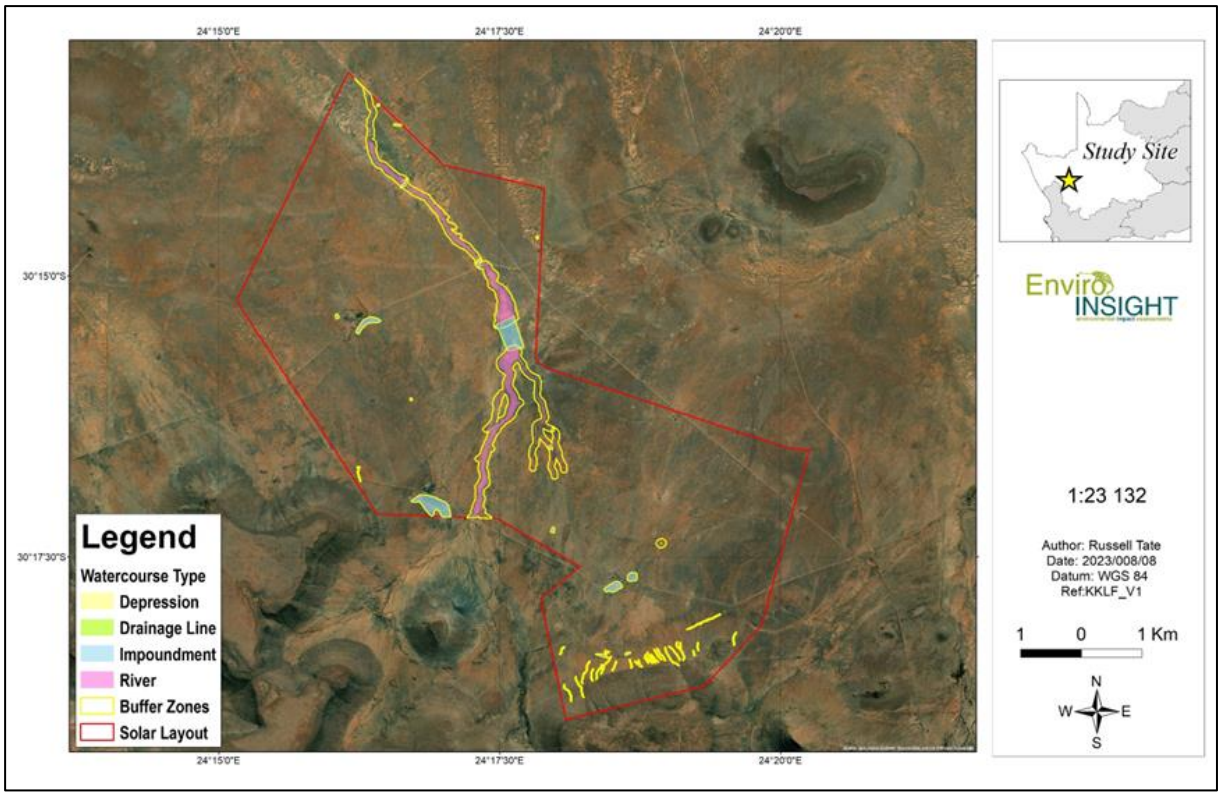


Figure 19: Delineated Aquatic Biodiversity Features and Buffers (Enviro Insight, 2023)

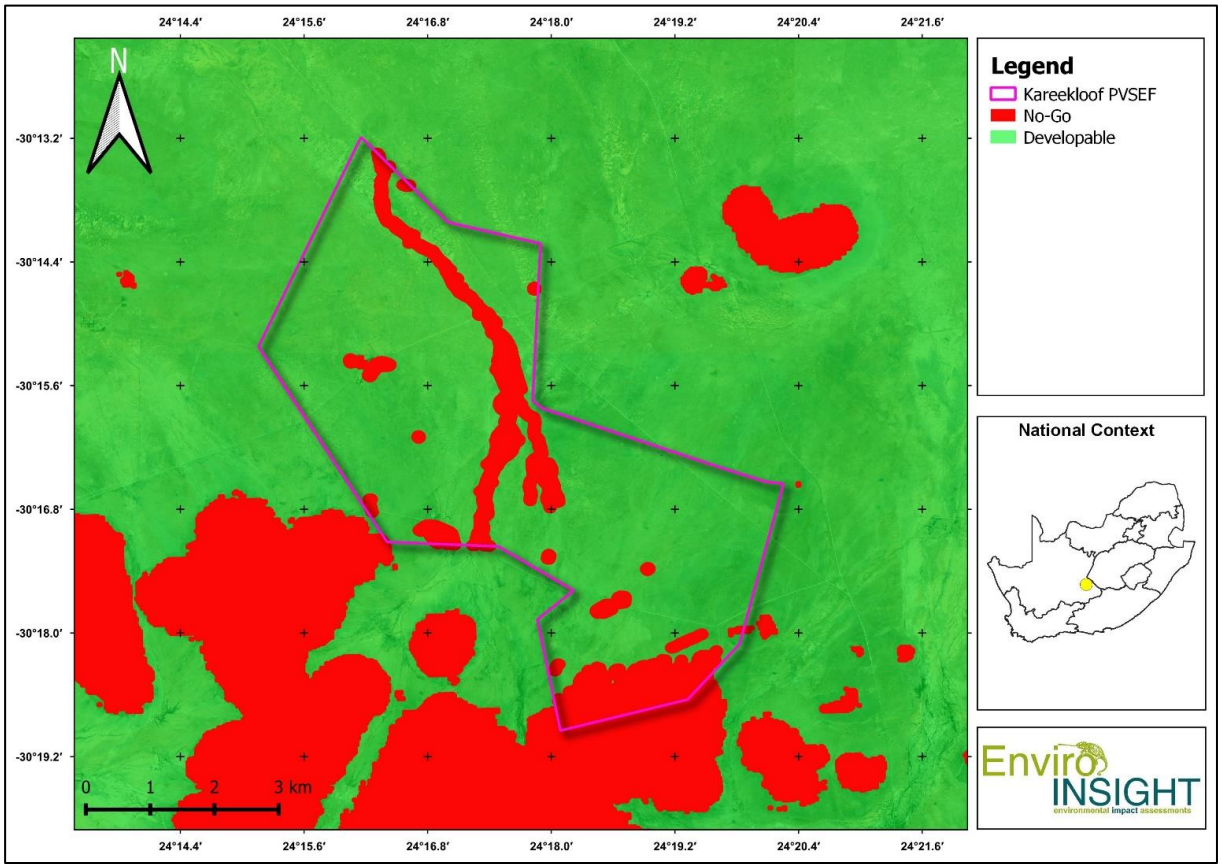


Figure 20: Terrestrial Biodiversity Site Sensitivity (Enviro Insight, 2023)

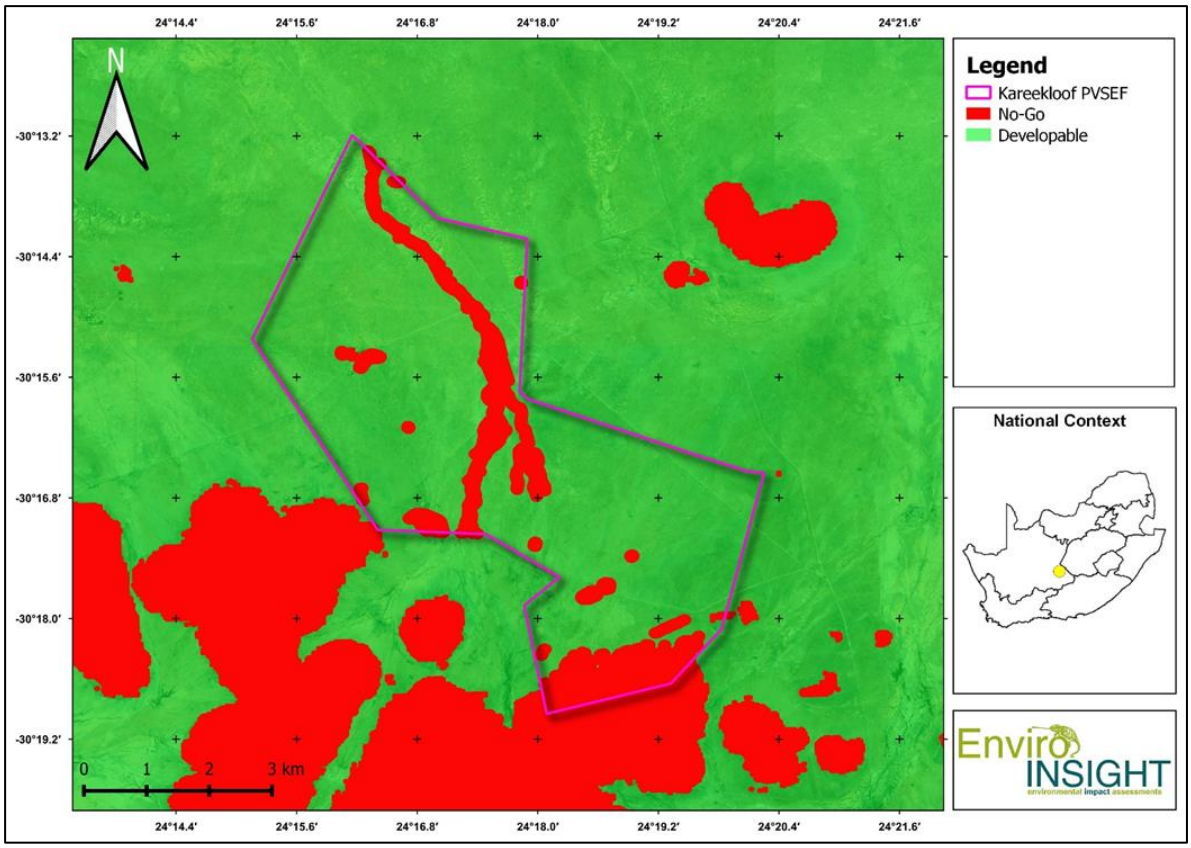


Figure 21: Avifaunal Site Sensitivity - High Sensitivity Areas (Enviro Insight, 2023)

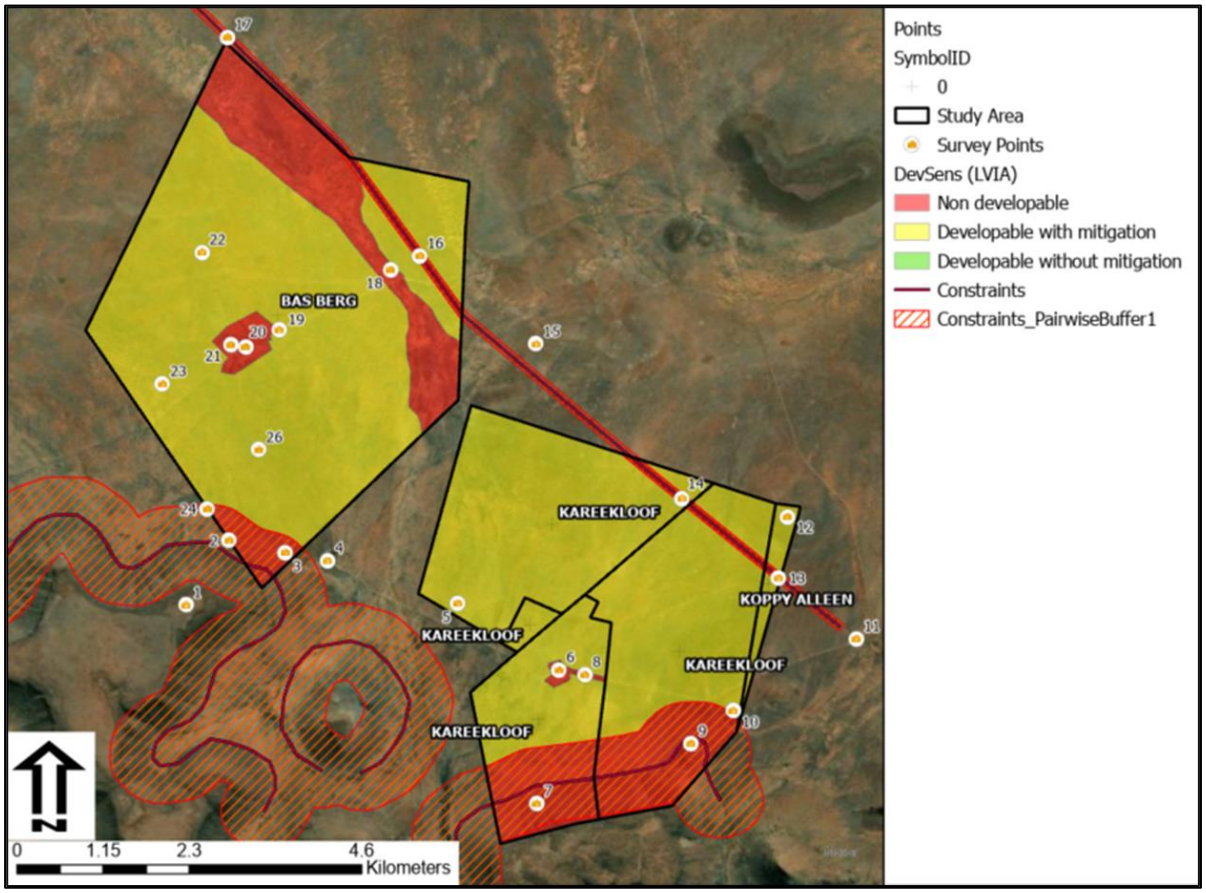


Figure 22: Visually Sensitive Areas (Stead, 2023)

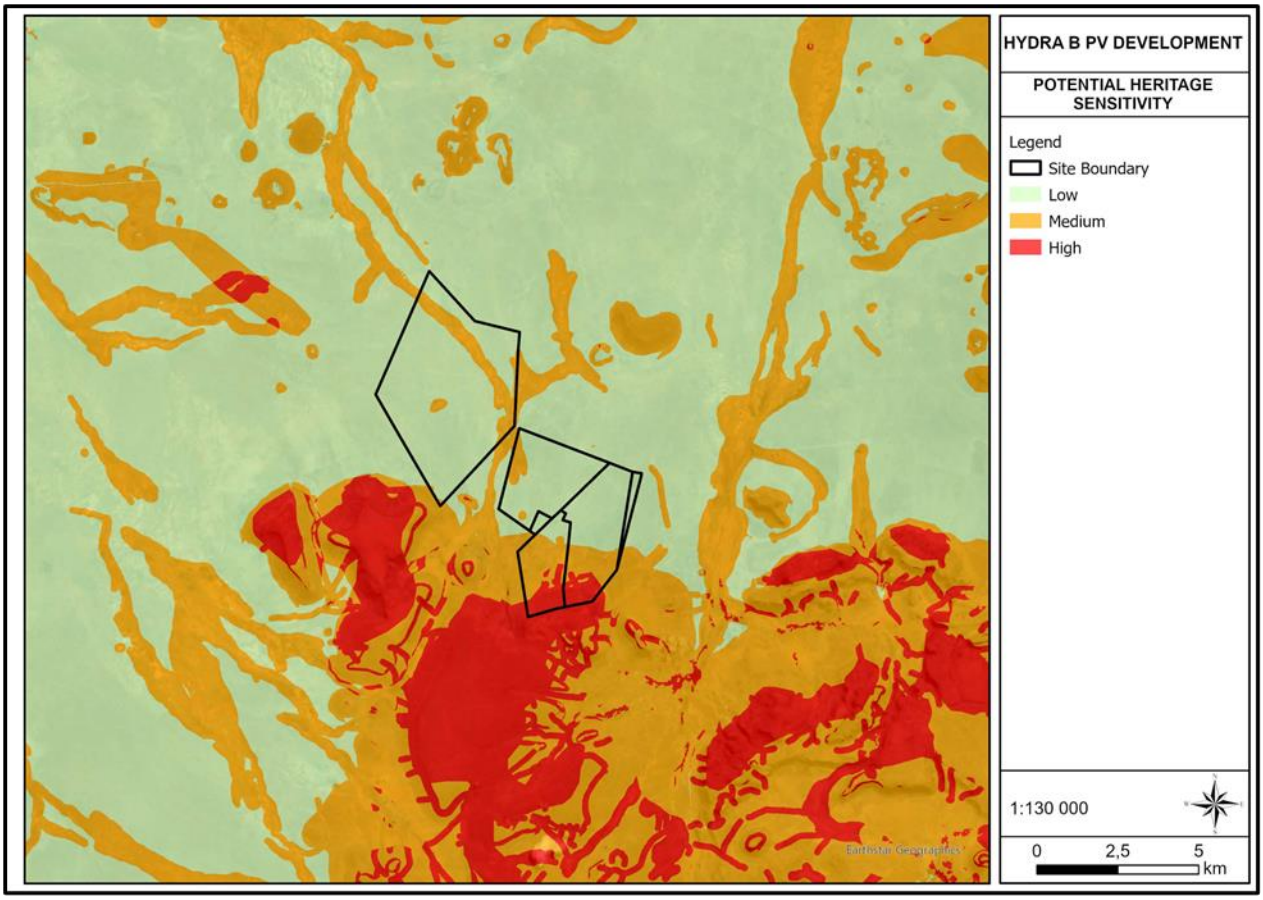


Figure 23: Heritage Sensitive Areas (Van Der Walt, 2023)

The Agricultural specialist confirmed the entire study site to be of medium sensitivity and did not identify any agricultural features or landscapes that would need to be avoided.

These sensitive features were then utilised to inform the Preferred Layout alternative for the scoping phase (Layout Alternative 2) as discussed below.

2.11.1.3 Layout Alternative 2

Based on the outcome of the site sensitivity assessment, the scoping phase preferred layout alternative (Layout Alternative 2) as depicted below was developed. This is the preferred layout was presented to stakeholders as part of the Scoping process and has been further refined in this impact assessment phase of the Environmental Process.

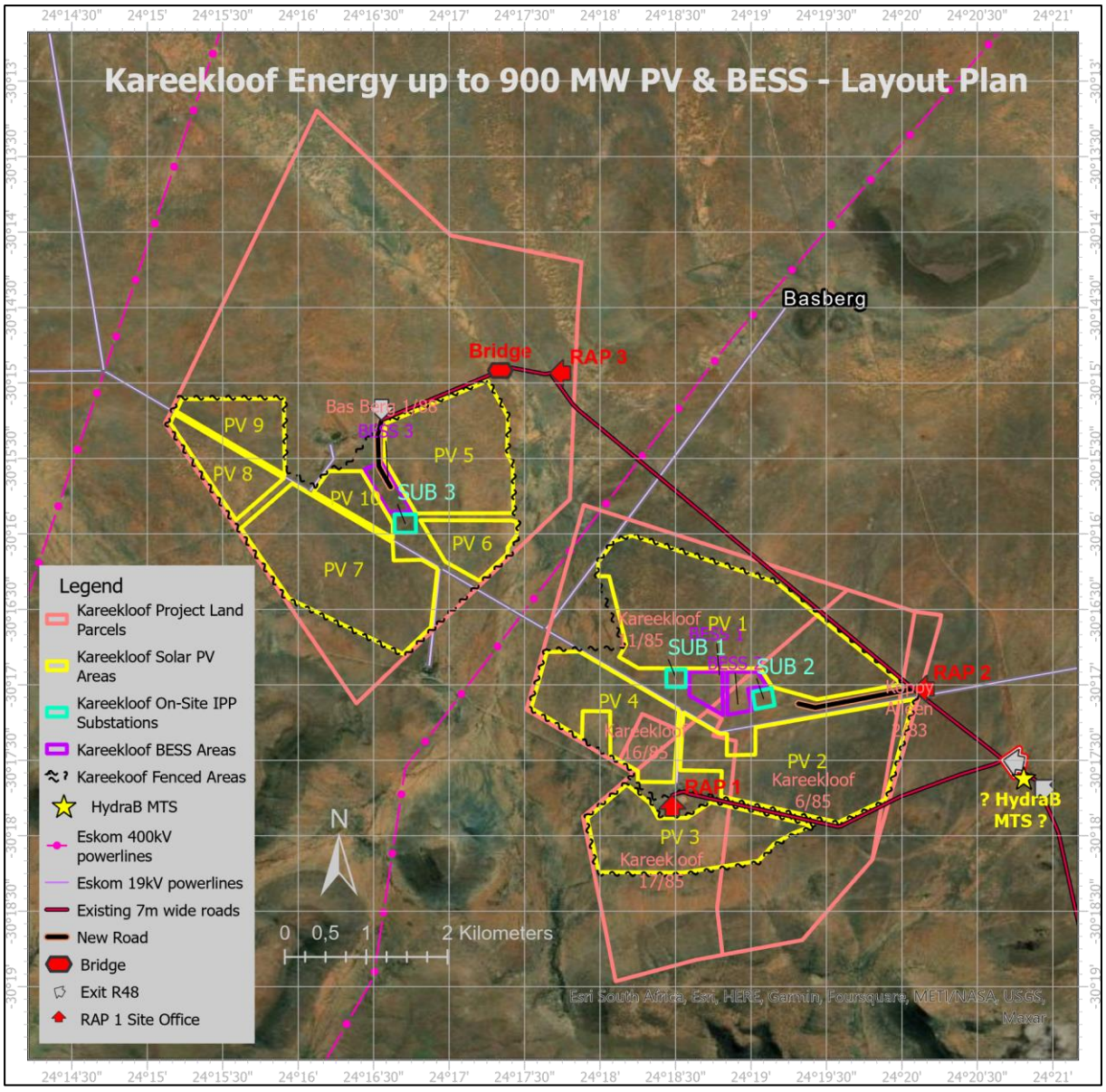


Figure 24: Layout Alternative 2 for Kareekloof Solar PV.

This Layout was developed to avoid all of the highly sensitive features.

Further engagements with specialists will be undertaken and the currently preferred layout alternative will be adapted further where necessary.

2.11.1.4 Layout Alternative 3 (Mitigated Preferred Alternative.

Layout Alternative 2 was refined in the Environmental Impact Assessment Phase of the Environmental Process. This was largely done to optimise the layout and to reduce the total fenced area in order to minimise the area of open space within the fenced layout.

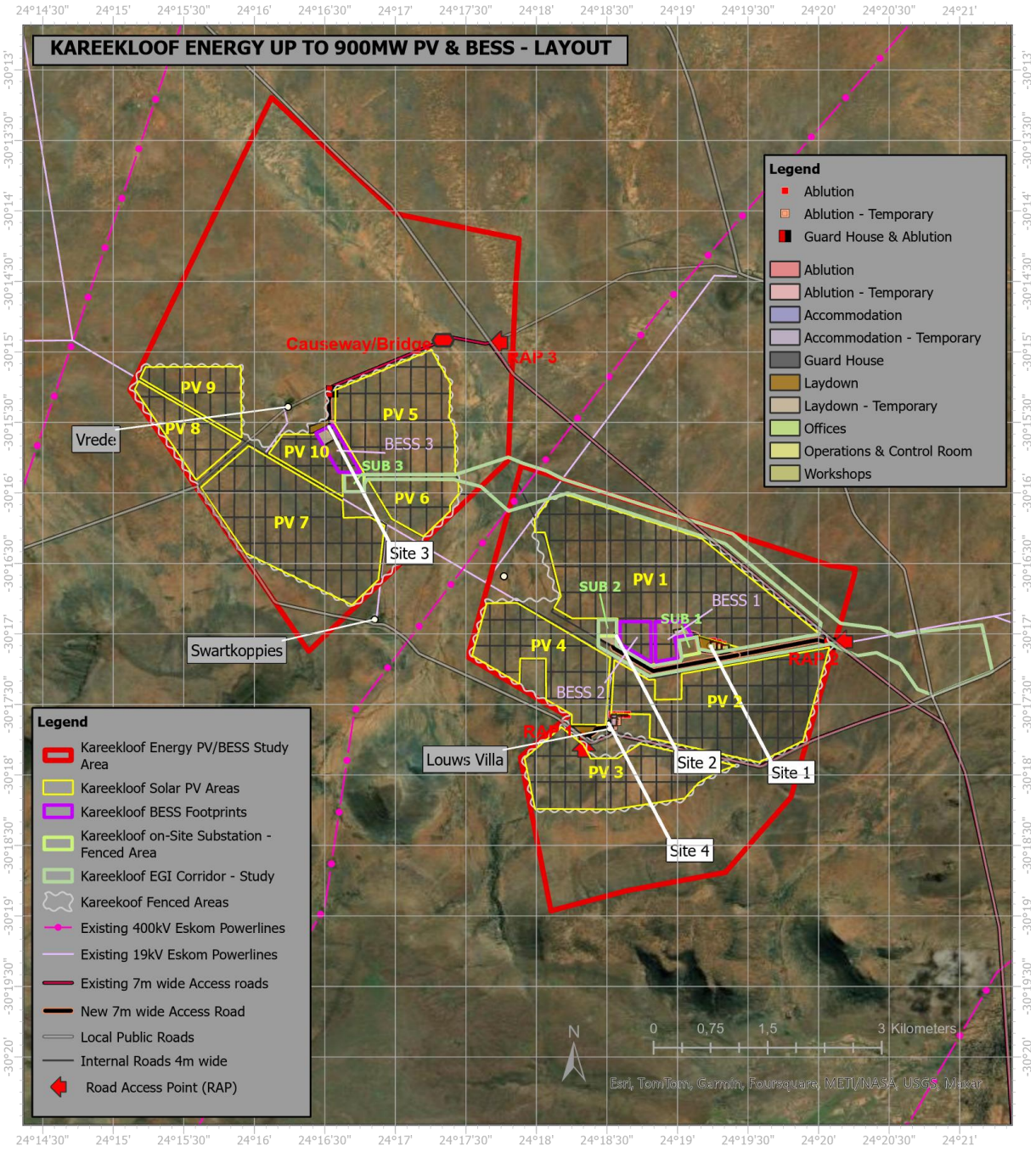


Figure 25: Layout Alternative 3 (Mitigated Preferred Layout) for Kareekloof Solar PV.

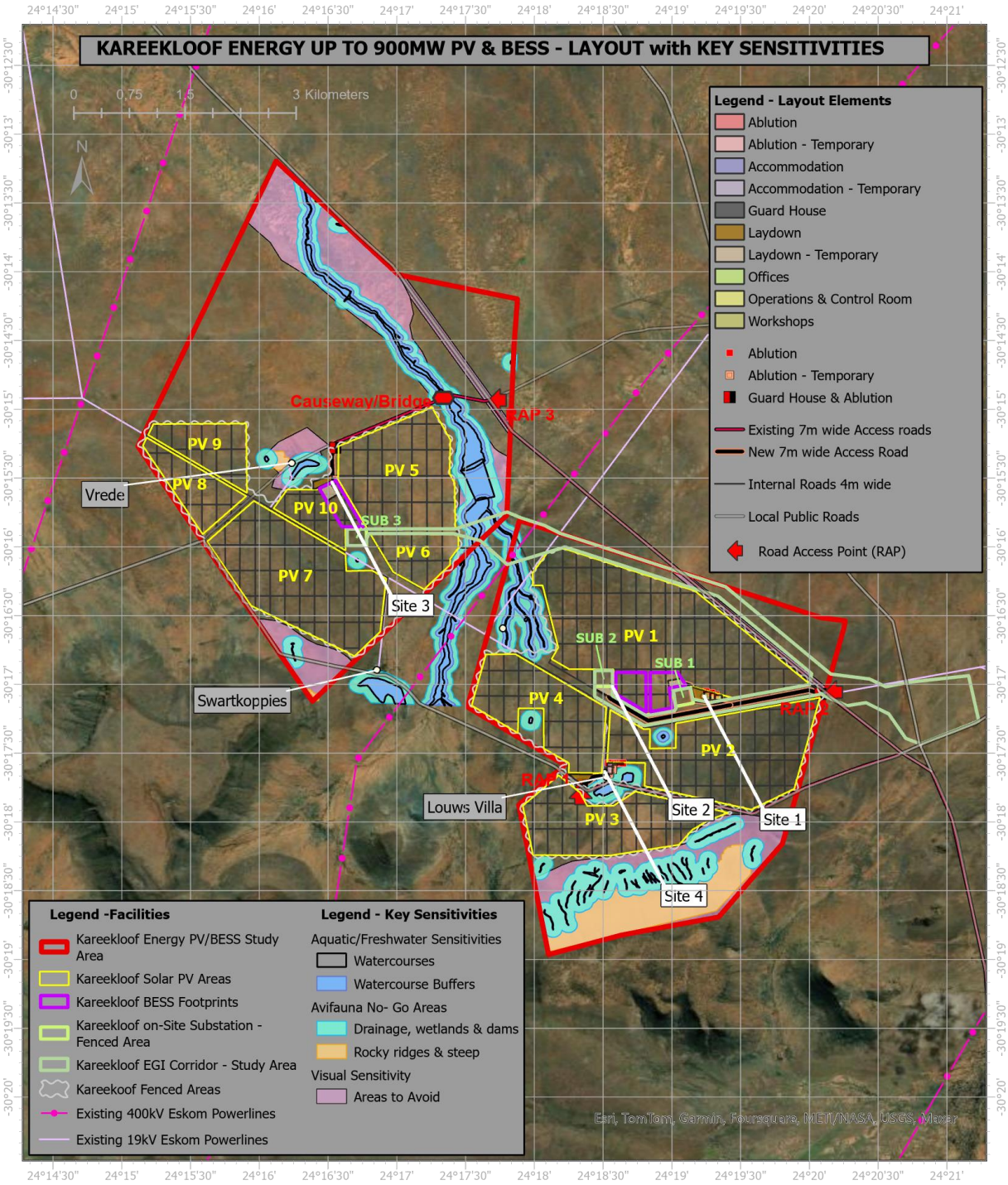


Figure 26: Layout Alternative 3 (Mitigated Preferred Layout) showing the proximity to sensitive features identified by the Terrestrial, Avifaunal, Aquatic and Visual Specialists.

2.11.2 Grid Connection Alternatives

The EGI (Eskom component) for Kareekloof Solar PV has been assessed as part of a separate environmental process, the alternatives in respect of the EGI have been considered and discussed in the Basic Assessment Process for the Kareekloof Solar PV and BESS Electrical Grid Infrastructure.

2.11.3 Access Road Alternatives

As discussed in section 2.6 above, the proposed access intents to utilise the existing access point from the R48 and furthermore utilise existing roads to access each of the PV development areas.

The relevant transport authorities have not raised concerns with the existing access, and as such no alternative access points have been considered.

The utilisation and upgrading of existing road infrastructure will have a significantly lower physical impact than the development of new road infrastructure.

2.11.4 The no-go alternative

The no-go Alternative (or status quo) proposes that Kareekloof Solar PV facility does not go ahead and that the area in proximity to the proposed Krypton MTS and within the Strategic EGI corridor will remain undeveloped as it is currently.

The land on which the Kareekloof Solar PV is proposed is currently vacant and used for limited game and livestock grazing activities, however due to a combination of factors, it has no potential for irrigated crop cultivation (this has been confirmed by the Agricultural Specialist).

The solar-power generation potential of the Emthanjeni Municipal area, particularly in proximity to the proposed Krypton substation and within the strategic EGI is significant and will persist should the no-go alternative occur.

The no-go 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 no-go alternative be approved, the positive impacts associated with Kareekloof Solar PV (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 will be used as a baseline from which to determine the level and significance of potential impacts associated with the proposed Kareekloof Solar PV Facility.

2.11.5 Comparison of alternatives

The table below reflects the key environmental advantages and disadvantages of the three layouts (i.e., the initial assessment area, Layout Alternative 2 and Layout Alternative 3). This will be expanded on during the Impact Assessment Phase of the Environmental Process.

Table 6: Comparison of Advantages and Disadvantages of Layout Alternatives described above.

Alternative	Preference	Reasons (incl. potential issues)
PV Layout Alternatives		
Layout Alternative 3	Mitigated Preferred	- Reduced fenced area limiting open space within PV Array - Accommodates the EGI to the new Krypton MTS location. - Avoids all high and very high sensitivity habitat. - Topographically suitable. - Avoids all hydrologically sensitive areas. - Avoids the high avifaunal sensitive areas
Layout Alternative 2	Preferred	- Avoids all high and very high sensitivity habitat. - Topographically suitable. - Avoids all hydrologically sensitive areas. - Avoids the high avifaunal sensitive areas
Initial Assessment Area	Portions Less Preferred, eliminated from further assessment	- Portions of the initial assessment area are topographically unsuitable for the development of PV. - Portions of the initial assessment area consist of high and very high ecologically sensitive areas. - Portions of the initial assessment area high and very high hydrologically sensitive areas. - Portions of the initial assessment area are within areas with a very high avifaunal sensitivity and their buffers.

Layout alternative 3 has been assessed against the no-go alternative in this phase of the Environmental Process.

2.12 PROJECT PROGRAMME AND TIMELINES

As mentioned previously Kareekloof Solar PV is intended to be bid into the REIPPPP or alternative state or private power procurement programme.

Table 7: Preliminary implementation schedule.

	Description	Timeline
1	Finalisation of Environmental and other Pre-Construction programmes	Second Quarter 2024
2	Bidding process	Last Quarter 2024
3	Finalisation of agreements	First Quarter 2025
4	Procurement of infrastructure	First Quarter 2025
5	Construction	2025
6	Commissioning	2026

The table above clearly depicts the dependence of the project on the timelines of any particular procurement programme. Any delay or acceleration within the procurement programme will have a corresponding effect on the timelines of the projects.

Due to the uncertainty regarding the timing of the procurement programmes, the competent authority is herewith requested that the validity period of the environmental authorisation (if authorised) be granted as follows:

- Commencement of Construction Activities within 10 Year's from the date of the Environmental Authorisation.
- Completion of all non-operational aspects of the Environmental Authorisation within 10 years of commencement of construction activities.

3. 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.

3.1 NATIONAL LEGISLATION

This section deals with nationally promulgated or nationally applicable legislation associated with the proposed Kareekloof Solar PV.

3.1.1 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.

The National Environmental Management Act, NEMA (discussed below) is the enabling legislation to ensure this primary right is achieved.

3.1.2 National Environmental Management Act (NEMA)

The current assessment is being undertaken in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998)[29]. 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 Forestry, Fisheries and the Environment) based on the findings of an Environmental Assessment.

The proposed development entails a number of listed activities, which require a Scoping & Environmental Impact Reporting process to be followed. Such a process must be conducted by an independent registered EAP[30]. Cape EAPrac has been appointed to undertake this process. The figure below depicts a summary of the Scoping and Environmental Impact Reporting Process.

[29] 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). These regulations came into effect on 08 December 2014 and replace the EIA regulations promulgated in 2006 and 2010.

[30] The EAP in this regard is registered with EAPASA under registration number 2019/301.

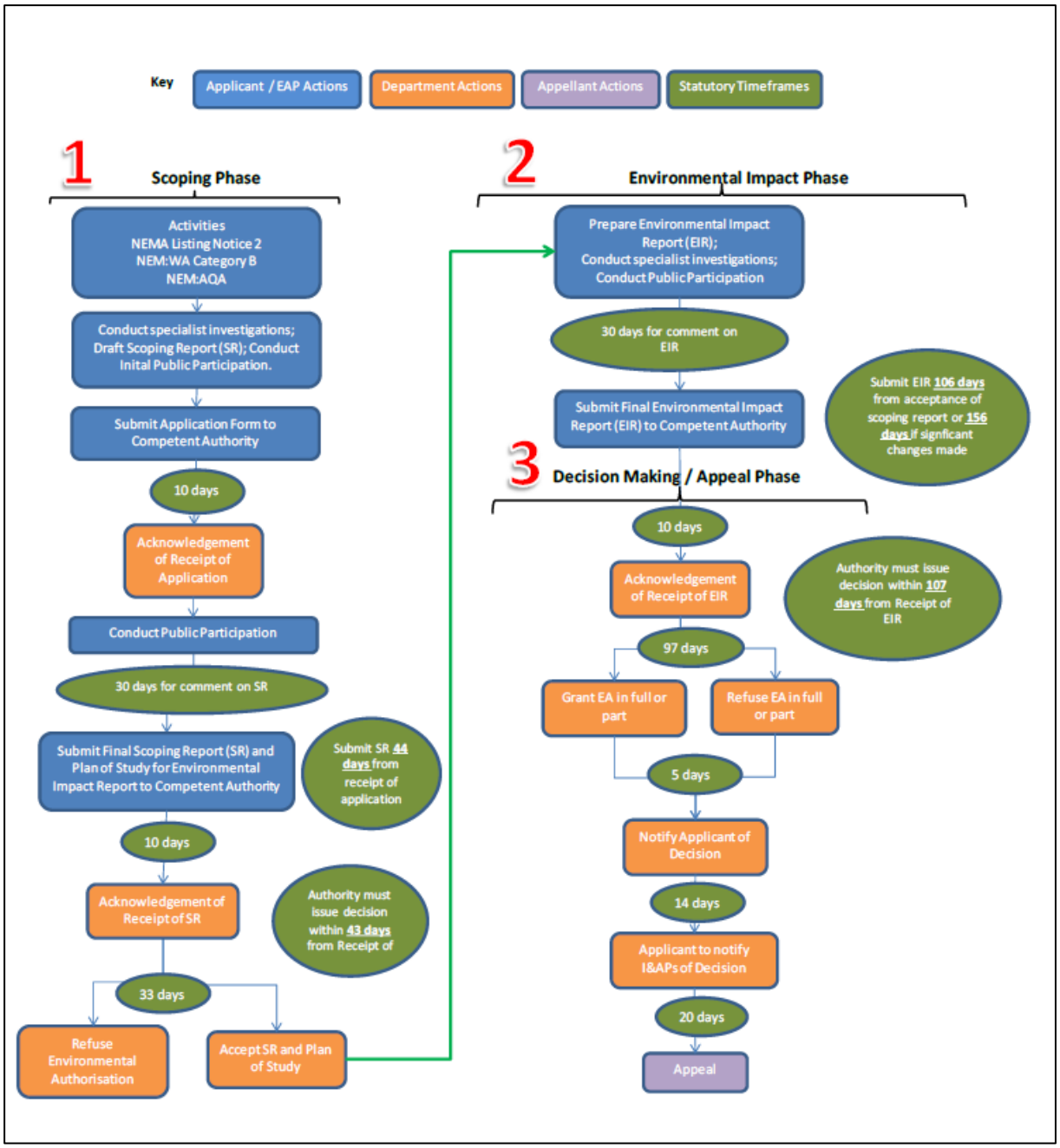


Figure 27: Summary of Scoping and Environmental Impact Reporting Process in terms of the 2014 EIA Regulations (as amended).

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

Table 8: NEMA 2014 (As amended in April 2017) listed activities applicable to Kareekloof Solar PV.

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates. Ensure to include thresholds/area/footprint applicable.
11(i)	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;	The three On-Site Substations will have a capacity of up to 300MVA each. Three 132kV powerlines will be routed in an

		EGI corridor/servitude from the three on-site substations to the grid connection
12(ii)(c)	The development of— (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	Some of the project infrastructure, such as internal roads are within 32m of the Aquatic features identified by the aquatic specialist.
14	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	The BESS proposed will include the storage of dangerous goods in excess of the threshold of this activity.
28(ii)	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	The proposed PV and BESS Development constitutes Commercial / Industrial use and will occur on a property currently used for agricultural purposes.
48	The expansion of— (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	Some of the project infrastructure, such as roads are routed within 32m of the freshwater resources identified by the aquatic specialist. .
Activity No(s):	**Provide the relevant Scoping and EIA Activity(ies) as set out in Listing Notice 2 of the EIA Regulations, 2014 as amended**	**Describe the portion of the proposed project to which the applicable listed activity relates. Ensure to include thresholds/area/footprint applicable.**
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.	The proposed Kareekloof Energy Project will have an Electricity Footprint of up to 900 megawatts.
4	The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.	The BESS proposed will include the storage of dangerous goods in excess of the threshold of this activity.
15	The clearance of an area of 20 hectares or more of indigenous vegetation.	The proposed Kareekloof Energy project will require the clearance of more than 20ha of indigenous vegetation.
Activity No(s):	**Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended**	**Describe the portion of the proposed project to which the applicable listed activity relates. Ensure to include thresholds/area/footprint applicable.**
18(g)(ii)(ii)	The widening of a road by more than 4m, or the lengthening of a road by more than 1km. g. Northern Cape ii. Outside urban areas: (ii) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland; or	The main and internal access roads will require that existing farm tracks be widened by more than 4m in some areas which are in proximity to the delineated watercourses. Existing Farm roads will be lengthened by more than 1km.

NOTE: Basic Assessment as well as S&EIR Activities are being triggered by the proposed development, the Environmental Application 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 competent authority, in this case the DFFE. Should the Department approve the proposed activity, the Environmental Authorisation does not exclude the need for obtaining relevant approvals from other Authorities who have a legal mandate in respect of the activity.

3.1.3 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, an environmental assessment and authorisation is required for the transformation or removal of indigenous vegetation in a critically endangered or endangered ecosystem if more than 300 square metres will be removed.

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, the project area falls within three vegetation types, namely Eastern Upper Karoo, Northern Upper Karoo and Besemkaree Koppies Shrubland.

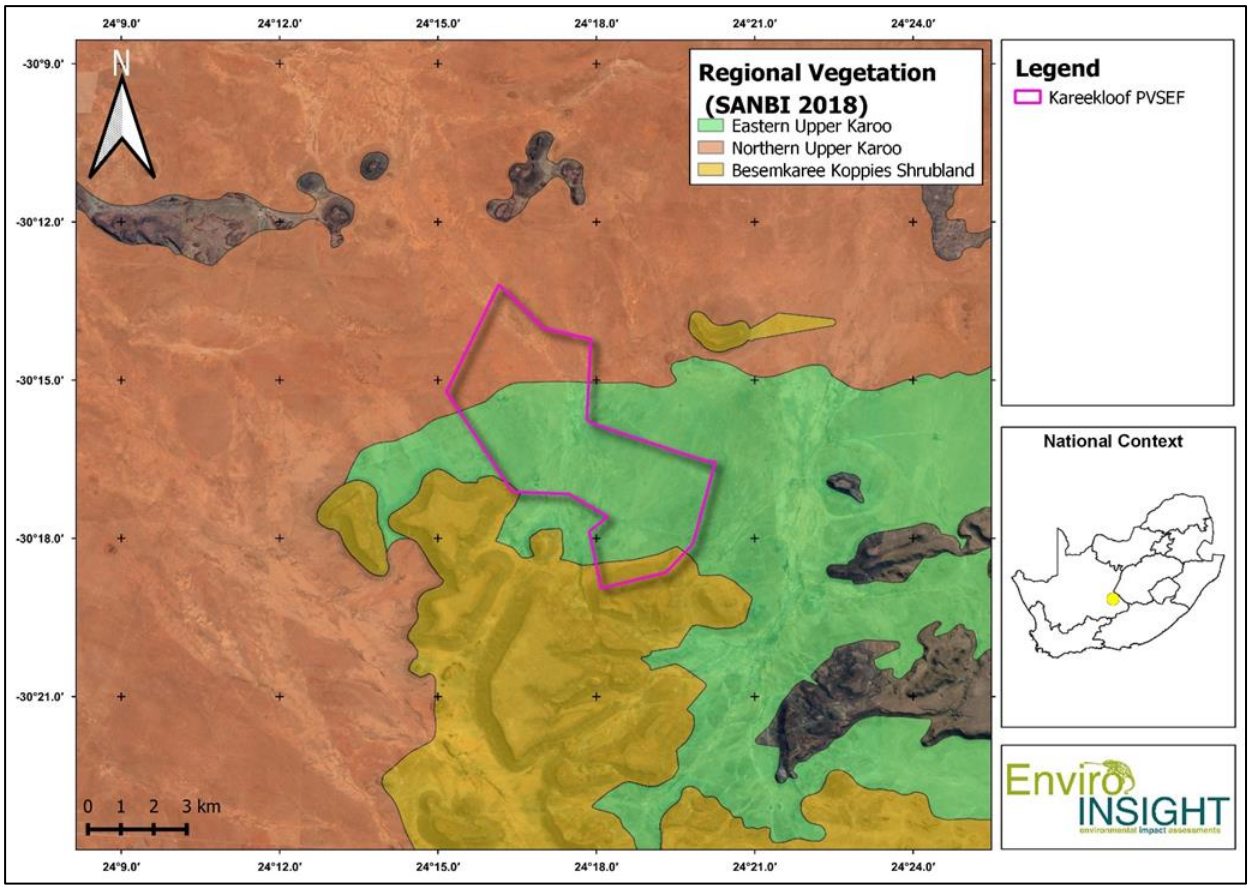


Figure 28: Broad Scale Vegetation types of Kareekloof Solar PV (Enviro Insight, 2023).

These Vegetation Types are all categorised as “least threatened”.

According to the Terrestrial Biodiversity Specialist, Besemkaree Koppies Shrubland occurs in the Northern Cape, Free State and Eastern Cape provinces on the plains of the Eastern Upper Karoo, between Richmond and Middelburg in the south and the Orange River in the north (Mucina & Rutherford 2006). The vegetation occurs on the slopes of koppies, buttes and tafelbergs and consists of a two-layered karroid shrubland. The lower layer of the vegetation is dominated by dwarf small-leaved shrubs and the upper layer is dominated by tall shrubs. The geology consists of dolerite koppies and sills embedded within Karoo Super Group sediments.

The Northern Upper Karoo vegetation unit occupies the Northern regions of the Upper Karoo plateau from Prieska, Vosburg and Carnarvon in the west to Philipstown, Petrusville and Petrusburg in the east. Bordered in the north by Niekerkshoop, Douglas and Petrusburg and in the south by Carnarvon, Pampoenpoort and De Aar. A few patches occur in Griqualand West.

The landscape typifying this vegetation type is flat to gently sloping plains with isolated Koppies of Upper Karoo Hardeveld in the south, Vaalbos Rocky Shrubland in the northeast and interspersed with many pans.

The Eastern Upper Karoo vegetation type is one of the largest vegetation types in the country and consists of flat and gently sloping plains vegetation dominated by dwarf microphyllous shrubs with ‘white’ grasses, especially Aristida, Eragrostis and Stipagrostis. Eastern Upper Karoo is found in the Northern, Western and Eastern Cape, between Carnarvon and Loxton in the west, De Aar, Petrusville and Venterstad in the north and Burgersdorp and Cradock in the east, and the Great Escarpment in the south (Mucina & Rutherford 2006).

3.1.4 Conservation of Agricultural Resources Act – CARA (Act 43 of 1983):

The Conservation of Agricultural Resources Act (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. CARA 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 Kareekloof Solar PV site is moderate and consists mainly of invasive Acacia species.

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) deals with the Utilisation and protection of vleis, marshes, water sponges and water courses

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

The Aquatic Biodiversity assessment attached in Appendix E3 has identified a number of surface water resources within the assessment area. The mitigated preferred layout, layout alternative 3 has avoided these features along with the buffers suggested by the specialist[31].

3.1.5 The Subdivision of Agricultural Land, Act 70 Of 1970

The Subdivision of Agricultural Land Act 70 of 1970 (SALA”) came into operation on 2 January 1971. The Department of Agriculture administers the Subdivision of Agricultural Land Act No. 70 of 1970. Subdivision of agricultural land, therefore, requires consent from the Department of Agriculture.

The Department of Agriculture is considered a commenting authority on this environmental process, but will be a decision-making authority on the SALA application which will take place after the project receives an EA.

The National and Northern Cape Department of Agriculture have been registered as a key stakeholder for this environmental process.

3.1.6 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.

[31] Some of the perimeter fencing does encroach into the aquatic biodiversity buffer areas. The aquatic specialist has confirmed that this to bee acceptable. The existing access road does cross one of the aquatic biodiversity features identified by the specialist.

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 Kareekloof Solar PV is to be sourced from the Emthanjeni Local Municipality (who will be engaged with to provide confirmation of availability). Should the applicant in the future, wish to utilise groundwater for the purposes of construction or operation of the facility, such use will require a licence in terms of Section 21(a) of the NWA.

The freshwater specialist has identified a number of surface water resources within the study site. Layout Alternative 3 avoids these the majority of these features along with the buffer areas identified by the specialist. There is one instance where the existing access road crosses one of these delineated watercourses and this existing access will be widened/upgraded. The proposal also includes infrastructure within the regulated zone of these aquatic features and as such will require a Water Use Licence / General Authorisation in terms of the NWA. Confluent Environmental have been appointed to facilitate this water use licence application. This application process has commenced on the Department of Water and Sanitation EWULAAS system and the application reference number is WU35671.

3.1.7 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 Terrestrial Biodiversity specialist has not identified any species protected in terms of the National Forest Act on site.

3.1.8 National Heritage Resources Act, 25 of 1998

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). The South African Heritage Resources agency 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 000m^2 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 this case, SAHRA).

- 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 this case, SAHRA).
- 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 (In this Case, SAHRA).

Mr Jaco van der Walt of Beyond Heritage has compiled and submitted a Heritage Impact Assessment and SAHRA. A copy of this assessment is attached in Appendix E4.

3.1.9 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.

3.2 PROVINCIAL LEGISLATION

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

3.2.1 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.

Chapter 2 of the act allows for the declaration of astronomy advantage areas whilst Chapter 3 pertains to the management and control of astronomy advantage areas. Management and control of astronomy advantage areas include, amongst others, the following:

- Restrictions on use of radio frequency spectrum in astronomy advantage areas;
- Declared activities in core or central astronomy advantage area;
- Identified activities in coordinated astronomy advantage area; and
- Authorisation to undertake identified activities.

The Kareekloof Solar PV facility was furthermore found to be situated more than 194km from the closest SKA station (SKA004).

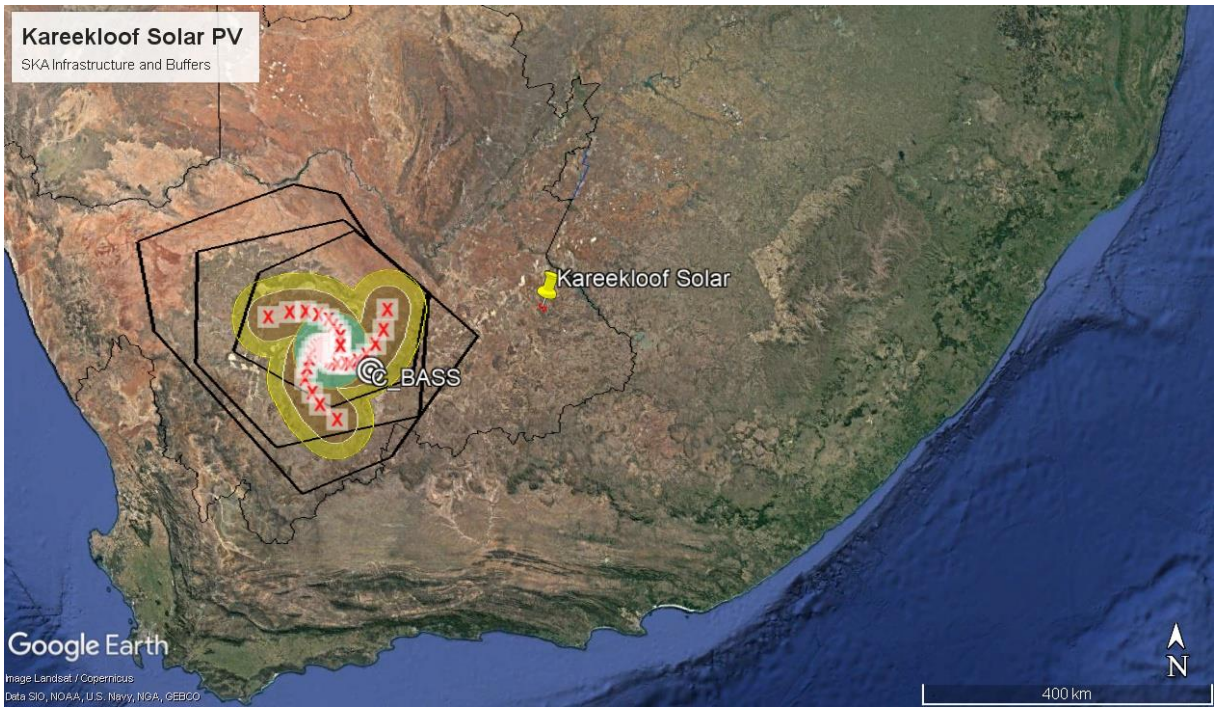


Figure 29: Proposed Kareekloof Solar PV in relation to the SKA Infrastructure and Buffers.

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

3.2.2 Northern Cape Land Use Planning Act (Act 16 of 2013)

In line with the Spatial Planning and Land Use Management Act, (Act 16 of 2013), the Northern Cape Land Use Planning Act 2014 (LUPA) was adopted by the provincial government of the Northern Cape in April 2014. Chapter III (which deals with spatial planning matters) sets out the minimum requirements for drafting a Provincial Spatial Development Framework (PSDF) for the WCP.

Of specific relevance, Section 4 requires a PSDF to (3) 'contain at least (c) provincial priorities, objectives and strategies, dealing in particular with (iiii) adaptation to climate change, mitigation of the impact of climate change, renewable energy production and energy conservation'. This requirement would apply to all future revisions of the PSDF. As such, it indicates the provincial government of the Northern Cape's commitment to renewable energy production in order to respond to climate change.

3.2.3 Northern Cape Amended Zoning Scheme Regulations for Commercial Renewable Energy Facilities (2011).

Amendments to the Northern Cape Land Use Ordinance (1985) (LUPO) were promulgated in 2011 in order to guide the development of commercial renewable energy generation facilities (REFs), mainly wind and solar. The Zoning Scheme amendments are specifically intended to provide guidance with regard to land use compatibility, and applicable development restrictions and conditions, including provision for mandatory rehabilitation post construction and final decommissioning ("abandonment" in terms of the Provincial Notice). The ambit of the Regulations includes all REFs as well as associated ("appurtenant") infra/ structure(s) operated for commercial gain, irrespective of whether such feed into the electricity grid or not. The section below provides an overview of key points of relevance to the proposed PV Development.

3.2.3.1 Zoning status

In terms of zoning status, “renewable energy structures” are designated as a consent use in the zone Agriculture I.

3.2.3.2 Land use restrictions.

Restrictions with regard to height are mainly applicable to wind energy facilities (WEFs) but associated on-site buildings for all REFs are limited to a maximum of 8,5 m (ground to highest point of roof).

Restrictions with regard to setback are only applicable to WEFs.

3.2.3.3 Establishment of a Rehabilitation Fund

Prior to authorisation, the applicant (“owner”) must make financial provision for the rehabilitation or management of negative environmental impacts, as well as of negative impacts associated with decommissioning or abandonment of the facility. Such provision should be in the form of a fund to be administrated by the Municipality and should be to the satisfaction of the competent authority (i.e. Department of Energy).

3.2.3.4 Land clearing/ erosion management.

- Land clearing should be limited to areas considered essential for the construction, operation and decommissioning of a Renewable Energy Facility.
- All land cleared during construction which does not form part of the Renewable Energy Facility structural footprint, must be rehabilitated in accordance with an approved rehabilitation plan.
- Soil erosion must be avoided at all costs, and any high-risk areas should be rehabilitated.

3.2.3.5 Visual impact management

- Visual and environmental impacts must be considered, to the satisfaction of the competent authority.
- Associated structures (i.e., substations, storage facilities, control buildings, etc.) must be screened from view by indigenous vegetation, and/or located underground, or be joined and clustered to avoid adverse visual impacts. In addition, appurtenant structures must be architecturally compatible with the receiving environment.
- Lighting should be restricted to safety and operational purposes, must be appropriately screened from adjacent land units, and should also be in accordance with applicable Civil Aviation Authority requirements.

3.2.3.6 Operational management and maintenance

- Renewable Energy Facilities may not cause or give rise to any noise or pollution, deemed to be a nuisance in terms of applicable Environmental Impact Assessment (EIA) regulations or Municipal by-laws.
- The PV Facility owner/ operator is responsible for maintaining the facility in a good condition, including with regard to painting, structural repairs, on-going rehabilitation measures (e.g., erosion), as well as the upkeep of safety and security measures.

3.2.3.7 Decommissioning management

- A PV Facility which has reached the end of its lifespan or that has been abandoned must be removed. The owner (operator) is responsible for the removal of such structures in whole, no longer than 150 days after the date of discontinued operation, and the land must be rehabilitated to the condition it was in prior to construction of the facility.
- Decommissioning activities must include the removal of all PV Facility structures, associated structures, as well as transmission lines; the disposal of solid and hazardous waste according to applicable waste disposal regulations; and the stabilisation and re-vegetation of the site. In order to minimise disruptive impacts on vegetation, soils, etc., the competent authority may grant approval not to remove any underground foundations or landscaping.

3.3 REGIONAL AND MUNICIPAL LEGISLATION

This section deals with regionally and municipally promulgated or regionally or municipally applicable legislation associated with the proposed Kareekloof Solar PV[32].

3.3.1 Emthanjeni Municipality Integrated Development Plan (2022 - 2027)

The Emthanjeni IDP has identified the following strategic objectives for the municipality.

1. **Strengthen financial sustainability.**
    a. To budget strategically
    b. Entrench the Long-Term Financial Plan in the planning, implementation and management of the organisation.
    c. Diversify revenue and ensure value for money services.
    d. Ensure sustainable financial risk and asset management.
    e. Diversify by sourcing grant funding to support projects, programmes and initiatives of Council.
    f. Ensure transparency in financial management by ensuring that all financial records are accurate, reliable and timely.

2. **Ensure good governance.**
    a. Create an efficient, effective, economic and accountable administration.
    b. Provide a transparent and corruption free municipality.
    c. Accountable leadership supported by professional and skilled administration.
    d. Communicate effectively with the public.
    e. A customer centred approach to everything

3. **Sustainable service delivery**
    a. Develop and provide bulk infrastructure within the climate change risks.
    b. Maintain existing bulk infrastructure and services.
    c. Develop, manage and regulate the built environment.
    d. Source alternative sources of energy in the context of national electricity provision.
    e. Conserve and manage the natural environment and mitigate the impacts of climate change.

4. **Facilitate an enabling environment for a diversified economy and growth to alleviate poverty.**
    a. Improve the regulatory environment for ease of doing business.
    b. Promote tourism.
    c. Alleviate poverty through job creation in municipal driven projects and programmes.
    d. Ensure all policies and systems in Local Municipality support poverty alleviation.
    e. Attract investment through catalytic infrastructure.

5. **Empowering people through innovation.**
    a. To promote healthy lifestyles through the provision of sport, recreational and other facilities and opportunities.
    b. Promote continued partnerships for youth development.
    c. Promote a safe environment for all who live in Municipal Area.
    d. Develop a Master Plan for "Smart Cities" in Municipal Area.

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

It is envisioned that the proposed Kareekloof Solar PV Facility can contribute to strategic objectives 1(d), 3(d), 3(e), 4(c) and 4(e) if the IDP.

3.3.2 Emthanjeni Local Municipality Spatial Development Framework (2091-2024)

The Emthanjeni Spatial Development Framework (SDF) outlines a strategic goal to ensure that adequate energy is supplied to meet developmental challenges, it furthermore promotes the notion that such energy should focus on renewable sources.

The SDF furthermore promotes Renewable Energy to shift the focus on to what it terms “sustainable energy”, stressing that appropriate policies need to be followed to ensure that adequate energy is supplied as, in order to meet developmental challenges such as decent jobs, security, climate change, food production or increasing incomes and access to energy for all communities.

The SDF does highlight a challenge and cites interventions that will be needed for large scale infrastructure that is located within or adjacent to landscapes of high heritage and scenic significance.

Policy BE17 states that:

- Wind and solar farm locations should be informed by a range of criteria, i.e., environmental considerations, topography, planning and land use considerations as well as infrastructure considerations.
- Wind farms and solar farms should be located where their visual and environmental impact will be the lowest.

The risk adverse approach to the proposed positioning of the infrastructure will ensure that these policy objectives are not compromised.

3.4 GUIDELINES, POLICIES AND AUTHORITATIVE REPORTS

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

3.4.1 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.

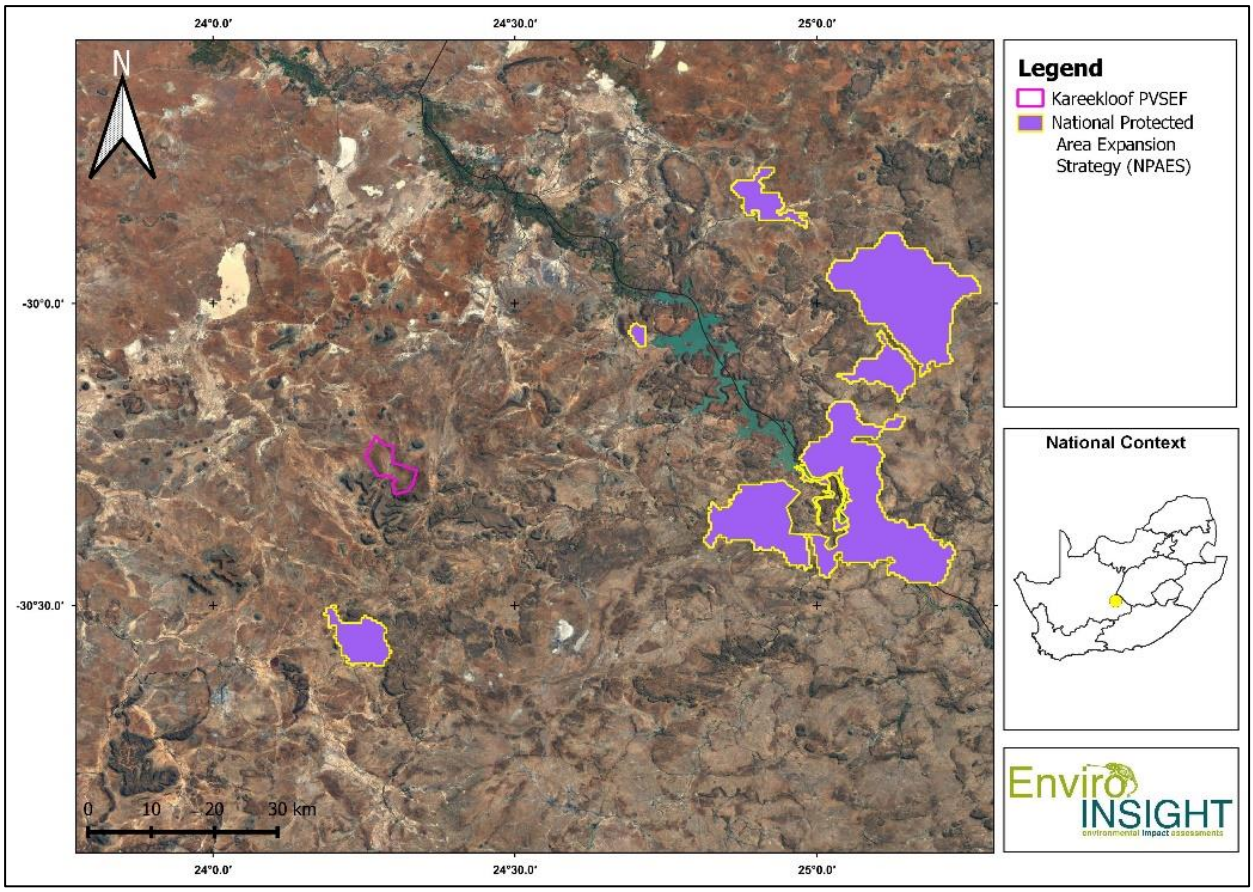


Figure 30: Proximity of Kareekloof Solar PV Project area to Protected areas as identified in the South African Protected Areas Database (Enviro Insight, 2023).

According to the terrestrial biodiversity specialist, the Kareekloof PVSEF project area does not intersect with any current or future planned protected areas. The nearest protected area is the Rolfontein Provincial Nature Reserve situated approximately 40 km away towards the northeast. The Kareekloof Solar PV project area is however situated entirely within the “Platberg-Karoo Conservancy” Important Bird Area (IBA).

The nearest future planned protected area is the “Senqu Caledon” area located approximately 23 km towards the south of the Kareekloof Solar PV project area.

3.4.2 Northern Cape Biodiversity Sector Plan (2016)

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.

The Northern Cape Biodiversity Sector Plan gives legal status to the CBA Map through the National Environmental Management: Biodiversity Act (Act 10 of 2004),

The Northern Cape Biodiversity Spatial Plan classifies areas into Critical Biodiversity Areas (CBA1), Degraded Critical Biodiversity Areas (CBA2), Ecological Support Areas (ESA1 &ESA2), Other Natural Areas (ONA) and Protected Areas (PA).

The terrestrial Biodiversity specialist confirmed that the region surrounding the Kareekloof Solar PV project area has been classified as an Ecological Support Areas (ESA) due to it being located in the Platberg-Karoo Conservancy, the vegetation units and important wetland and river features. From a

Terrestrial Biodiversity perspective, the Platberg-Karoo Conservancy and the vegetation units are important systems for grasslands and grassland-associated animals, as well as important areas for the conservation of avifauna. This section of the Karoo has the highest rainfall and provides an ecotone between the Nama Karoo and Grassland biomes.

The Kareekloof Solar PV study site is entirely located on an ESA. The assignment of this ESA as "Very High Sensitivity" in the Kareekloof Solar PV project area by the screening tool was refuted by the terrestrial biodiversity specialist for the following reasons:

- No threatened ecosystems or vegetation types are present in the portion of the ESA that cover the proposed Kareekloof Solar PV;
- No specific habitat in the Kareekloof Solar PV project area has any obvious key ecological role such as a migration corridor;
- No threatened plant species are expected to occur in the Kareekloof Solar PV project area;
- Only two threatened fauna species of medium sensitivity (modelled to occur, not known to occur) were flagged by the screening tool for the Kareekloof Solar PV project area (please refer to avifauna SSVR); and
- This ESA is an extremely large area (860,279 ha).

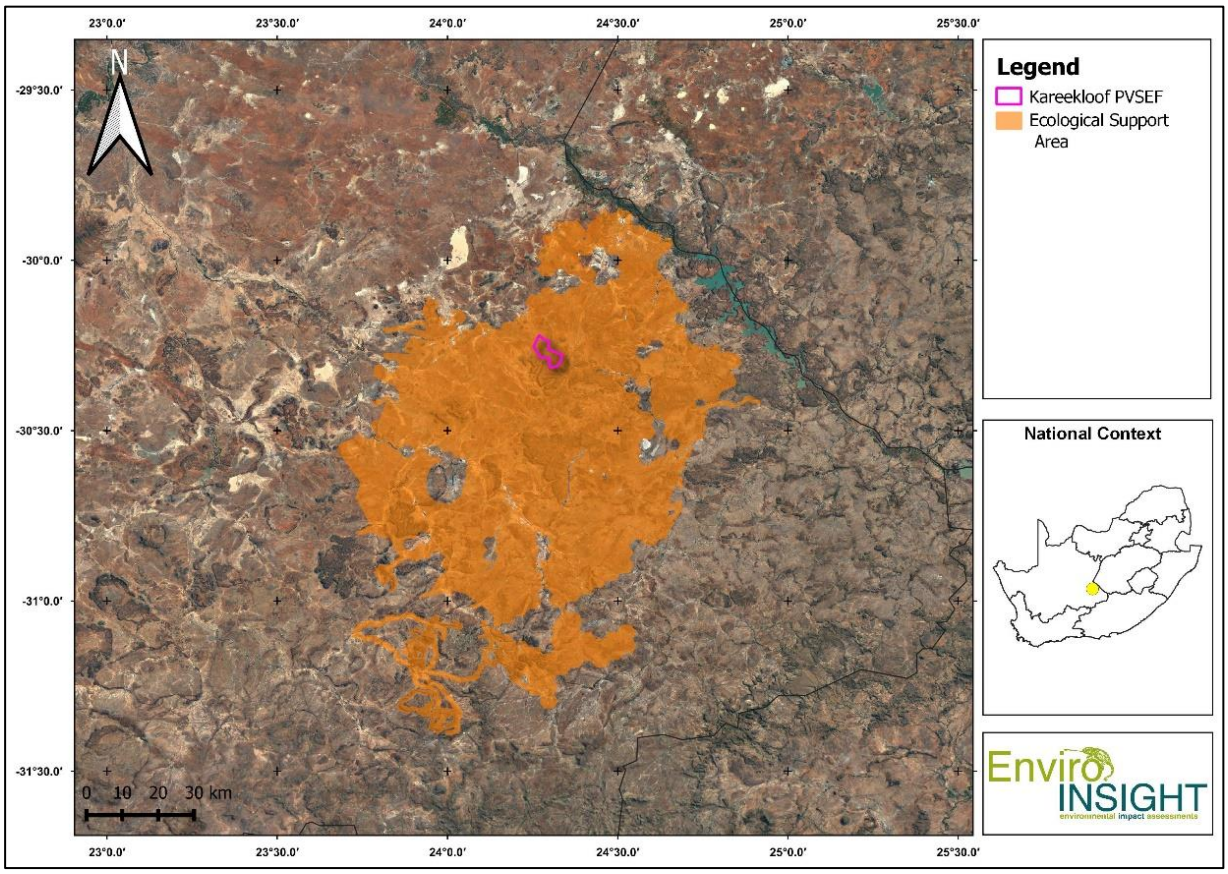


Figure 31: Kareekloof Solar PV project area in relation to Critical Biodiversity Areas and Ecological Support Areas as per the Northern Cape Biodiversity Spatial Plan (Enviro Insight, 2023).

3.4.3 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 Renewable Energy and aims to create the necessary

conditions for the development and commercial implementation of Renewable Energy technologies. The position of the White Paper on Renewable 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 Renewable Energy 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 Renewable Energy sector.

The White Paper on Renewable Energy Policy set a target of 10 000GWh to be generated from Renewable Energy by 2013 to be produced mainly from biomass, wind, solar and small-scale hydro. The target was subsequently reviewed in 2009 during the Renewable Energy 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.

3.4.4 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 Renewable Energy 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 Renewable Energy sources and ensuring energy security through the diversification of supply.

3.4.5 Integrated Energy Plan, 2016

The development of a National Integrated Energy Plan was envisaged in the White Paper on the Energy Policy of the Republic of South Africa of 1998 and, in terms of the National Energy Act, 2008

(Act No. 34 of 2008), the Minister of Energy is mandated to develop and, on an annual basis, review and publish the Integrated Energy Plan in the Government Gazette. The purpose of the Integrated Energy Plan is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development.

The **Integrated** Energy Plan notes that South Africa needs to grow its energy supply to support economi**c expansion and** in so doing, alleviate supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean and modern forms of energy at an affordable price. As part of the Integrated Energy Planning process, eight key objectives were identified, namely:

- 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; and
- Objective 8: Increase access to modern energy.

The Integrated Energy Plan provides an assessment of current energy consumption trends within different sectors of the economy (i.e., agriculture, commerce, industry, residential and transport) and uses this information to identify future energy requirements, based on different scenarios. The scenarios are informed by different assumptions on economic development and the structure of the economy and also take into account the impact of key policies such as environmental policies, energy efficiency policies, transport policies and industrial policies, amongst others.

Based on this information the Integrated Energy Plan then determines the optimal mix of energy sources and technologies to meet those energy needs in the most cost-effective manner for each of the scenarios. The associated environmental impacts, socio-economic benefits and macroeconomic impacts are also analysed. The Integrated Energy Plan is therefore focused on determining the long-term energy pathway for South Africa, taking into account a multitude of factors which are embedded in the eight objectives.

As part of the analysis four key scenarios were developed, namely the Base Case, Environmental Awareness, Resource Constrained and Green Shoots scenarios:

- The Base Case Scenario assumes that existing policies are implemented and will continue to shape the energy sector landscape going forward. It assumes moderate economic growth in the medium to long term;
- The Environmental Awareness Scenario is characterised by more stringent emission limits and a more environmentally aware society, where a higher cost is placed on externalities caused by the supply of energy;
- The Resource Constrained Scenario in which global energy commodity prices (i.e., coal, crude oil and natural gas) are high due to limited supply;
- The Green Shoots Scenario describes an economy in which the targets for high economic growth and structural changes to the economy, as set out in the National Development Plan, are met.

The Integrated Energy Plan notes that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources. In terms of renewable energy, the document refers to wind and solar energy. The document does however appear to support solar over wind noting that solar PV and CSP with storage present excellent opportunities to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Solar technologies also present the greatest potential for job creation and localisation. Incentive programmes and special

focused programmes to promote further development in the technology, as well as solar roll-out programmes should be pursued.

3.4.6 Integrated Resource Plan for Electricity (2010-2030)

The Integrated Resource Plan (IRP) for electricity 2010 – 2030 is a subset of the Integrated Energy Plan 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.

3.4.7 National Development Plan 2030 (2012)

The National Development Plan 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 National Development Plan 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 National Development Plan 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 National Development Plan 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 National Development Plan 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.

3.4.8 The New Growth Path Framework

The aim of the New Economic Growth Path Framework is to enhance growth, employment creation and equity. Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy. In this regard the framework identifies investments in five key areas namely: energy, transport, communication, water and housing.

The New Growth Path also identifies five other priority areas as part of the programme, through a series of partnerships between the State and the private sector. The Green Economy as one of the five priority areas to create jobs, including expansions in construction and the production of technologies for solar, wind and biofuels. In this regard clean manufacturing and environmental services are projected to create 300 000 jobs over the next decade.

3.4.9 National Infrastructure Plan

The South African Government adopted a National Infrastructure Plan in 2012. The aim of the plan is to transform the economic landscape while simultaneously creating significant numbers of new jobs and strengthen the delivery of basic services. The plan also supports the integration of African economies. In terms of the plan Government will invest R827 billion over the next three years to build new and upgrade existing infrastructure. The aim of the investments is to improve access by South Africans to healthcare facilities, schools, water, sanitation, housing and electrification. The plan also notes that investment in the construction of ports, roads, railway systems, electricity plants, hospitals, schools and dams will contribute to improved economic growth.

As part of the National Infrastructure Plan, Cabinet established the Presidential Infrastructure Coordinating Committee (PICC). The Committee identified and developed 18 strategic integrated projects (SIPS). The SIPs cover social and economic infrastructure across all nine provinces (with an emphasis on lagging regions) and consist of:

- Five geographically focussed SIPs;
- Three spatial SIPs;
- Three energy SIPs;
- Three social infrastructure SIPs;
- Two knowledge SIPs;
- One regional integration SIP;
- One water and sanitation SIP.

The three energy SIPS that are related to Kareekloof Solar PV are SIP 8, 9 and 10.

Table 9: Strategic Infrastructure related to Kareekloof Solar PV

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); Support bio-fuel production facilities.
SIP 9: Electricity generation to support socio-economic development
Accelerate the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances; Monitor implementation of major projects such as new power stations: Medupi, Kusile and Ingula.
SIP 10: Electricity transmission and distribution for all
Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

Although this project aligns with these 3 SIP's, it will only receive formal SIP status once it is selected as a preferred bidder under the REIPPPP or other private procurement process.

3.4.10 Strategic Environmental Assessment (SEA) for Wind and Solar PV energy in South Africa

The Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2013) identified eight (8) Renewable Development Zones (REDZs). The REDZs identified areas where large scale renewable energy facilities can be developed in in a manner that limits significant negative impacts on the environment while yielding the highest possible socio-economic benefits to the country.

The Phase 2 SEA identified a further 3 REDZ, which were formally gazetted in 2021. The Kareekloof Solar PV Facility is not situated within a REDZ.

3.4.11 Conservation of Migratory Species of Wild Animals

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 Kareekloof Solar PV (Annexure E3). Birdlife Africa South Africa has also been given an opportunity to comment on the Scoping Report and will be given a further opportunity to comment on this Draft EIR.

3.4.12 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 Kareekloof Solar PV (Annexure E3). Birdlife Africa South Africa has also been given an opportunity to comment in this regard.

3.4.13 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 BLSA 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 E3 for a copy of the Avifaunal Site Sensitivity Verification Report. In compliance with regime 2 of these guidelines, a second season of avifaunal monitoring and Avifaunal Impact Assessment will take place during the Environmental Impact Reporting Phase of this Environmental Process.

3.4.14 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 10: Potential environmental impacts of solar energy projects (Adapted from DEA, 2015) showing where they have been considered in this report.

Impact Description	Relevant Legislation	Applicability to this project
Visual Impact	NEMA	Visual Assessment attached in Annexure E8.
Noise Impact (CSP)	NEMA	Not applicable, as CSP is not considered as a technology alternative.
Land Use Transformation (fuel growth and production)	NEMA, NEMPAA, NHRA	Not Applicable to PV. Agricultural specialist input however attached in Annexure E6.
Impacts on Cultural Heritage	NEMA, NHRA	Heritage Assessment is attached in Annexure E5.
Impacts on Biodiversity	NEMA, NEMBA, NEMPAA, NFA	Biodiversity related Assessments attached in Annexure E1 - E4 (Terrestrial Biodiversity, Avifauna and Aquatic Biodiversity)
Impacts on Water Resources	NEMA, NEMICMA, NWA, WSA	The project will obtain water directly from the local municipality. A freshwater ecologist has assessed the potential impacts on freshwater resources (Annexure E4). All Aquatic Biodiversity Features as well and associated buffers identified by the Aquatic Biodiversity Specialist have been avoided in Layout Alternative 3 (Mitigated Preferred Layout)
Hazardous Waste Generation (CSP and PV)	NEMA, NEMWA, HAS	The EMPr and the BESS risk Assessment makes provision for damaged and

Impact Description	Relevant Legislation	Applicability to this project
		defunct PV and Battery infrastructure for dismantling and re-use.
Electromagnetic Interference	NEMA	The nearest SKA station has been identified as SKA 004, at approximately 190km from the proposed Kareekloof Solar PV. SKA and SARAO have been given an opportunity to provide comment in this regard.
Aircraft Interference	NEMA, MSA	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.
Loss of Agricultural Land	SALA	Agricultural specialist input is attached in Annexure E6
Sterilisation of mineral resources	MPRDA	The Department of Mineral Resources has been registered as an I&AP on this environmental process. The applicant will also consult with DMR to ascertain whether there are any prospecting rights in terms of section 53 of the MPRDA on the properties.

Assuming an IPP project triggers the need for BA or S&EIR under the EIA regulations (which in this case is a Scoping and Environmental Impact Reporting process), 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 EMPr. 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 environmental process and where necessary, additional specialist input has been obtained. The environmental

impact management actions and outcomes identified as part of this environmental process have been incorporated into the Environmental Management Programme that is attached in appendix H.

3.4.15 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.*[33]

It is believed that the proposed 900MW Kareekloof Solar PV 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.

33 Refer to definition of "sustainable development" in section 1 of NEMA.

3.4.16 National Freshwater Ecosystem Priority Area Status

The National Freshwater Ecosystem Priority Areas (NFEPA) database forms part of a comprehensive approach to the sustainable and equitable development of South Africa's scarce water resources. This database guides how many rivers, wetlands and estuaries, and which ones, should remain in a natural or near-natural condition to support the water resource protection goals of the National Water Act (Act 36 of 1998). This directly applies to the National Water Act, which feeds into Catchment Management Strategies, water resource classification, reserve determination, and the setting and monitoring of resource quality objectives (Nel *et al*., 2011). The NFEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's biodiversity goals (NEM:BA) (Act 10 of 2004), informing both the listing of threatened freshwater ecosystems and the process of bioregional planning provided for by this Act (Nel *et al.,* 2011).

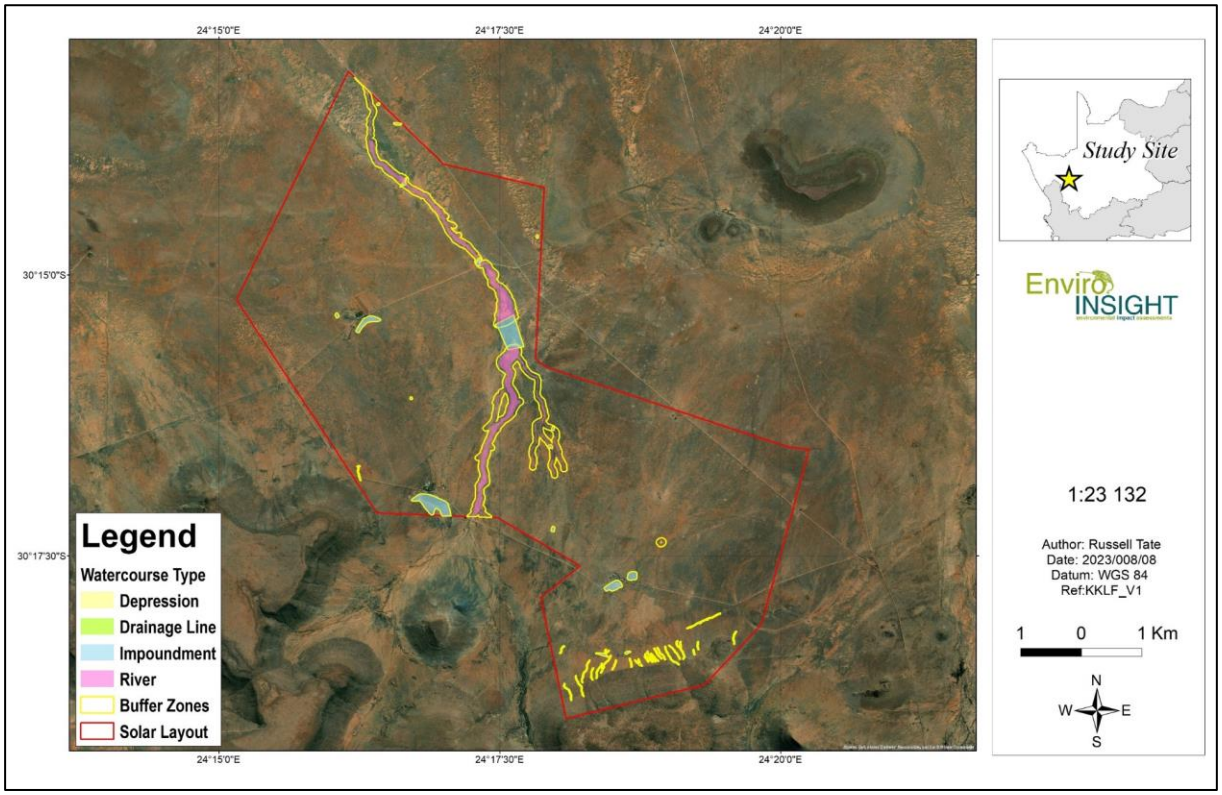


Figure 32: Delineated Surface Water Resources and recommended buffers within the study site (Enviro Insight, 2023)

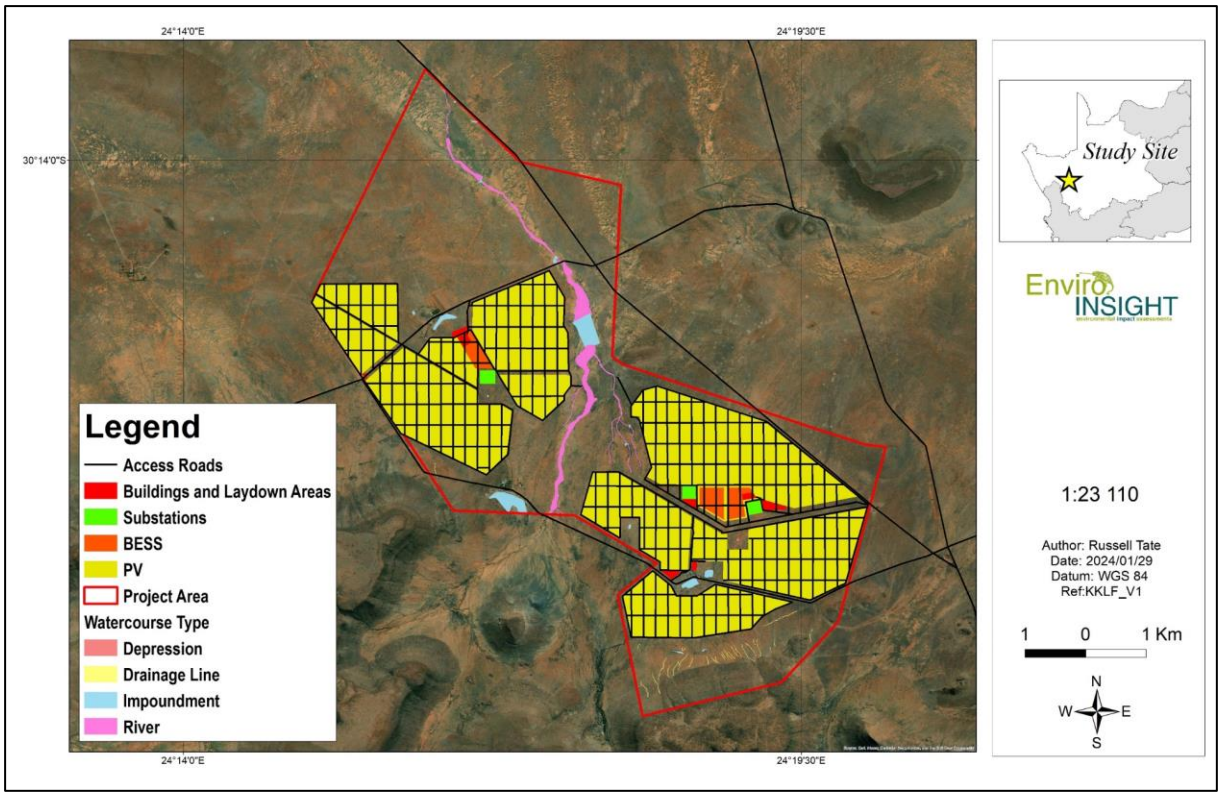


Figure 33: Showing how Layout Alternative 3 (Mitigated preferred alternative) avoids the delineated aquatic features.

3.4.17 DFFE Screening Tool and Protocols

The National Web based Environmental Screening Tool is a geographically based web-enabled application which allows a proponent intending to submit an application for environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations 2014, as amended to screen their proposed site for any environmental sensitivity.

The Screening Tool also provides site specific EIA process and review information for a specific area.

Further to this, the Screening Tool identifies related exclusions and/ or specific requirements including specialist studies applicable to the proposed site and/or development, based on the national sector classification and the environmental sensitivity of the site.

Finally, the Screening Tool allows for the generating of a Screening Report referred to in Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended whereby a Screening Report is required to accompany any application for Environmental.

Prior to commencing with a specialist assessment, the current use of the land and the environmental sensitivity of the site under consideration identified by the national web based environmental screening tool (screening tool), where determined, must be confirmed by undertaking a site sensitivity verification.

A screening tool report was generated for the proposed Kareekloof Solar PV and is attached in Appendix H and the site sensitivity verification is discussed in section 5.9 below.

The table below reflects the specialist studies recommended in the DFFE Screening tool and whether they will be included in the Draft EIR.

Table 11: Specialist Studies recommended in the DFFE Screening Tool.

Study Recommended in Screening Tool	Discussion
Agricultural Impact Assessment	Appendix E5.

Study Recommended in Screening Tool	Discussion
Landscape/Visual Impact Assessment	Appendix E6
Archaeological and Cultural Heritage Impact Assessment	Appendix E4
Palaeontology Impact Assessment	Appendix E4
Terrestrial Biodiversity Impact Assessment	Appendix E1
Aquatic Biodiversity Impact Assessment	Appendix E3
Avian Impact Assessment	Appendix E2
Civil Aviation Assessment	The closest airstrip was identified as the Petrusville Aerodrome situated approximately 38 km to the Northeast of the site. The South Avian Civil Aviation Authority, ATNS and the Saldanha Airport were given an opportunity to comment on the Draft Scoping Report and will be given a further opportunity to comment on this Draft EIR. The applicant will also submit an obstacle application (Part 30-27) to the South African Civil Aviation Authority.
Defence Assessment	There are no defence activities or infrastructure in proximity to the proposed development. The South African National Defence Force were provided with an opportunity to comment on the Draft Scoping Report and will be provided a further opportunity to comment on this Draft EIR.
RFI Assessment	Not undertaken –It was furthermore found that the project is situated more than 180km from the closest SKA station (SKA004). The South African SKA Project Office and the South African Radio Astronomy Observatory (SARAO) have been registered as a key stakeholder on this environmental process and have been requested to provide input in terms of the Astronomy Geographic Advantage Act and potential impact to SKA.
Geotechnical Assessment	A geotechnical assessment will not be undertaken as part of the environmental assessment process. The project site does not contain any unstable geological features and while geotechnical factors are crucial for the long-term success and stability of PV installations, they do not pose significant environmental risks during the EIA phase. A detailed geotechnical assessment will only be completed during the detailed design phase where specific engineering decisions need to be made. This will not affect the outcome of the environmental assessment.
Socio-Economic Assessment	Appendix E8
Plant Species Assessment	Appendix E1
Animal Species Assessment	Appendix E1 & E2

4. PLANNING CONTEXT

A Planning statement will be prepared as part of the Environmental Impact Reporting phase of this environmental process.

The land use planning process for the Kareekloof will typically involve the following:

- Application for consent use in terms of the Spatial Planning and Land Use Management Act, Act 16 of 2013, submitted to the Emthanjeni Local Municipality, in terms of the Emthanjeni Municipal Zoning Scheme By-law, 2017.
- Application in terms of the Subdivision of Agricultural Land Act (Act 70 of 1970).

In terms of the Municipal By-law, a renewable energy structure is permitted as a consent use of Agricultural 1 Zoned land.

Table 12: Showing Renewable Energy Structures as a consent use on Land Zoned for Agriculture 1.

1	2	3
Zoning	**Primary use**	**Consent use**
AGRICULTURAL ZONES		
Agricultural Zone I (AZ1)		
The objective of this zone is to promote and protect agriculture on farms as an important economic, environmental and cultural resource. Limited provision is made for non-agricultural uses to provide rural communities in more remote areas with the opportunity to increase the economic potential of their properties, provided these uses do not present a significant negative impact on the primary agricultural resource.	**Primary use** • Agriculture • Farm shop • Function venue • Guest house • Bed & Breakfast • Plant nursery	**Consent uses** • Additional dwelling units • Airfield • Animal care centre • Aqua-culture • Farm Shop • Freestanding base telecommunication station • Off road trail • Quarry • Renewable energy structure • Tourist facilities • Utility service • Crèche • Farmers' Market

The following planning processes are likely to be required for the proposed Kareekloof Solar PV:

- The property is located within the Emthanjeni Local Municipality and any process of land use change will be subject to the Scheme Regulations and Municipal Planning By-laws of the said Municipality.
- The property is currently zoned as Agricultural Zone 1 in terms of Emthanjeni Municipal Zoning Scheme By-law, 2017. In order to allow for the development of a Renewable Energy Facility, application for a consent use on the applicable portion of the property will have to be launched.
- The application for consent use will be compiled and submitted in terms of the Spatial Planning and Land Use Management Act, Act 16 of 2013 (SPLUMA), as well as the Emthanjeni Local Municipal Zoning Scheme By-law, 2017.
- SPLUMA retracts the Removal of Restrictions Act, Act 84 of 1967, and any title deed restrictions on the property may be removed at the discretion of the local authority in terms of SPLUMA.

In addition to attaining the land use rights at the Local Authority, a long-term lease from the Department of Agriculture will be required as the properties are currently zoned for agricultural use.

5. SITE DESCRIPTION AND ATTRIBUTES

The following sections provide a description of the natural environment, built environment and social and economic context of the Portion 1 of the farm Bas Berg 88, Portion 2 of the farm Koppy Alleen 83 and Portions 6, 11, 16 & 17 of the farm Karee Kloof 85, with particular focus on the Study Site for the proposed Kareekloof Solar PV.

5.1 LOCATION & BUILT ENVIRONMENT

The target properties, Portion 1 of the farm Bas Berg 88, Portion 2 of the farm Koppy Alleen 83 and Portions 6, 11, 16 & 17 of the farm Karee Kloof 85, are located in the Pixley ka Seme District of the Northern Cape Province, within the jurisdiction area of the Emthanjeni Local Municipality. North

The total properties are approximately 3590 hectares in size and located approximately 50km East of De Aar.

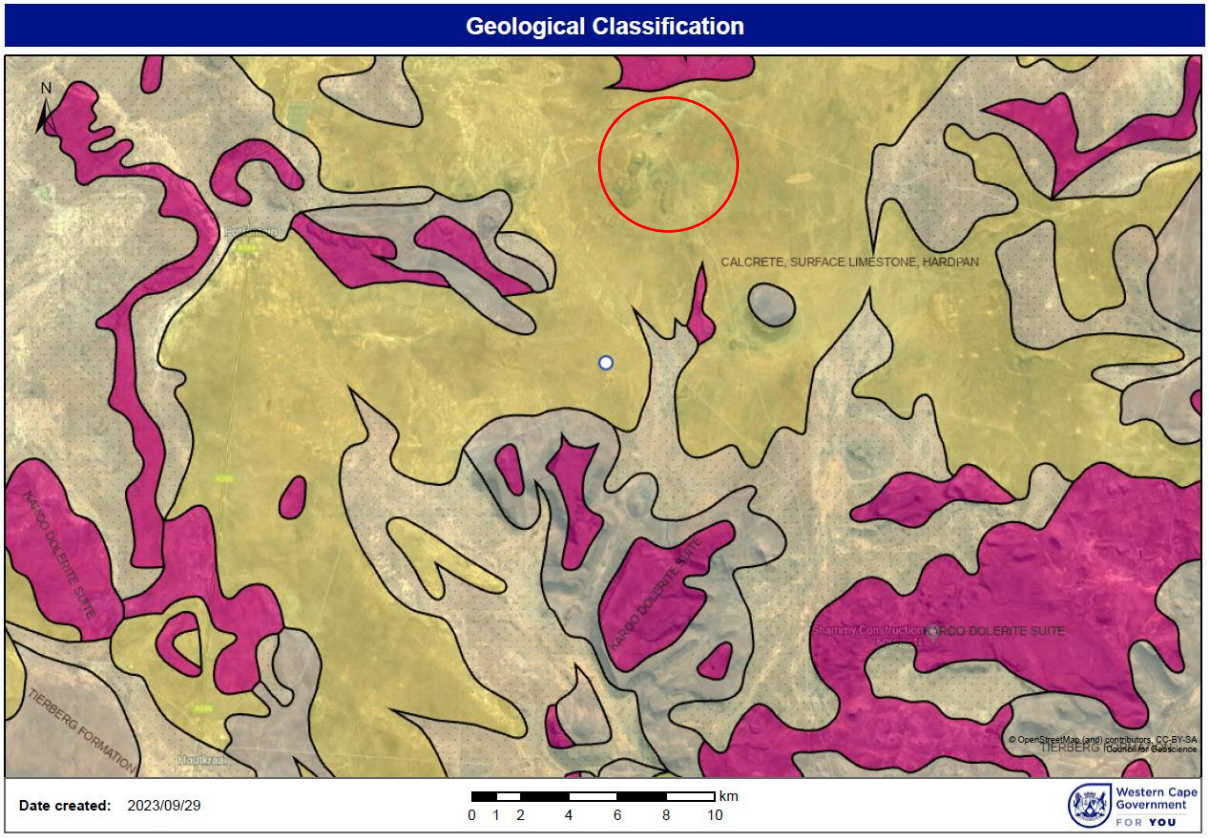
The proposed Kareekloof Solar PV is accessed from the R48 between De Aar and Petrusville.

There are three homesteads within the study site. These homesteads along with a buffer have been incorporated into the proposed layout (Layout Alternative 2)

5.2 GEOLOGY & CLIMATE

Karoo Supergroup – Beaufort Group – The Karoo Supergroup comprises approximately 60% of the surface of South Africa, consisting of thick succession of sedimentary rocks. The Beaufort Group is dominated by fluvial depositional environments consisting of sedimentary rocks such as sandstone, mudstone, limestone and calcretes. The surrounding area contains early Jurassic sills of the Karoo Dolerite Suite that intruded into the sedimentary successions.

Table 13: Classification of underlying Soils at Kareekloof Solar PV



According to the Aquatic Biodiversity Specialist the Mean Annual Precipitation (MAP) is 331 mm, peaking in 2022 at 623 mm, with the lowest value recorded in 2015 at 231 mm.

The temporal distribution of rainfall consisted of a unimodal flood regime where peak flows are observed in the summer between November and March...

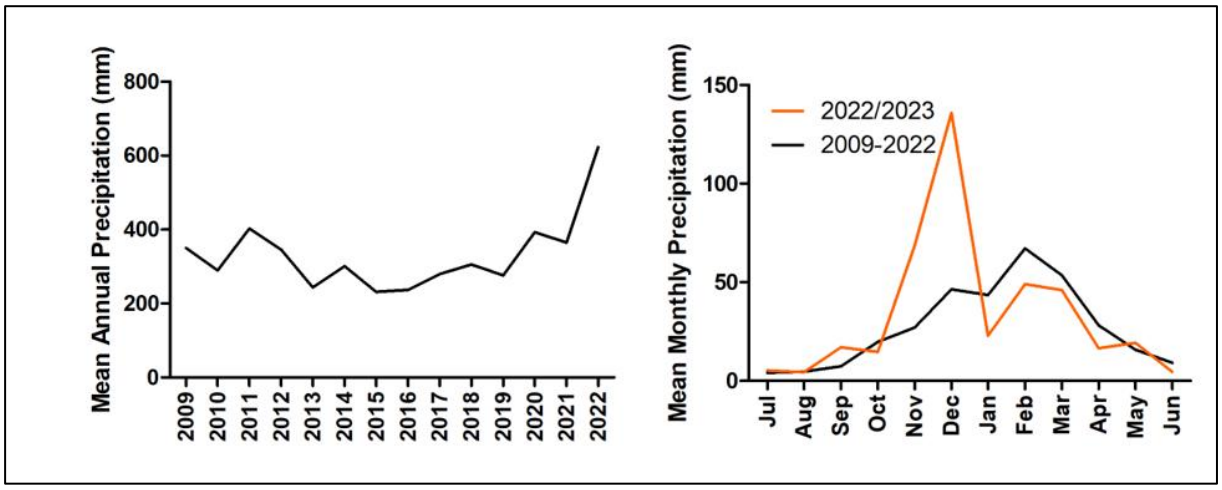


Figure 34: Average Annual and monthly Rainfall for the De Aar area where the Kareekloof Solar PV facility is proposed (Enviro Insite, 2023).

The average annual temperatures range from 3° in July to 33° in December to February.

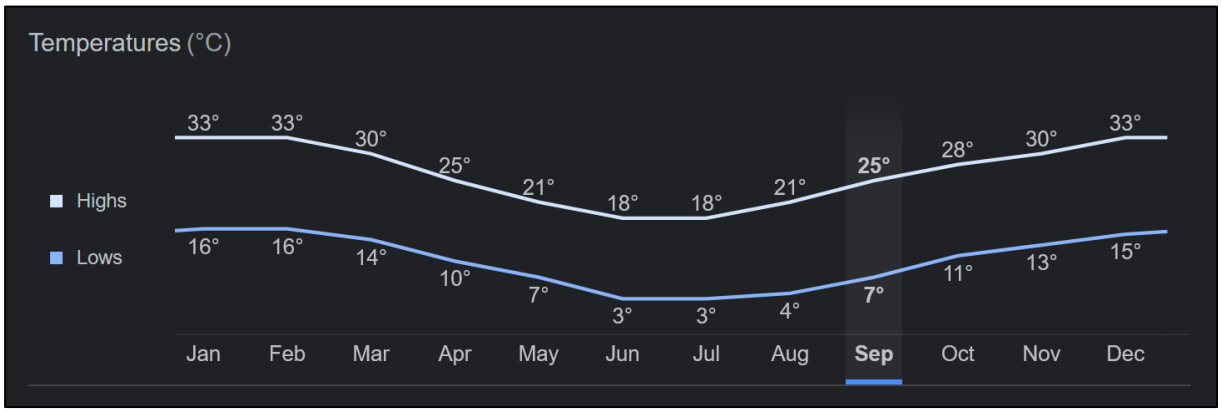


Figure 35: Average Monthly Temperatures for the De Aar Area.

5.3 TOPOGRAPHY

According to the Terrestrial Biodiversity Specialist, the Kareekloof Solar PV project area is predominantly located on relatively flat land, with elevated rocky ridges characterising the southern areas outside of the proposed PVSEF. There are few depression wetlands, scattered artificial dams and drainage areas present and no major rivers.

The flat areas of Northern and Eastern Upper Karoo vegetation types are characterised by two major habitat types, namely Nama Karoo Low Shrubland and Natural Grassland according to the National Landcover Classification.

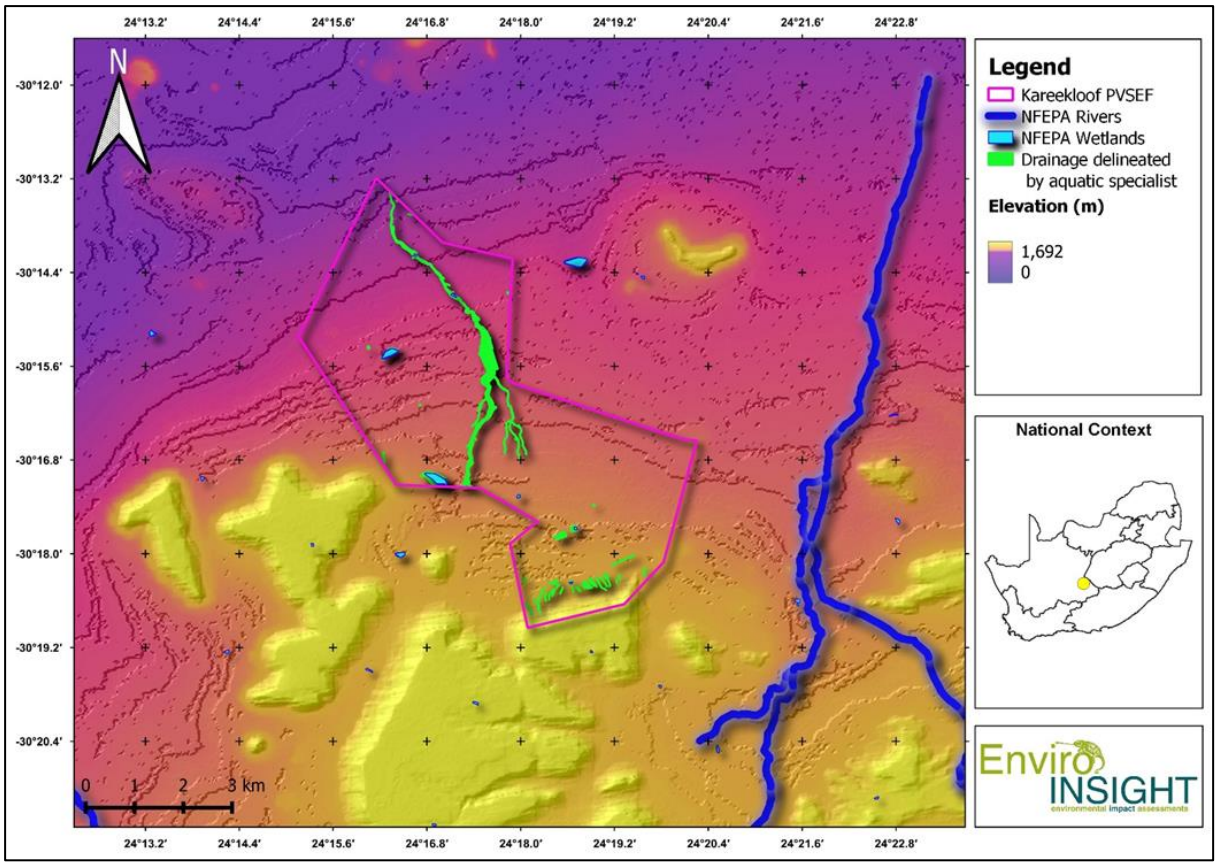


Figure 36: Main landscape features and elevation within the Kareekloof Solar PV Study Site (Enviro Insight, 2024).

5.4 BOTANICAL COMPOSITION OF THE SITE

Enviro Insight undertook a Terrestrial Biodiversity Site Sensitivity Verification and Terrestrial Biodiversity Impact Assessment which included details of the Botanical component of the site. Please refer to the Terrestrial Biodiversity Impact Assessment in Appendix E1. from which the following is summarised.

5.4.1 Broad-Scale Vegetation Patterns

According to the national vegetation map, the project area falls within three broad vegetation units, namely Eastern Upper Karoo, Northern Upper Karoo and Besemkaree Koppies Shrubland.

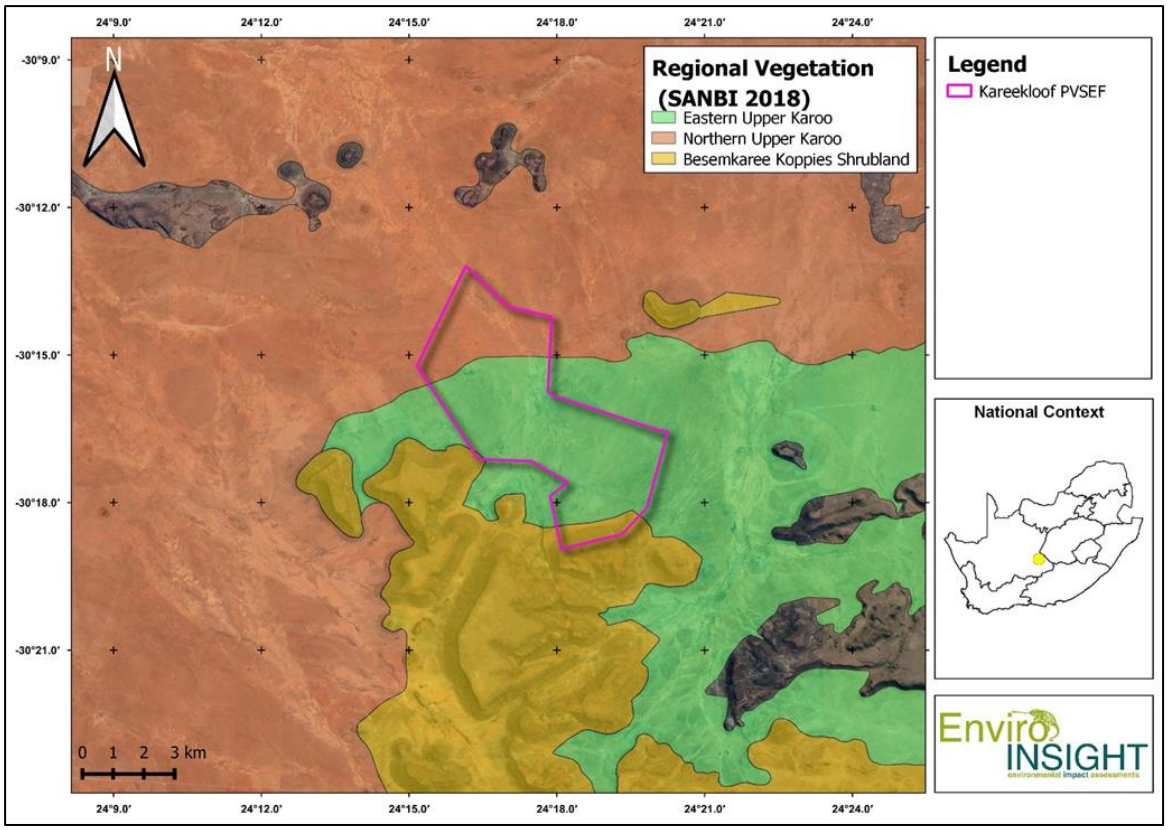


Figure 37: Broad Scale Vegetation Types Associated with Kareekloof Solar PV (Enviro Insight, 2024).

5.4.2 Habitats & Plant Communities

This area generally receives very limited and sporadic rainfall. Accordingly, plant diversity is relatively low. Four main habitats were identified based on species composition and structure. The main driver of vegetation pattern in the area is the substrate. These 4 main habitat types are discussed below.

5.4.2.1 Grassland

This is the dominant habitat and is mostly present on softer, sandier soils. It is characterised by a dense grass sward with only few shrubs present. It is dominated by white grasses of the genera *Aristida* and *Eragrostis* interspersed with *microphyllous* shrubs such as *Lycium spp*.

This habitat is considered moderately sensitive due to moderate species diversity and the potential presence of provincially protected species (of the genera *Aloe, Ruschia, Jamesbrittenia, Crassula, Haemanthus, Oxalis*).

Figure 38: Example of Grassland Habitat Types (Enviro Insight, 2023)

5.4.2.2 Scrubland

This habitat is present as patches amongst the grassland, typically characterised by the near absence of grasses (such as *Aristida sp*. and *Eragrostis sp*.) and the presence of large, woody shrubs. However, it often forms a habitat mosaic with the grassland, particularly on the ecotone of the two habitats. Similar to the grassland habitat, scrubland has a very expansive occurrence in the region and is therefore not considered to be highly sensitive. Provincially protected species of the genera *Aloe, Ruschia, Euphorbia, Haemanthus, Oxalis, Jamesbrittenia* and *Ammocharis* have been recorded in the area before.

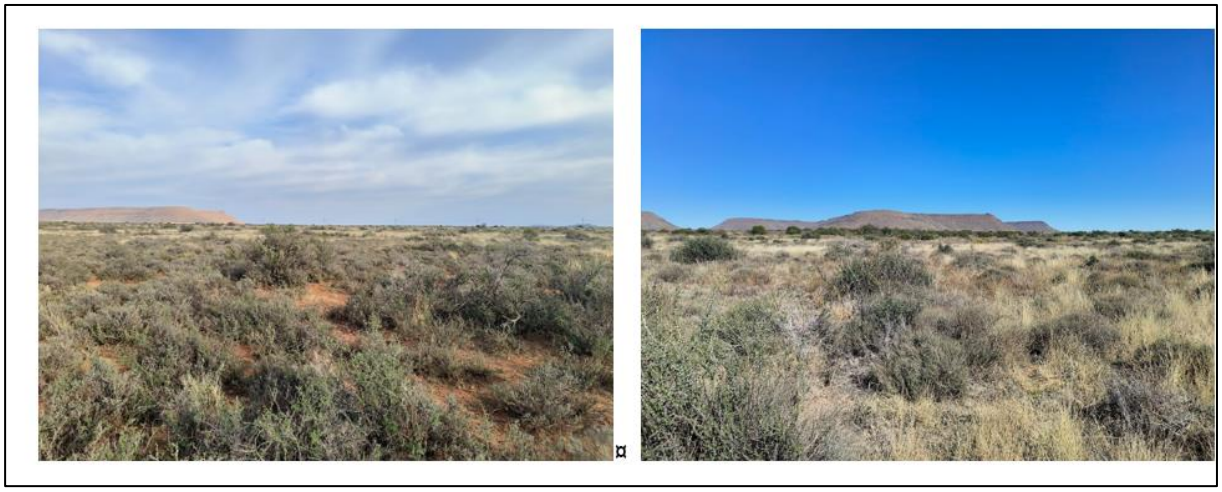


Figure 39: Example of Shrubland Habitat Types (Enviro Insight, 2023)

5.4.2.3 Rocky Ridges & Steep Slopes

This structurally defined habitat is limited in the region and has the potential to act a s a migration corridor for fauna. It is also not able to fully recover from any mechanical disturbances and has therefore been buffered from development by 30m. The presence of the protected tree Boscia *albitrunca* has been recorded on similar Koppies or their foot slopes within a 5 km radius from the Kareekloof Solar PV Study Site. It is important to note that these Rocky Ridges and Steep Slopes are completely avoided by Layout Alternative 3 (Mitigated Preferred Layout).

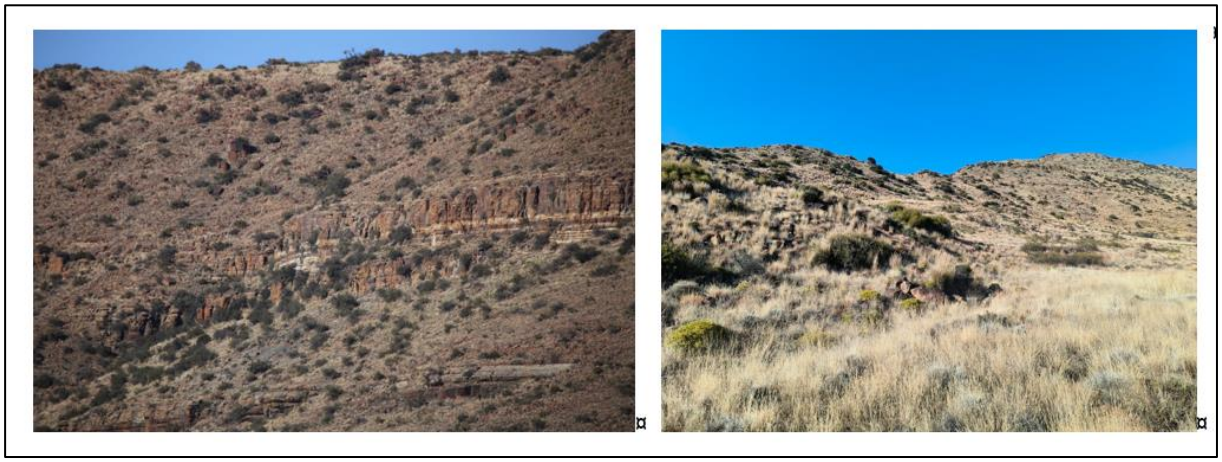


Figure 40: Example of Rocky Ridges and Steep Slopes Habitat Types (Enviro Insight, 2023)

5.4.2.4 Drainage, wetlands & dams

This is a collection of aquatic habitats predominantly characterised by the ephemeral drainage lines and their marginal vegetation, but also the man-made impoundments (dams) in these drainage lines which retain surface water for longer.

These habitats are very limited in this arid region and due to the periodic presence of water provide excellent foraging habitats for fauna, particularly in the dry months. The dense marginal vegetation is also often suitable for fauna breeding purposes. This habitat is considered to be sensitive as it functions as both foraging habitat and migration corridors for fauna and is limited in the landscape. It has therefore been buffered from development by 100 m. It is important to note that these Drainage features, wetlands and dams along with their buffers have been avoided by Layout Alternative 3 (Mitigated Preferred Layout).

Figure 41: Example of Drainage, Wetlands and Dams Habitat Types (Enviro Insight, 2023)

5.4.3 Botanical Species of conservation concern.

According to the terrestrial biodiversity specialist, no botanical species of conservation concern are expected to be found on site.

5.5 TERRESTRIAL FAUNAL COMPONENT OF THE SITE

Enviro Insight undertook a Terrestrial Biodiversity Site Sensitivity Verification and Impact Assessment (Appendix E1) which included consideration of the Faunal component.

The specialist confirmed that the aquatic habitats (drainage and dams) and the rocky ridges and steep slopes habitats represent the most limited and therefore, most important ecological features for terrestrial fauna.

The main drainage line and its associated marginal vegetation as well as the rocky ridges and steep slopes habitats function as migration corridors across the landscape for fauna.

5.5.1 Faunal Species of conservation concern

According to the terrestrial biodiversity specialist, no faunal species of conservation concern are expected to be found on site[34].

5.6 AQUATIC COMPOSITION OF THE STUDY SITE

[34] This excludes avifaunal species which are discussed separately.

Tate Environmental in conjunction with Enviro Insight undertook an Aquatic Biodiversity Assessment of the proposed project site. Please refer to the Aquatic Biodiversity Site Sensitivity Verification report attached in **Annexure E4** from which the following has been drawn.

Two hydrogeomorphic (HGM) wetland types were observed during the survey within the 500m screening area. These wetland types consisted of riverine and depression wetland types.

A number of artificial wetlands were also identified during the survey and included historical borrow pits and impoundments created to capture surface runoff. Additional drainage features associated with the project also include drainage lines.

The wetland areas could be separated into 3 distinct units as detailed below.

Table 14: Wetland classification within 500m screening zone (Enviro Insight, 2023)

Wetland Name	Hectares	System	DWS Ecoregion/s	NFEPA Wet Veg Group/s	Landscape Unit	HGM Type
HGM1	29.08	Inland	Nama Karoo	Upper Nama Karoo	Valley Bottom	River
HGM2	25.08	Inland	Nama Karoo	Upper Nama Karoo	Valley Bottom	River
HGM3	0.133	Inland	Nama Karoo	Upper Nama Karoo	Flat	Depression

Figure 42: The depression unit at HGM3 (Enviro Insight, 2023)

Figure 43: The riverine geomorphic unit at HGM1 (Enviro Insight, 2023)

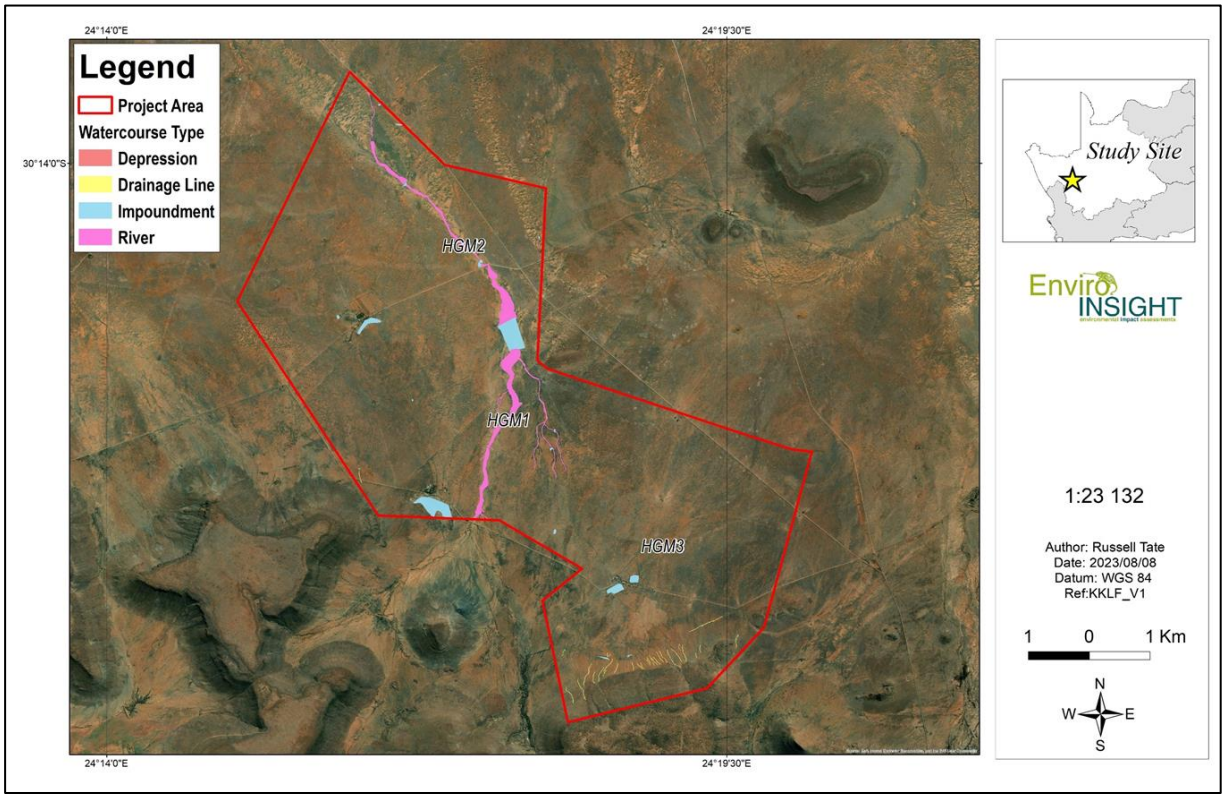


Figure 44: Delineation of the watercourses in the project area (Enviro Insight, 2023).

As shown in section 3.1.6 above, the Mitigated Preferred Alternative (Layout Alternative 3) avoids these aquatic features and the recommended buffers.

5.7 AVIFAUNAL COMPOSITION OF THE SITE

An Avifaunal specialist, Enviro Insight, undertook a site sensitivity verification and Avifaunal Impact Assessment of the proposed Kareekloof Solar PV facility. Please refer to Appendix E2 for a copy of the Avifauna Impact Assessment Report.

The Avifaunal specialist confirmed that a total of 109 bird species have been recorded by the South African Bird Atlas Project (SABAP2) on the nine focal pentads relevant to the Kareekloof Solar PV project area, all of which are expected to occur on the project area. Eight species of conservation concern (threatened and near threatened) have been observed within at least one of the nine focal pentads for the Kareekloof Solar PV project area, two of which were observed during the winter survey (August 2023). The specialist furthermore noted that the Tawny Eagle, predicted by the Screening Tool, has not been recorded in the SABAP2 dataset for the nine focal pentads for the Kareekloof Solar PV study area.

Table 15: Expected and observed avifauna species of conservation concern for the Kareekloof solar PV project area.

Common Name	Scientific Name	Global Status (IUCN)	Regional Status (Taylor et al. 2015)	Individuals Observed Winter (Aug '23)
Ludwig's Bustard	*Neotis ludwigii*	EN	EN	
Martial Eagle	*Polemaetus bellicosus*	EN	EN	
Secretarybird	*Sagittarius serpentarius*	EN	VU	1
African Rock Pipit	*Anthus crenatus*	LC	NT	
Verreaux's Eagle	*Aquila verreauxii*	LC	VU	5
Lanner Falcon	*Falco biarmicus*	LC	VU	
Blue Korhaan	*Eupodotis caerulescens*	NT	LC	
Blue Crane	*Grus paradisea*	VU	NT	

Figure 45: A Verreaux's Eagle observed on the Kareekloof PVSEF project area during the winter survey (Enviro Insight, 2023)

The total number of bird species observed by the avifaunal specialist within and around the Kareekloof Solar PV project area during the winter survey (31July - 4 August 2023) was 69, comprising a total of 907 individuals. Of these, two species are considered to be of conservation concern, namely the

Verreax's Eagle and Secretarybird. In general, the observed avian species richness is relatively low but expected for this region and abundances were moderate to high due to a productive summer season.

5.8 SOCIAL CONTEXT

This section below provides a summary of the social context of the local municipality as contained in their 2020-2023 IDP. Further details on the social context of the District and the province are included in the Social Impact Assessment appendix E8.

Emthanjeni Local Municipality is a category B municipality consisting of three towns: De Aar, Britstown and Hanover. It is situated in the Pixley ka Seme District Municipality and is the seat of this district.

Emthanjeni represents approximately 22, 7% of the district's population. The Pixley ka Seme District has an approximate population of 220 830 people (IHS Markit Review 2019) representing 16, 26% of the Northern Cape population with its 1 145 861 residents. The Northern Cape represents 2, 21% of the National population.

Table 16: Demographics of the local municipality (Emthanjeni IDP, 2020 - 2023)

		2011	2016 (CS 2016)	2019 (MSEP 2021)
Population		42 356	45 405	46 777
Population growth rate			1.69%	0.41%
Households		10 456	12 617	11 583
People per household		4.1	3.9	4.07
Indigent Households			3 594	3 799
Gender breakdown	**Males**	20 722 (41%)	22 443 (49%)	(49%)
	Females	21 634 (51%)	22 962 (51%)	(51%)
Age breakdown	**0-14**	13 424	11 949	30.1%
	15-64	26 461	30 832	61.1%
	65+	2 471	2 621	8.8%
Race composition	**Black-African**	14 059	14 515	
	Coloured	24 436	27 644	
	White	3 388	3 129	
	Asian	236	116	
Unemployment rate		28%	28%	27.3%
Population density		3 person's/km²	3 person's/km²	3.5 person's/km²

5.9 ECONOMIC CONTEXT

The following Economic overview was provided by the Social Specialist, Mr Tony Barbour.

Agriculture is the key economic sector in the district and local municipality. Many of the towns within the district municipal area function mainly as agricultural service centres, with the level of services provided at the centres to a large extent reliable on the intensity of the farming practices in the surrounding area. Despite the largely semi-arid and arid environment in the district, the fertile land that lies alongside the Orange, Vaal and Riet Rivers supports the production of some of the country's finest

quality agricultural products, including grapes and vegetables. The main livestock farming in the region include cattle, sheep, and goat farming. Game breeding has also been identified as one of the opportunities which could be linked with the tourism sector for Game reserves and hunting activities. However, despite the key role played by agriculture there is limited value adding to the farming products within the district and the area is prone to droughts and climate change.

From a mining perspective, the main deposits in Pixley ka Seme include alluvial diamond mining along the Orange River and various semi-precious stones, such as tiger-eye and zinc deposits. The region also has various saltpans for the potential of salt production. Uranium deposits also occur in the district.

The PKSDM IDP notes that the tourism opportunities in the district will increase due to the Karoo Array Telescope (KAT), a project being driven at a national level. Of relevance, the PKSDM notes that care needs to be taken with developments that have the potential to negatively impact on the Karoo landscapes.

Of key relevance to this environmental process is that the PKSDM IDP identifies renewable energy as key economic sector and refers to the substantial socio-economic development and enterprise development contributions leveraged by the IPPPP commitments. The IDP notes that the towns of Prieska and Carnarvon have in recent years changed character from small rural towns to potentially regional hubs as a result of investments in renewable energy generation and the Square Kilometre Array (SKA) radio telescope project, respectively.

5.9.1 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.

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.

5.9.2 Project specific costs

The Kareekloof Solar PV 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.

1.1.1 Revenue streams

The payback of the facility results mainly from electricity sales, either under the current governmental programme, known as the “Renewable Energy Independent Power Producer Procurement Programme” (REIPPPP) or through private power purchase agreements.

The IPP procurement programme 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 IPP procurement programme preferred bidders will enter into a power purchase agreement between the IPP generator and the Single Buyers Office/Department of Energy. National treasury provides surety, while NERSA regulates the IPP licences.

The bidding and tender procedure of the IPP procurement programme requires an approved EIA Environmental Authorisation as a gate keeping criteria, where no project would be considered without the EIA Environmental Authorisation being given. In most cases the same criteria are applicable to a private power purchase agreement.

5.10 VISUAL CONTEXT

Mr Stephen Stead of Visual Resource Management Africa (VRMA) undertook a Visual Site Sensitivity Verification and Visual Impact Assessment of the proposed Kareekloof Solar PV (See Appendix E6). The following visual context was determined from this study. A Level 3 Landscape and Visual Impact Assessment has been undertaken and is included in this Environmental Impact Report.

The DFFE Screening tool indicated Very High Landscape Sensitivity due to

- Slope between 1:4 and 1:10,
- Mountain tops and high ridges, and
- Slope more than 1:4m.

The visual specialists confirmed these sensitivities for certain parts of the site which were excluded from the preferred layout alternative.

5.10.1 Policy fit.

In terms of regional and local planning fit for planned landscape and visual related themes, the expected visual/ landscape policy fit of the landscape change is rated Medium. While not within a REDZ, there are other Renewable Energy projects within the zone of visual influence, and the site is already degraded to some degree from the existing Eskom power line that transects the site. The project is also within a strategic powerline corridor area, and as such, further powerlines are likely to be routing through the vicinity.

5.10.2 Zone of visual influence

No significant, landscapes are located within the proposed project zone of visual influence.

The specialist did however identify the following key landscape features within the project site.

Table 17: Landscape Features within the study site as identified by the Visual Specialist.

Theme	Description
Isolated farmstead	The area is located in the Karoo where the land use is predominantly defined by the arid environment where dryland sheep and goat farming are taking place. There are a number of farms in the project area that are part of the project. No other farms were identified in close proximity to the project. The farmsteads do add scenic value as a key focal point within a cultural landscape.

Theme	Description
	
Old farmsteads	As testiment to the very arid environment, one of the farms depicts the farmstead in a delapidated state, degrading local landscape resources.
	
Inselbergs	The inselbergs located to the south of the project area are key landforms in the landscape that significantly add to the scenic quality of the area. These areas are not being used as tourist related landscape resources and, with the powerline running through the hills, some of the value of the hills is degraded. These hills are very iconic in the karoo landscape and a suitable buffer should be provided to ensure that steep slope areas are excluded.

Theme	Description
	
Powerlines	There is a 765kV power line running through the property. This area does fall within a strategic powerline corridor and, as such, other powerlines are likely to be routed alongside the existing powerline.
Washes	Within the arid landscape are many hydrological washes that do add to the local scenic quality.
Deep rural	The area is remote and would be considered as deep rural with limited receptors.

The preliminary finding of the visual specialist is that with the exclusion of the southern hills and steep slopes areas, the proposed landscape change will not constitute a fatal flaw. Mitigations will be required to protect the following visual and landscape resources:

- 500m buffer from the southern mountains.
- Setback of 50m from the northern rural access road where there a 'walling' effect is created by the proposed location of PV on either side of road.
- Exclusion of the main farmhouse area of farm Koppy Alleen, and the adjacent small 'koppie' as part of retaining cultural landscape integrity.
- Exclusion around the remaining structures of the abandoned Kareekloof Farmhouses.
- Exclusion of drainage lines as these areas are unique landscape features of the region (refer to Aquatic Biodiversity Specialist findings).

Layout Alternative 3 (mitigated preferred alternative) all of these sensitive features and buffers recommended by the Visual Specialist.

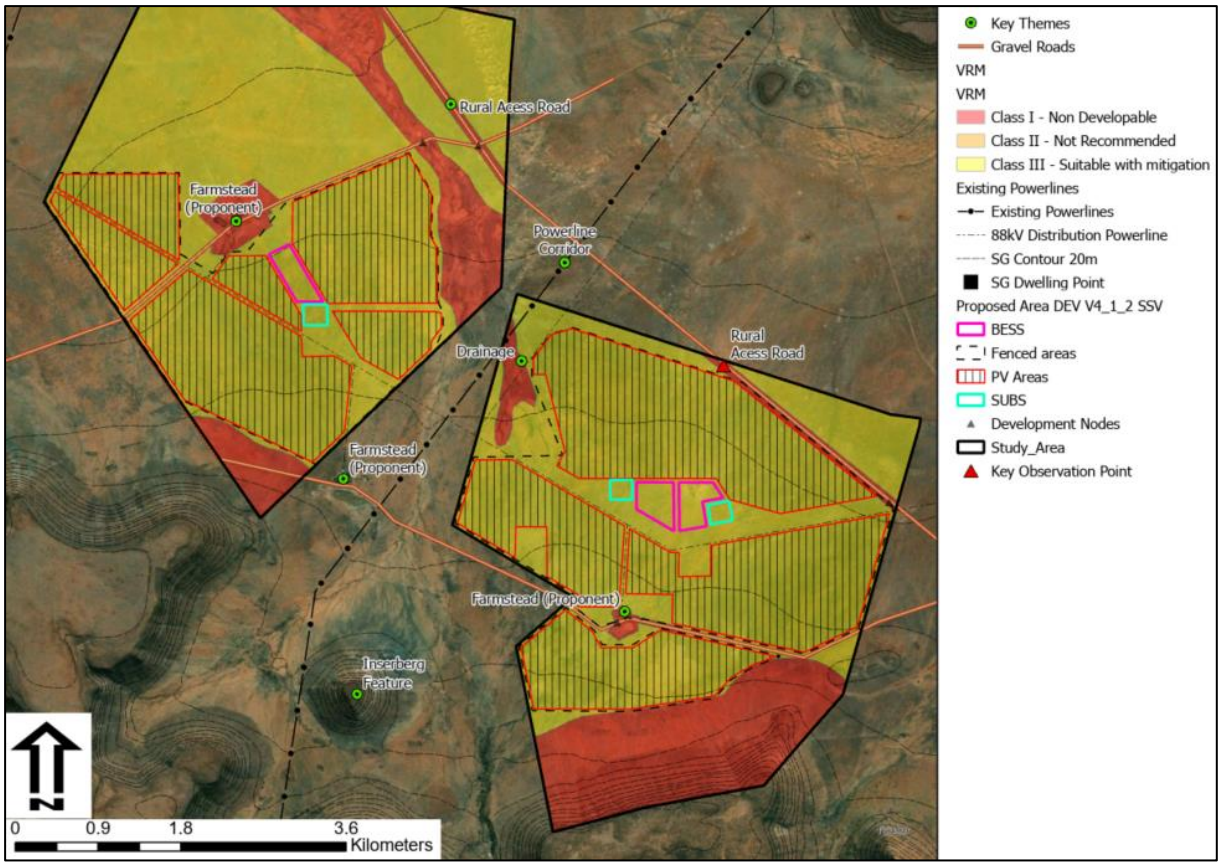


Figure 46: Layout Alternative 3 (Preferred Mitigated Layout) in relation to the visually sensitive features (Stead, 2024).

5.11 SITE SENSITIVITY.

On 20 March 2020 the Minister of Forestry, Fisheries and the Environmental published the general requirements for undertaking site sensitivity verification for environmental themes for activities requiring environmental authorisation (Government Gazette No. 43110). In terms of these requirements, prior to commencing with a specialist assessment, the **current land use** and **environmental sensitivity** of the site under consideration by the screening tool must be confirmed by undertaking a site sensitivity verification by either an EAP or a specialist.

The report uses national datasets to identify site sensitivities and potential specialist studies that may be required for any particular development. Since the datasets are not necessarily groundtruthed, there may be instances where the required specialist study is in actual fact not necessary.

Prior to commencing with a specialist assessment, the **current use of the land** must be verified and the environmental sensitivity of the site under consideration identified by the screening tool must be verified by the undertaking a **site sensitivity verification** (SSV).

According to the Assessment Protocol for specialist involvement, if any part of the proposed development falls within an area of 'high" or "very high" sensitivity and confirmed as such by the specialist or EAP, the requirements prescribed for such sensitivity must be followed.

In terms of legislative requirements, the following is required to form part of a site sensitivity verification.

Table 18: General requirements for site sensitivity verifications in terms of GN43110.

SSVr Requirement	Discussion
The SSV must be undertaken by an EAP or a specialist.	This SSV report (SSVr) has been compiled by the EAP and the Specialists. Please refer to the Specialist SSVr's attached in appendices E1 to E7.

SSVr Requirement	Discussion
A preliminary on-site inspection must be undertaken.	A site Inspection was undertaken by the EAP in June 2023 and January 2024. All specialists have undertaken site inspections between June 2023 and January 2024. Please refer to the Specialist SSVR's attached in Appendix E1-E7 for dates in which each specialist undertook field work.
A desktop analysis must be undertaken, alongside any other applicable/ relevant information.	Consideration has been given to the datasets available on the SANBI BGIS spatial application. All relevant spatial biodiversity layers were consulted, including: - Northern Cape Biodiversity Sector plan. - National Freshwater Ecosystems Priority areas. - National Spatial Biodiversity Assessment. - National Protected Areas Expansion Strategy. - Important Bird Areas - South African Bird Atlas Project (SABAP 2) dataset.

5.11.1 General Site Information

The General site information for the proposed Kareekloof Solar PV is discussed in detail in sections 5.1 – 5.10 of this report. These sections on the general site conditions have been informed by the specialist studies attached in appendices E1 – E8.

5.11.2 Screening Tool Results

According to the Screening Tool Report that was run on **25 April 2023**, the following summary of the Study Site environmental sensitivities were identified in the screening tool.

Table 19: Summary of the development footprint environmental sensitivities.

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme		X		
Animal Species Theme			X	
Aquatic Biodiversity Theme	X			
Archaeological and Cultural Heritage Theme				X
Avian Theme				X
Civil Aviation (Solar PV) Theme				X
Defence Theme				X
Landscape (Solar) Theme	X			
Paleontology Theme	X			
Plant Species Theme				X
RFI Theme			X	
Terrestrial Biodiversity Theme	X			

The verification of these sensitivities by the participating specialists is included in the sections below. Please also refer to the site sensitivity maps included in section 2.11 of this report.

The table below depicts the screening tool sensitivities compared to those verified by the specialists and EAP.

Table 20: Environmental Theme sensitivities identified by the screening tool and those verified on site by the EAP and participating specialists.

Theme	Screening tool Sensitivity	Sensitivity Verified by Specialist / EAP	Discussion
Agriculture	High	Medium-Low	The agricultural Specialist has refuted the screening tool sensitivity and confirmed the entire site to be of medium to low sensitivity. An agricultural compliance statement has been undertaken. Please refer to appendix E5.
Animal Species	Medium	Medium	The Avifaunal Specialist confirmed that the Site Ecological Importance for Neotis Luwigi were evaluated for each of the avifauna habitats in the Kareekloof Solar PV project area. Regardless of the verified Medium Sensitivity, a Bird species impact assessment and not a compliance statement was undertaken in compliance with the Bird Life South Africa Guidelines. Please refer to Appendix E1 and E2.
Aquatic	Very High	Very Low and Very High	The Aquatic Biodiversity specialist has confirmed the Low sensitivity for the majority of the site and has confirmed and further delineated the very high sensitivity features. All very high Aquatic Biodiversity features along with required buffers have been avoided by the mitigated preferred layout – Layout Alternative 3. An aquatic was undertaken. Please refer to Appendix E2
Archaeology	Low	Low and High	The Archaeology Specialist has confirmed the low sensitivity for the majority of the site but has identified areas of high sensitivity. A Heritage Impact assessment was undertaken. Please refer to Appendix E4.
Avian	Low	High	The Avifauna Specialist has refuted the low sensitivity classification in the screening tool due to the possible (and confirmed) presence of 5 Species of Conservation concern. Ecological Importance for Neotis Luwigi were evaluated for each of the avifauna habitats in the Kareekloof Solar PV project area. Regardless of the verified Medium Sensitivity, a Bird species impact assessment and not a compliance statement was undertaken in compliance with the Bird Life South Africa Guidelines. Please refer to Appendix E1 and E2.
Civil Aviation	Low	Low	The closest airstrip was identified as the Petrusville Aerodrome situated approximately 38 km to the Northeast of the site. The South Avian Civil Aviation Authority, ATNS and the Saldanha Airport were be given an opportunity to comment on the draft Scoping Report and will be given a further opportunity to comment on this Draft

Theme	Screening tool Sensitivity	Sensitivity Verified by Specialist / EAP	Discussion
			EIR. The applicant will also submit an obstacle application (Part 30-27) to the South African Civil Aviation Authority.
Defence	Low	Low	There is no Department of Defence Infrastructure in proximity to the proposed Development. The South African National Defence Force were provided with an opportunity to comment on the Draft Scoping report and will be given a further opportunity to comment on this Draft Environmental Impact Report.
Landscape	Very High	Low and Very High	The visual specialist (appendix E6) confirmed the very high sensitivity in the Screening Tool for certain areas. The southern border of the study area the flat-topped inselbergs are unique mountain features and do have steep slopes on the northern flanks that are included in the proposed project assessment area. These areas and a buffer of 500m from the mountain feature should be retained as a natural landscape. Exclusion of these areas would result in Low risk to slopes and mountain features. These features and buffers have been avoided by layout alternative 3 (mitigated preferred layout) and as such the Landscape and Visual Sensitivity of the remaining areas is classified as low. A landscape and visual impact assessment was undertaken and is included in Appendix E6.
Palaeontology	Very High	Low to Moderate	The Heritage Specialist confirmed that the study area ranges from low to moderate and high paleontological sensitivity based on the SAHRA paleontological sensitivity map. Please refer to Appendix E4.
Plant Species	Low	Low	The Terrestrial Biodiversity Specialist has confirmed the low sensitivity of the site and furthermore confirmed that no plant species of conservation concern were observed or expected to occur on the site. A plant species assessment forms part of the Terrestrial Biodiversity Assessment attached in Appendix E1
RFI	Medium	Low	The project is situated more than 180km from the closest SKA station (SKA004). The South African SKA Project Office and the South African Radio Astronomy Observatory (SARAO) have been registered as a key stakeholder on this environmental process and have been requested to provide input in terms of the Astronomy Geographic Advantage Act and potential impact to SKA.
Terrestrial Biodiversity	Very High	Low - Very High	The Terrestrial Biodiversity Specialist confirmed that the findings of the site verification, which included a desktop assessment and site survey, could not confirm the Very High environmental sensitivity of the Terrestrial Biodiversity Theme, which is based solely

Theme	Screening tool Sensitivity	Sensitivity Verified by Specialist / EAP	Discussion
			on the presence of an Ecological Support Area (ESA) on which the Kareekloof Solar PV project area is located. This ESA is an extremely large area (860,279 ha; Figure and of low intensity land use activities. There are no specific terrestrial features that are linked to the ESA (e.g. specific habitat types or fauna populations), and the vast majority of the ESA encompassed ecosystems that are considered to be of Least Concern. The ESA has most likely been classified as a supporting ecological role to provide connectivity between the surrounding Critical Biodiversity Areas and Protected Areas and to maintain healthy populations of many species that are not of conservation concern. While this is an important ecological role, designation of the entire area as Very High for the entire study site is unfounded. The specialist did however identify Very High sensitivity features within the study site and these were avoided (along with the suggested buffers) in Layout Alternative 3 (mitigated preferred layout).

5.11.2.1 Agriculture

The Screening Tool identifies the agricultural sensitivity theme as “High”, with high and medium sensitivity and low sensitivity areas present on the majority of the study site.

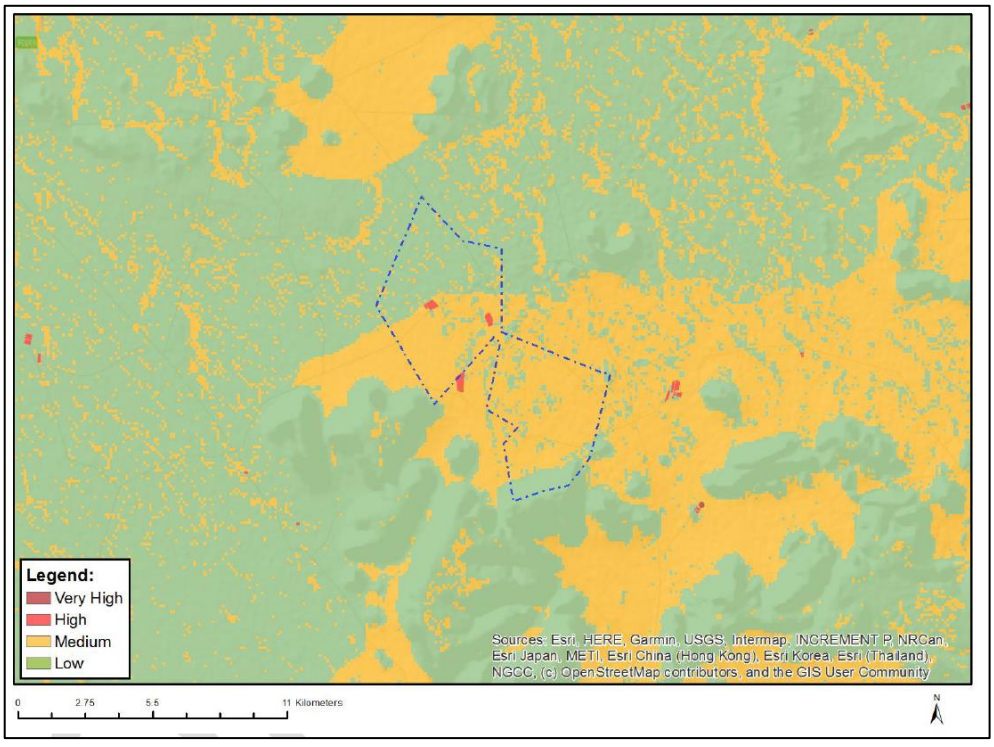


Figure 47: Image from Screening Tool identifying agricultural theme sensitivity for the Study Site.

The high sensitivity areas were reflected in the screening tool for the following reasons:

- Annual Crop Cultivation;
- Planted Pastures Rotation; and
- Land capability of Low-Moderate/07. Low-Moderate.

The agricultural Specialist has refuted this and confirmed the entire site to be of medium to low sensitivity. Please refer to Appendix E5 for a copy of the Agriculture SSVR and Compliance statement.

5.11.2.2 Animal Species

The Screening Tool identifies the Animal Species sensitivity theme as “Medium”, with low sensitivity areas also present on the site.

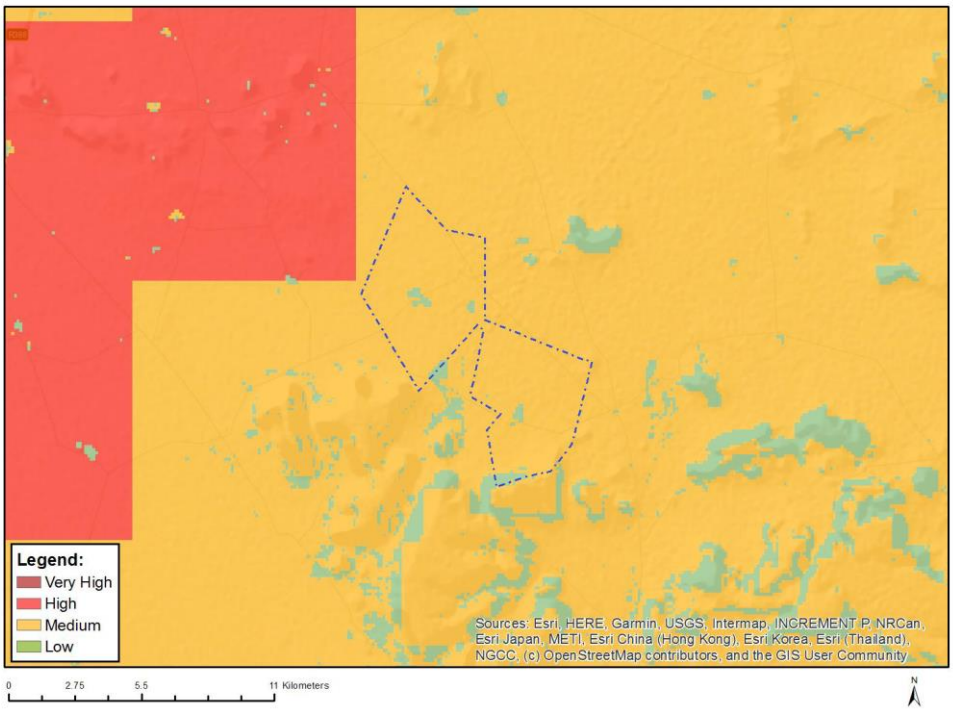


Figure 48: Image from Screening Tool identifying Animal Species theme sensitivity for the Study Site.

The medium sensitivity was attributed to the sensitive bird species Neotis ludwigii. A Bird species impact assessment and not a compliance statement has been undertaken in compliance with the Bird Life South Africa Guidelines.

5.11.2.3 Aquatic Biodiversity

The Screening Tool identifies the Aquatic Biodiversity sensitivity theme as “Very High”, but with the majority of the site as low sensitivity.

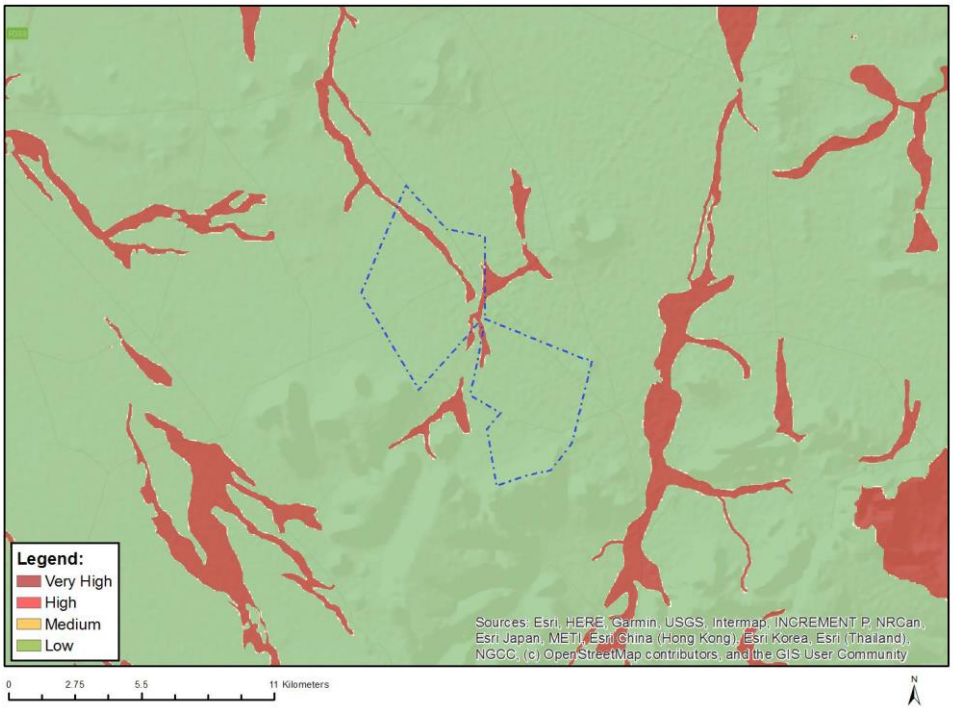


Figure 49: Image from Screening Tool identifying Aquatic Biodiversity theme sensitivity.

The Aquatic Biodiversity specialist (Appendix E3) has confirmed the Low sensitivity for the majority of the site and has confirmed and further delineated the very high sensitivity features (notwithstanding all Aquatic Biodiversity features along with required buffers have been avoided by the mitigated preferred layout – Layout Alternative 3)

5.11.2.4 Archaeology and Cultural Heritage

The Screening Tool identifies the Archaeology and Cultural Heritage sensitivity theme as “Low”.

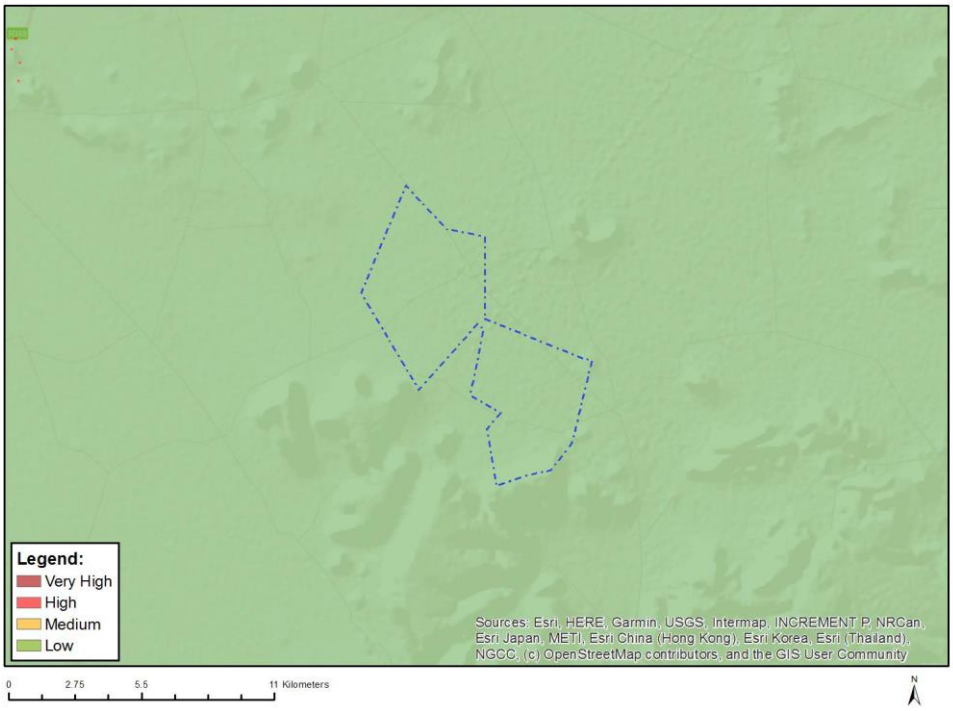


Figure 50: Image from Screening Tool identifying Archaeology and Cultural Heritage theme sensitivity.

The Heritage Specialist (Annexure E5) has confirmed the low sensitivity identified in the screening tool for the majority of the property but has identified certain areas associated with the Koppies and the Watercouses that may contain Archaeological Resources.

5.11.2.5 Avifauna

The Screening Tool identifies the Avifauna sensitivity theme as “Low” for the entire study site.

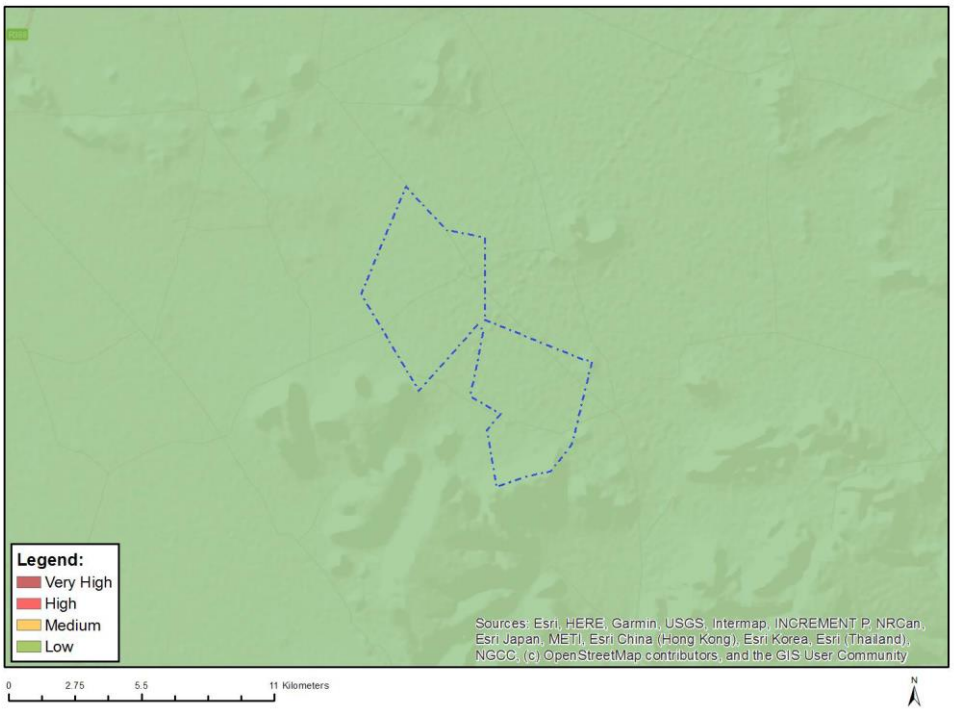


Figure 51: Image from Screening Tool identifying Avifauna theme sensitivity for the Study Site.

The Avifauna Specialist has refuted the low sensitivity classification in the screening tool due to the possible (and confirmed) presence of 5 Species of Conservation concern.

The Site Ecological Importance will be evaluated for each of the avifauna habitats in the Kareekloof Solar PV project area in the impact assessment phase of the environmental process, after the second season of avifaunal monitoring is completed. In compliance with the Bird Life SA Guidelines, an avifaunal impact assessment will be undertaken, regardless of the outcome of the second season of avifaunal monitoring.

5.11.2.6 Visual and Landscape

The Screening Tool identifies the Visual and landscape sensitivity theme as “Very High”, but with the majority of the site consisting of medium sensitivity.

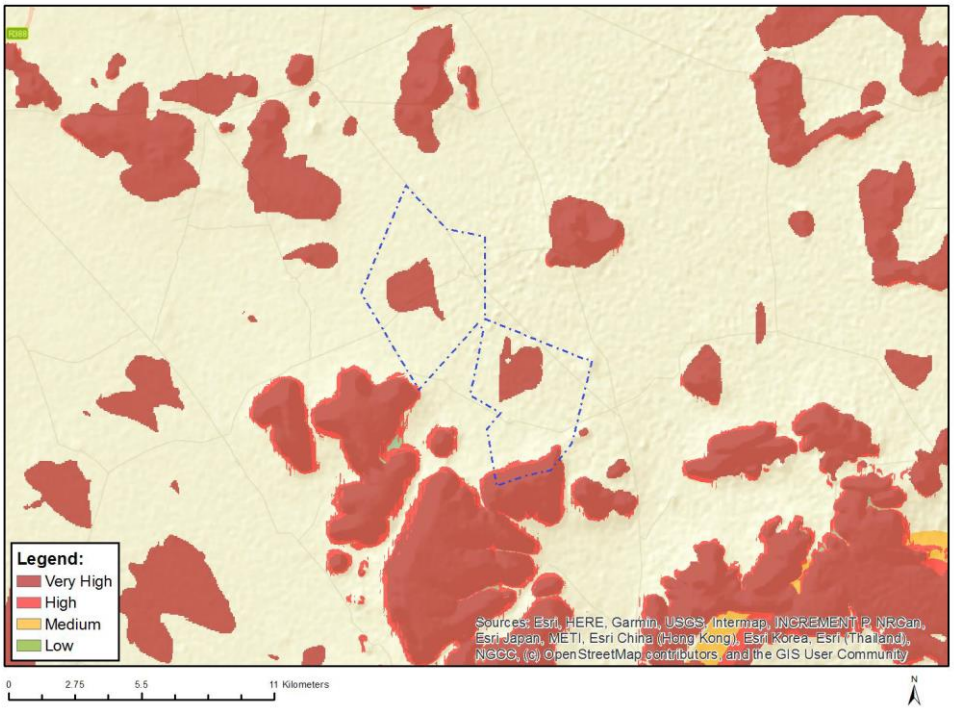


Figure 52: Image from Screening Tool identifying Visual and Landscape theme sensitivity for the Study Site.

The very high sensitivity was attributed to the following features:

- Slope between 1:4 and 1:10
- Mountain tops and high ridges
- Slope more than 1:4.

The visual specialist (appendix E6) confirmed the very high sensitivity in the Screening Tool for certain areas.

The southern border of the study area the flat-topped inselbergs are unique mountain features and do have steep slopes on the northern flanks that are included in the proposed project assessment area. These areas and a buffer of 500m from the mountain feature should be retained as a natural landscape. Exclusion of these areas would result in Low risk to slopes and mountain features. These features and buffers have been avoided by layout alternative 3 (mitigated preferred layout) and as such the Landscape and Visual Sensitivity of the remaining areas is classified as low.

5.11.2.7 Palaeontology

The Screening Tool identifies the Palaeontology sensitivity theme as Very high due to features with a high Palaeontology sensitivity.

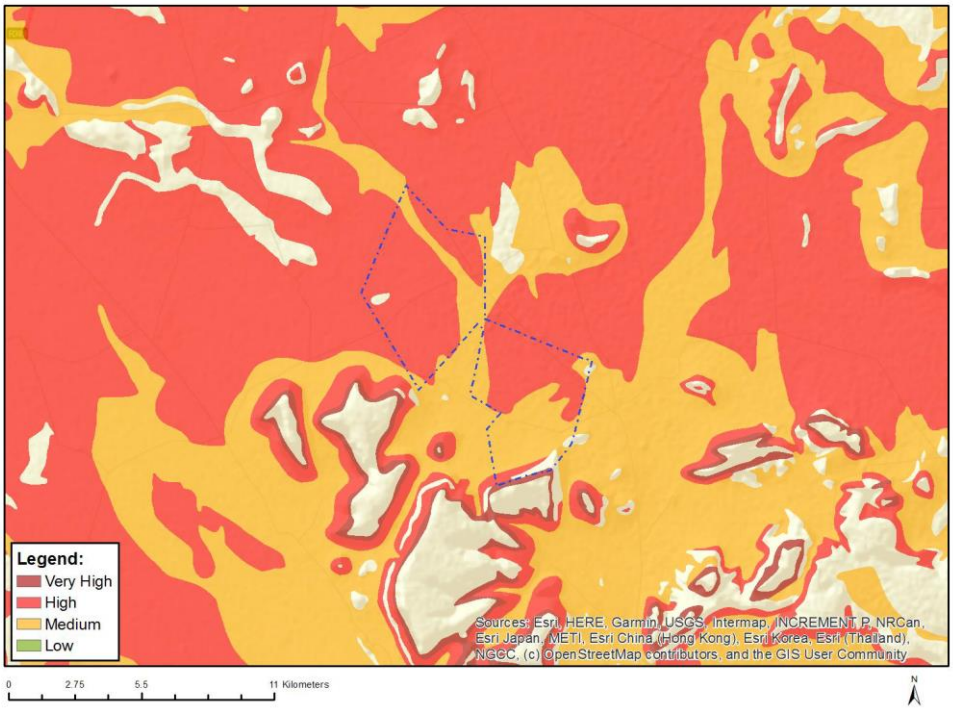


Figure 53: Image from Screening Tool identifying Palaeontology theme sensitivity for the Study Site.

The Heritage Specialist (Appendix E4) confirmed that the study area ranges from low to moderate paleontological sensitivity based on the SAHRA paleontological sensitivity map.

5.11.2.8 Plant Species

The Screening Tool identifies the Plant Species sensitivity theme as “Low”, for the entire study site.

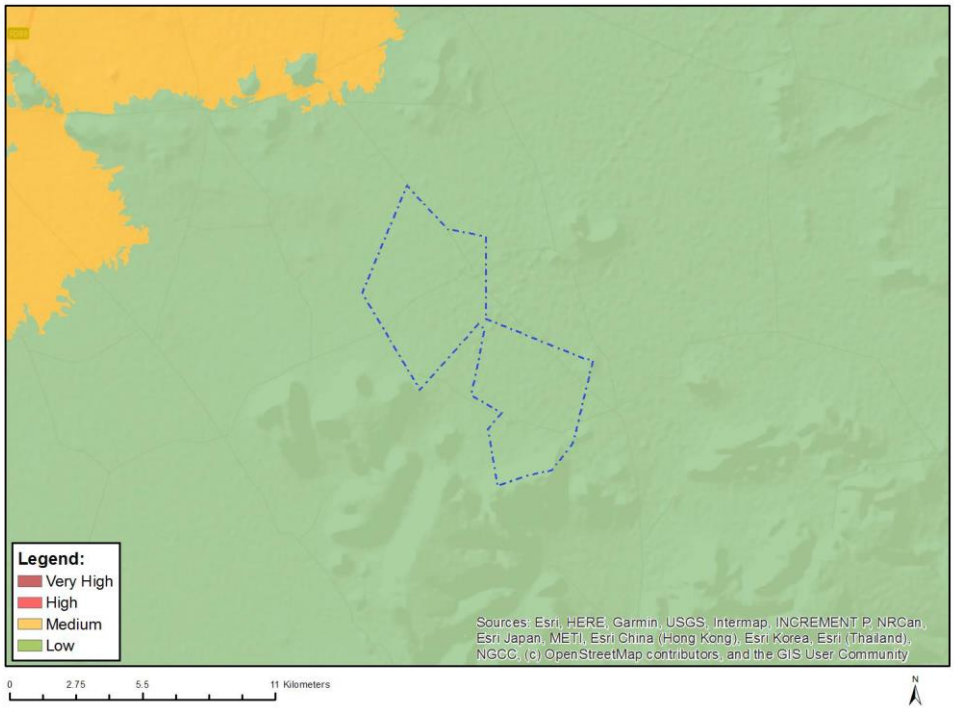


Figure 54: Image from Screening Tool identifying Plant Species theme sensitivity for the Study Site.

The Terrestrial Biodiversity Specialist (Appendix E1) has confirmed the low sensitivity of the site and furthermore confirmed that no plant species of conservation concern were observed or expected to occur on the site.

5.11.2.9 Terrestrial Biodiversity

The Screening Tool identifies the Terrestrial Biodiversity sensitivity theme as “Very High”, for the Majority of the site.

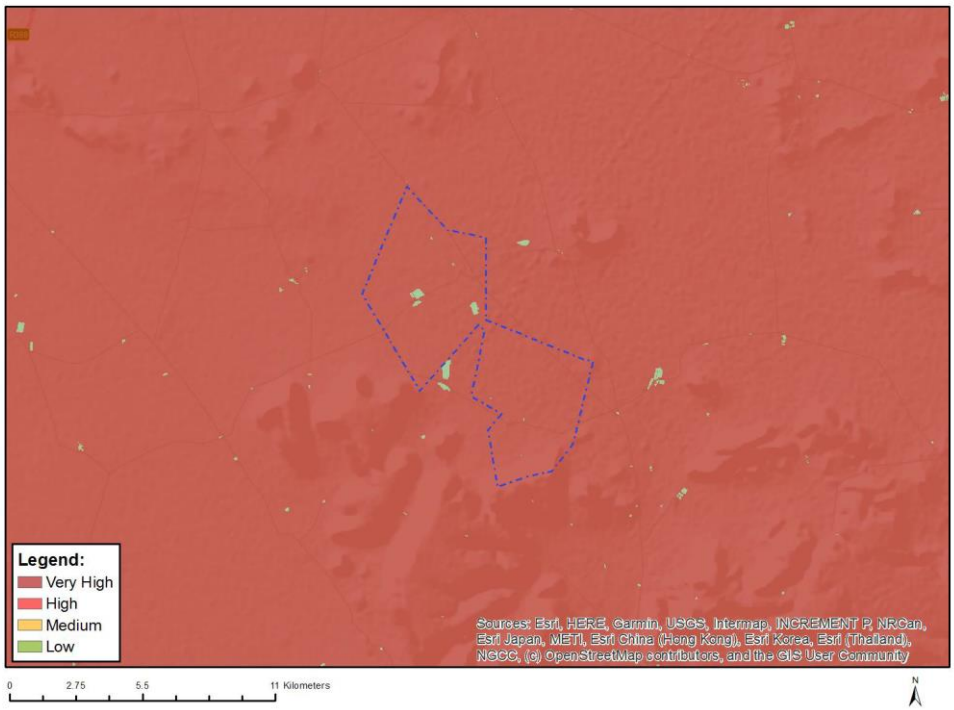


Figure 55: Image from Screening Tool identifying Terrestrial Biodiversity theme sensitivity for the Study Site.

The Terrestrial Biodiversity Specialist (Appendix E1) confirmed that the findings of the site verification, which included a desktop assessment and site survey, could not confirm the Very High environmental sensitivity of the Terrestrial Biodiversity Theme, which is based solely on the presence of an Ecological Support Area (ESA) on which the Kareekloof Solar PV project area is located. This ESA is an extremely large area (860,279 ha; Figure and of low intensity land use activities. There are no specific terrestrial features that are linked to the ESA (e.g. specific habitat types or fauna populations), and the vast majority of the ESA encompassed ecosystems that are considered to be of Least Concern.

The ESA has most likely been classified as a supporting ecological role to provide connectivity between the surrounding Critical Biodiversity Areas and Protected Areas and to maintain healthy populations of many species that are not of conservation concern. While this is an important ecological role, designation of the entire area as Very High for the entire study site is unfounded. The specialist did however identify Very High sensitivity features within the study site and these were avoided (along with the suggested buffers) in Layout Alternative 2 (preferred layout).

5.11.3 Specialist Assessments

It is important to note that specialist involvement is needed when the environment could be **significantly affected** by the proposed activity, where that environment is **valued by, or important** to **society** and/or where there is **insufficient information** to determine whether impacts would be significant.

The scope of specialists' contribution (if required) depends on the **nature of the project**, the environmental context [of the site] and the amount of available information and does not always entail detailed studies or assessment of impacts (*Source: Guideline for the review of specialist input in EIA processes, 2005*).

Based on the SSV above read in conjunction with the Specialist SSVr's in appendices E1-E7 of the Scoping report, the following specialist assessments have been undertaken as part of this impact assessment.

1. Freshwater Biodiversity Impact Assessment.
2. Terrestrial Biodiversity Impact Assessment.
3. Plant Species Compliance Statement.
4. Animal Species Impact Assessment.
5. Avifaunal Impact Assessment
6. Heritage Impact Assessment (including Cultural Heritage, Archaeology and Palaeontology)
7. Landscape and Visual Impact Assessment
8. Agricultural Compliance Statement[35].
9. Socio-Economic Impact Assessment[36].

6. ASSESSMENT OF IMPACTS

The Plan of Study for the environmental Impact Assessment (PosEIA) was approved by the DFFE on 13 December 2023. In compliance with the approved PosEIA, the following aspects have been assessed in this Draft EIR.

Table 21: Impacts Assessed in the Environmental Impact Report.

Specialist Discipline	Nature of assessed.	Project phase	Specialist appointed.
Terrestrial Biodiversity	Habitat loss due to placement of infrastructure, habitat fragmentation & reduced connectivity within the landscape	Construction, Operation and Decommissioning	Enviro Insight .
	Increased presence of alien invasive plant species due to soil disturbance and movement during the construction phase;		
	Soil erosion and compaction		
	Pollution		
Aquatic Biodiversity	Direct impacts attributed to linear road infrastructure which may require the implementation of culverts and drifts	All Phases	Enviro Insight
	Indirect hydrological process impacts stemming from watershed roughness change.		
Avifauna	The removal or alteration of large expanses of habitat specifically utilised by avifauna species of conservation concern;	Construction, Operation and Decommissioning	Enviro Insight
	Collisions with solar panels from the effects of polarized light and/or the "lake effect";		
	Collisions/electrocutions with auxiliary infrastructure, specifically electrical transmission lines and security fences (vehicle induced flushing);		
	Disturbance due to noise such as, machinery movements and maintenance operations during		

[35] This Agricultural compliance statement must consider the comment raised by an adjacent landowner regarding the fact that more than 10% of the properties are being considered for this development.

[36] The Socio-Economic Impact Assessment must consider the concern raised by an adjacent landowner, that the proposed project will have a negative impact on the socio economics of the area.

Specialist Discipline	Nature of assessed.	Project phase	Specialist appointed.
	the construction and operational phase of the proposed PVSEF;		
	Attraction of certain bird species due to the development of PVSEF with associated infrastructure such as perches, nest and shade opportunities; and		
	Chemicals used to keep the PV panels clean from dust (suppressants) may cause poisoning and or exacerbate habitat loss.		
Agriculture	Loss of areas of grazing areas where livestock can be produced	Construction and Operation.	Mr Johan Lanz
	Soil compaction	Construction	
	Soil erosion	Construction and Operation	
	Loss of soil fertility through disturbance of in situ horizon organisation	Construction	
	Soil chemical pollution	Construction and Operation	
Heritage	Direct impact on heritage Resources (including archaeology, Palaeontology and Built environment) identified within the study site.	Construction	Mr Jaco van Der Walt
Visual	Loss of site landscape character from the removal of vegetation and the construction of the PV structures and associated infrastructure;	Construction	Visual Resource Management Africa, Mr Stephen Stead.
	Wind-blown dust due to the removal of large areas of vegetation		
	Possible soil erosion from temporary roads crossing drainage lines		
	Windblown litter from the laydown and construction sites		
	Light spillage making a glow effect that would be clearly noticeable to the surrounding dark sky night landscapes to the north of the proposed site;	Operation	
	Massing effect on the landscape from a large-scale modification;		
	On-going soil erosion;		
	On-going windblown dust		
	Movement of vehicles and associated dust	Decommissioning	
	Windblown dust from the disturbance of cover vegetation / gravel		
Social	Creation of employment and business opportunities, and opportunity for skills development and on-site training.	Construction, Operation and Decommissioning	Tony Barbour Consulting, Mr Tony Barbour.
	Impacts associated with the presence of construction workers on local communities.	Construction	
	Impacts related to the potential influx of jobseekers	Construction, Operation and Decommissioning	
	Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site.	Construction and Decommissioning	
	Increased risk of grass fires associated with construction related activities	Construction Construction	
	Nuisance impacts, such as noise, dust, and		

Specialist Discipline	Nature of assessed.	Project phase	Specialist appointed.
	safety, associated with construction related activities and vehicles.		
	Impact on productive farmland	Operation	
Battery Energy Storage System Risk	The following potential risks of Lithium-ion or sodium ion batteries will be assessed: 1. the proximity to occupied residences; 2. the layout to prevent domino effects of fires/explosions between facilities; 3. suitable emergency response during all phases of the project; and 4. suitable end of life plan to be in place.	Construction, Operation and Decommissioning.	ISHEcon Ms Debbie Mitchell.
	The following potential risks for Redox flow BESS (assume vanadium but may be alternative chemistry) batteries will be assessed: 1. proximity to water courses; 2. suitable secondary spill containment for large tanks of electrolyte; 3. suitable emergency response during all phases of the project; and 4. suitable end of life plan to be in place.		
	The following potential risks for Molten metal BESS will be assessed: 1. safety of personnel due to high temperature liquids; 2. suitable emergency response during all phases of the project; and 3. suitable end of life plan to be in place		

This section of the report was completed with input from the following specialists:

- Terrestrial Biodiversity (Enviro Insight, 2024)
- Avifauna (Enviro Insight, 2024)
- Plant Species (Enviro Insight, 2024)
- Animal Species (Enviro Insight, 2024)
- Aquatic Biodiversity (Enviro Insight, 2024)
- Agricultural (Lanz, 2024)
- Archaeology and Heritage (van der Walt, 2024)
- Visual (VRMA, 2024)
- Socio Economic (Tony Barbour, 2024)

The impacts will firstly be discussed per specialist discipline and then summarised in the impact summary and statement in the following sections.

6.1 ASSESSMENT METHODOLOGY

All possible impacts need to the assessed – the **direct, in-direct as well as cumulative impacts**. The following general assessment methodology has been applied:

- **Nature of the impact:** impacts associated with the proposed PV have been described in terms of whether they are negative or positive and to what extent.
- **Duration of impacts**: Impact were assessed in terms of their anticipated duration:

  - Short term (e.g., during the construction phase – 0 – 2 years)
  - Medium term (e.g., during part or all of the operational phase – 2 - 20 years)
  - Long term (e.g., > 20 years)
  - Permanent (e.g., where the impact is for all intents and purposes irreversible)
  - Discontinuous or intermittent (e.g., where the impact may only occur during specific climatic conditions or during a particular season of the year)
- **Intensity or magnitude**: The size of the impact (if positive) or its severity (if negative):
  - Low, where the receiving environment (biophysical, social, economic, cultural etc) is negligibly affected or where the impact is so low that the remedial action is not required;
  - Medium, where the receiving environment (biophysical, social, economic, cultural etc) is altered, but not severely affected, and the impact can be remedied successfully; and
  - High, where the receiving environment (biophysical, social, economic, cultural etc) would be substantially (i.e., to a very large degree) affected. If a negative impact, could lead to irreplaceable loss of a resource and/or unacceptable consequences for human wellbeing.
- **Probability**: Should describe the likelihood of the impact actually occurring indicated as:
  - Improbable, where the possibility of the impact is very low either because of design or historic experience;
  - Probable, where there is a distinct possibility that the impact will occur;
  - Highly probable, where it is most likely that the impact will occur; or
  - Definite, where the impact will occur regardless of any prevention measures.
- **Significance:** The significance of impacts can be determined through a synthesis of the assessment criteria. Significance can be described as:
  - Low, where it would have negligible effect on the receiving environment (biophysical, social, economic, cultural etc), and on the decision;
  - Medium, where it would have a moderate effect on the receiving environment (biophysical, social, economic, cultural etc), and should influence the decision;
  - High, where it would have, or there would be a high risk of, a large effect on the receiving environment (biophysical, social, economic, cultural etc). These impacts should have a major influence on the decision;
  - Very high, where it would have, or there would be a high risk of, an irreversible negative impact on the receiving environment (biophysical, social, economic, cultural etc) and irreplaceable loss of natural capital/resources or a major positive effect on human well-being. Impacts of very high significance should be a central factor in decision-making.
  - Provision should be made for with and without mitigation scenarios.
- **Reversibility:**

  - Reversible, the impact can be managed to a low to high degree and is not permanent; or
  - Irreversible, the impact can only be managed to a limited degree and is permanent.
- **Confidence**: The level of confidence in predicting the impact can be described as:
  - Low, where there is little confidence in the prediction, due to inherent uncertainty about the likely response of the receiving ecosystem, or inadequate information;
  - Medium, where there is a moderate level of confidence in the prediction, or
  - High, where the impact can be predicted with a high level of confidence.
- **Consequence**: What will happen if the impact occurs
  - Insignificant, where the potential consequence of an identified impact will not cause detrimental impact to the receiving environment;
  - Significant, where the potential consequence of an identified impact will cause detrimental impact to the receiving environment.
  - Provision must be made for with and without mitigation scenarios.

The impacts have been assessed in terms of the following aspects:

- **Status of the impact**

The specialist should determine whether the impacts are negative, positive or neutral ("cost – benefit" analysis). The impacts are to be assessed in terms of their effect on the project and the environment. For example, an impact that is positive for the proposed development may be negative for the environment. It is important that this distinction is made in the analysis.

- **Cumulative impact**

Consideration must be given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts must be evaluated with an assessment of similar developments planned and already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.

Care must be taken to ensure that where cumulative impacts can occur that these impacts are considered and categorised as **additive** (incremental or accumulative); **interactive**, **sequential** or **synergistic**.

Based on a synthesis of the information contained in the above-described procedure, the specialists assessed 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.

Where relevant, all specialists have assessed the mitigated preferred layout (Layout Alternative 3) and the No-Go Alternative using the abovementioned general methodology as a basis. Please note that each specialist utilises rating and weighting criteria specific to their discipline in order to determine the significance of specific impacts.

For ease of reference, the significance and status of impacts reflected in all the assessment tables in the following sections are also visually reflected using the following colour scheme[37].

All positive impacts (regardless of their significance)	
Very low or low negative impacts	
Medium negative impacts	
Medium – High negative impacts	
High and Very High negative impacts	

6.2 TERRESTRIAL BIODIVERSITY IMPACTS

A Terrestrial Biodiversity Impact Assessment (covering Animal Species, Plant Species and Terrestrial Biodiversity) was undertaken by Enviro Insight and is attached in Annexure E1**.** The following has been summarised from this assessment.

6.2.1 Construction Phase Terrestrial Biodiversity Impacts[38]

During the construction phase, the main Terrestrial Biodiversity impact will be the direct Habitat loss. Clearing of natural vegetation for the construction and establishment of the solar PV and associated infrastructure will result in the loss, degradation and fragmentation of foraging and breeding habitat for fauna.

Table 22: Assessment of Construction Phase Terrestrial Biodiversity Impacts.

Nature: Direct Loss of Habitat		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Regional	Localised
Duration	Permanent	Permanent
Magnitude / Severity	Direct	Direct.
Probability	Definite	Definite
Significance	**High**	**Medium**
Status	Negative	Negative
Reversibility	Not Reversible	Not Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment.	Resource will be partially lost	Resource will be partially lost
Can impact be mitigated?	Partly	
Mitigation:	Please refer to section 7 for summary of all mitigation measures.	

Nature: Establishment and Spread of Alien and Invasive Species		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Regional	Regional
Duration	Long Term	Long Term

[37] Where specialist ratings fall across 2 of the groups, the worst case is reflected in the quick reference.

[38] The impact tables in this section reflect those of the preferred alternative (Layout Alternative 3. Cumulative and no-go impacts are assessed in following separate sections.

Magnitude / Severity	Direct	Direct.
Probability	Definite	Highly probable
Significance	**Moderate**	**Low**
Status	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment.	Resource will be partially lost	Resource will be partially lost
Can impact be mitigated?	Achievable	
Mitigation:	Please refer to section 7 for summary of all mitigation measures.	

Nature: Erosion and Soil Compaction		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Regional	Localised
Duration	Long Term	Long Term
Magnitude / Severity	Direct	Direct.
Probability	Definite	Highly probable
Significance	**High**	**Medium**
Status	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment.	Resource will be partially lost	Resource will be partially lost
Can impact be mitigated?	Achievable	
Mitigation:	Please refer to section 7 for summary of all mitigation measures.	

Nature: Ecotoxicity associated with Chemical use.		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Regional	Localised
Duration	Permanent	Long Term
Magnitude / Severity	Direct	Direct.
Probability	Definite	Highly probable
Significance	**High**	**Low**
Status	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment.	Resource will be partially lost	Resource will be partially lost
Can impact be mitigated?	Achievable	
Mitigation:	Please refer to section 7 for summary of all mitigation measures.	

6.2.2 Operational Phase Terrestrial Biodiversity impacts[39]

The following Terrestrial Biodiversity Impacts were assessed by the Terrestrial Biodiversity Specialist for the operational phase of the development.

Table 23: Assessment of Operational Phase Terrestrial Biodiversity Impacts.

Nature: Loss of Habitat associated with the shading from PV panels and the Maintenance of vegetation.		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Regional	Localised
Duration	Permanent	Permanent
Magnitude / Severity	Direct	Direct.
Probability	Definite	Definite
Significance	**High**	**Medium**
Status	Negative	Negative
Reversibility	Not Reversible	Not Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment.	Resource will be partially lost	Resource will be partially lost
Can impact be mitigated?	Partly	
Mitigation:	Please refer to section 7 for summary of all mitigation measures.	

Nature: Establishment and Spread of Alien and Invasive Species		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Regional	Regional
Duration	Long Term	Long Term
Magnitude / Severity	Direct	Direct.
Probability	Definite	Highly probable
Significance	**Moderate**	**Low**
Status	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment.	Resource will be partially lost	Resource will be partially lost
Can impact be mitigated?	Achievable	
Mitigation:	Please refer to section 7 for summary of all mitigation measures.	

[39] The impact tables in this section reflect those of the preferred alternative (Layout Alternative 5). Cumulative and no-go impacts assessed in following separate sections.

Nature: Erosion and Soil Compaction		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Regional	Localised
Duration	Long Term	Long Term
Magnitude / Severity	Direct	Direct.
Probability	Definite	Highly probable
Significance	**High**	**Medium**
Status	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment.	Resource will be partially lost	Resource will be partially lost
Can impact be mitigated?	Achievable	
Mitigation:	Please refer to section 7 for summary of all mitigation measures.	

Nature: Ecotoxicity associated with Chemical use.		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Regional	Localised
Duration	Permanent	Long Term
Magnitude / Severity	Direct	Direct.
Probability	Definite	Highly probable
Significance	**High**	**Low**
Status	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment.	Resource will be partially lost	Resource will be partially lost
Can impact be mitigated?	Achievable	
Mitigation:	Please refer to section 7 for summary of all mitigation measures.	

6.2.3 Decommissioning Phase Terrestrial Biodiversity Impacts

When the facility reaches the end of its lifespan, all machinery and related installations must be dismantled and removed, and the site should, as far as is reasonably possible, be restored to its original condition. It is only if the developer decides to extend the life of the solar farm and repowering the site, that the panels need to be replaced.

As decommissioning of large-scale solar farms in South Africa are new, the regulatory framework and impacts associated with this phase are based on assumptions. Perhaps the most important assumption is that decommissioning a solar farm is straight forward and simple, compared to the problems associated with decommissioning a nuclear power station, or a coal or gas fired plant. The major issues are the physical removal and the disposal of the used parts. Where possible, all recyclable materials must be repurposed in an environmentally friendly way. Active restoration will be required since it will be a large area filled with mostly grasses.

It is expected that the dismantling of the PV arrays and associated infrastructure can lead to disturbance of fauna community, in all ways similar to that resulting from the construction phase. The ecological impacts associated with the decommissioning phase will be similar to those listed in the construction phase and the associated mitigations measures must be updated and implemented to reduce potential adverse impacts.

6.2.4 Concluding Statement – Terrestrial Biodiversity Impacts

The specialist confirmed that the proposed Kareekloof Solar PV and BESS is located within three vegetation types, all listed as Least Threatened but poorly protected. None of the infrastructure is located in a threatened ecosystem or national protected expansion area. The Terrestrial Biodiversity theme of the screening tool report was rated as Very High sensitivity. However, based on the SSV, this could not be confirmed and is rather considered to be of low-medium sensitivity in relation to the proposed development.

The project is located in an ESA and no plant SCC are expected to occur on site. The ESAs are mainly due to watercourses on site which have been avoided.

Most of the project is located in grasslands on flat plains and gently sloping hills that are considered to be moderately sensitive. The drainage areas, wetlands and rocky ridges with associated steep slopes are considered to be sensitive and have been avoided for placement of PV arrays, laydown areas and associated infrastructure.

The specialist concluded that no fatal flaws are evident for the proposed project as the infrastructure layout was designed in relation to the final habitat sensitivities and avoided the No-Go areas. It is the opinion of the specialists that the project, may be considered for environmental authorisation, on condition that all prescribed mitigation measures and supporting recommendations are implemented.

6.3 AQUATIC BIODIVERSITY IMPACTS

An Aquatic Biodiversity Impact Assessment was undertaken by Tate Environmental in conjunction with Enviro Insight. Please refer to the Aquatic Biodiversity Impact Assessment in appendix E3 from which the following has been summarised. The specialist identified the following activities associated with the facility that could potentially have an impact on Aquatic Resources.

- Site access and clearing of vegetation in working areas;
- Establishment of laydown yard/construction camps;
- Excavations and earthworks for infrastructure setting;
- Excavations and earthworks for infrastructure foundations;
- Stockpiling and movement of soils and construction materials;
- Storage and use of chemicals, fuels and oils;
- Storm-water management.

The specialist noted that the watercourses delineated in this study have been effectively avoided, along with a suitable buffer for PV, substation and BESS infrastructure. Based on the preferred layout, only a single crossing point is anticipated to be upgraded with the bulk of the roadways avoiding sensitive water associated habitats.

In this regard, the specialist recommended that should culverts be utilised, multiple culverts spread across the watercourse as opposed a single culvert, should be undertaken ensure the spread flows across the systems and the maintenance of alluvial deposition in riparian habitats. Should culverts not be utilised due to the design requirements of the project, it is recommended that reinforced drift structures are utilised.

An aquatic risk assessment was to address the minimum requirements of the Department of Water and Sanitation (DWS). The DWS risk assessment was conducted in accordance with the requirements of the DWS General Authorisation (GA) legislation in terms of Section 39 of the NWA for water uses as defined in Section 21(c) or Section 21(i) (GN 49833 of 2023).

Table 24: Summary of Aquatic Risk Assessment for the Construction, Operation and Decomissioning Phase of the Kareekloof Energy PV and BESS project.

Phase	Activity	Impact	Risk Ratings
CONSTRUCTION	Clearing of vegetation	Alteration of runoff velocity	Low
		Production of sediment	Low
		Increasing erosion downslope	Low
	Excavating/shaping landscape for infrastructure placement	Alteration of runoff velocity	Low
		Production of sediment	Low
		Increasing erosion downslope	Low
	Stockpiling and placement of construction materials and structures	Alteration of runoff velocity	Low
		Production of fines and contaminants	Low
		Increasing erosion downslope	Low
OPERATIONAL	Solar PV Structures	Direct alteration of drainage	Low
		Hydrological process alteration	Low
		Establishment of alien plants on disturbed areas	Low
	Linear Infrastructure (Roads)	Alteration of surface drainage	Low
		Alteration of instream habitats	Low
		Establishment of alien plants on disturbed areas	Low
DECOMMISSIONING	Clearing of vegetation	Alteration of runoff velocity	Low
		Production of sediment	Low
		Increasing erosion downslope	Low
	Excavating/shaping landscape for infrastructure placement	Alteration of runoff velocity	Low
		Production of sediment	Low
		Increasing erosion downslope	Low
	Stockpiling and placement of construction materials and structures	Alteration of runoff velocity	Low
		Production of fines and contaminants	Low
		Increasing erosion downslope	Low

The outcomes of the risk assessment undertaken by the aquatic specialist indicate minor impacts from the proposed activities. The minor impacts can be attributed to the avoidance of the sensitive habitats and implementation of buffer zones. Should avoidance and basic mitigation actions be implemented, limited impacts to aquatic biodiversity can be expected.

6.4 AVIFAUNAL IMPACTS

An Avifaunal Impact Assessment was undertaken by Enviro Insight and is attached in Annexure E2**.** The following has been summarised from this assessment.

The specialist identified the following existing impacts on Avifauna, associated with the existing land-use.

- Livestock and game grazing – this reduces plant diversity and abundance and therefore habitat viability for foraging avifauna. However, the low intensity of this practice is unlikely to have significantly altered the avifauna assemblage within the region. Death of game and livestock will attract scavenging species (e.g. Tawny Eagle) and could bring such species into direct contact with the project infrastructure (specifically powerlines) leading to fatalities.
- Livestock water facilities/waterholes – drinking facilities for livestock and small associated manmade structures are present throughout the site. Such facilities modify natural habitat through the presence of alien trees acting as an attractant for avifauna, as well as the trampling of vegetation by livestock removing foraging habitat for birds.

- Alien and invasive species – alien trees are present throughout the project area, but mostly near developed infrastructure such as buildings, waterholes and impoundments. While their presence may reduce natural foraging or roosting habitat for some avian species, it also provides roosting and nesting opportunities. Larger alien trees such as pines and eucalyptus tend to attract large birds such as raptors and crows.
- Electricity powerlines and pylons -Electricity powerlines and pylons are both opportunities and risks for avifauna. While the infrastructure provides roosting, nesting and perching habitat for birds, it also subjects avifauna to potential risks of collision and electrocution. As shown in the avifaunal assessment. a photo of a dead Jackal Buzzard was taken in the project area under an existing powerline that was likely killed by collision with the line. This poses a probable and continuous threat to avifauna in the project area.
- Impoundment situated close to the powerline - the large dam on site is an important attractant for water birds, as observed during both seasonal surveys. The location of the powerline within close proximity to the dam increases the risk of waterfowl collisions with powerlines, making both the powerline and dam greater impacts to birds on site.
- Farm fences - present throughout the site, livestock fences are a noteworthy impact to avifauna. While birds may use fences for perching, they also pose collision and entrapment risks. Fences running parallel to roads pose greater risks to avifauna, as birds may be flushed by passing vehicles and collide with fences.

The main impacts associated with the Kareekloof Energy PV and BESS were identified as follows:

- the removal or alteration of large expanses of habitat specifically utilised by avifauna species of conservation concern;
- collisions with solar panels from the effects of polarized light and/or the “lake effect”;
- collisions/electrocutions with auxiliary infrastructure, specifically security or farm fences (vehicle induced flushing);
- disturbance due to noise such as, machinery movements and maintenance operations during the construction and operational phase of the proposed PVSEF;
- attraction of certain bird species due to the development of PVSEF with associated infrastructure such as perches, nest and shade opportunities; and
- chemicals used to keep the PV panels clean from dust (suppressants) may cause poisoning and/or exacerbate habitat loss.

6.4.1 Construction Phase Avifaunal Impacts.

The following Avifaunal Impacts were assessed for the construction phase of the proposed PV facility and associated infrastructure.

Table 25: Assessment of construction Phase Avifaunal Impacts.

Nature: Direct Loss of Avifaunal Habitat		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Whole site and nearby surroundings	Part of site
Duration	permanent	long term
Magnitude / Severity	High	Medium
Probability	High	High
Significance	**Medium**	**Low**
Status	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Medium	Medium

Can impact be mitigated?	Medium to High
Mitigation:	Mitigation measures outlined in section 7

Nature: Sensory Disturbance		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Whole site and nearby surroundings	Part of site
Duration	Short term	Short term
Magnitude / Severity	High	Medium
Probability	High	High
Significance	**Low**	**Low**
Status	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Medium	Medium
Can impact be mitigated?	Medium to High	
Mitigation:	Mitigation measures outlined in section 7	

6.4.2 Operational Phase Avifaunal Impacts

The following Avifaunal Impacts were assessed for the Operational phase of the proposed PV facility and associated infrastructure.

Table 26: Assessment of Operational Phase Avifaunal Impacts

Nature: Direct Mortality through collision and electrocution		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Whole site and nearby surroundings	Part of site
Duration	Short term	Short term
Magnitude / Severity	High	Medium
Probability	High	High
Significance	**Medium**	**Low**
Status	Negative	Negative
Reversibility	Partly Reversible	Partly Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Medium	Medium
Can impact be mitigated?	Medium to High	
Mitigation:	Mitigation measures outlined in section 7	

Nature: Attraction of Commensal species to the facility.		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Whole site and nearby surroundings	Part of site
Duration	Long term	Long term

Magnitude / Severity	High	Medium
Probability	High	High
Significance	**Medium**	**Low**
Status	Negative	Negative
Reversibility	Partly Reversible	Partly Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Medium	Medium
Can impact be mitigated?	No mitigation required due to low impact.	
Mitigation:	Mitigation measures outlined in section 7	

Nature: Ecotoxicity associated with chemical use.		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Whole site and nearby surroundings	Part of site
Duration	Long Term	Long Term
Magnitude / Severity	High	Medium
Probability	High	High
Significance	**Low**	**Low**
Status	Negative	Negative
Reversibility	Partially reversable if mitigation measures are strictly implemented	Partially reversable if mitigation measures are strictly implemented
Irreplaceable loss of resources / Sensitivity of receiving environment	Medium	Medium
Can impact be mitigated?	Medium.	
Mitigation:	Mitigation measures outlined in section 7	

6.4.3 Decommissioning Phase Avifaunal Impacts

The following Avifaunal Impacts were assessed for the Closure and Decomissioning phase of the proposed PV facility and associated infrastructure.

Table 27: Assessment of Closure and Decomissioning Phase Avifaunal Impacts

Nature: Direct Loss of Avifaunal Habitat		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Whole site and nearby surroundings	Part of site
Duration	permanent	long term
Magnitude / Severity	High	Medium
Probability	High	High
Significance	**Medium**	**Low**
Status	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Medium	Medium

Can impact be mitigated?	Medium to High
Mitigation:	Mitigation measures outlined in section 7

Nature: Sensory Disturbance		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Whole site and nearby surroundings	Part of site
Duration	Short term	Short term
Magnitude / Severity	High	Medium
Probability	High	High
Significance	**Low**	**Low**
Status	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Medium	Medium
Can impact be mitigated?	Medium to High	
Mitigation:	Mitigation measures outlined in section 7	

6.4.4 Concluding Statement – Avifaunal Impacts

The avifaunal specialist concluded that there are no major negative impacts to avifauna species of conservation concern expected from the proposed development, provided that the proposed mitigation measures are applied. The Kareekloof Energy PV and BESS as well as associated project activities are likely to represent a low risk to avifauna (after application of mitigation).

The specialist furthermore confirmed that the infrastructure design has considered the Site Ecological Importance delineation carefully and successfully avoided all Very High Site ecological habitats.

The specialists therefore recommends that the Competent Authority should grant environmental authorisation for this proposed development, on condition that:

- All mitigation measures stipulated in this EIA report above are adhered to and captured in an Environmental Management Plan (EMP);
- The EMP must include the necessity for post-construction avifauna monitoring as stipulated in Jenkins et al. (2017).

6.5 AGRICULTURAL IMPACTS.

An Agricultural Compliance Statement was undertaken by Mr Johann Lanz from Soil ZA and is attached in Annexure E3**.** The following has been summarised from this assessment.

It should be noted that in terms of the protocols, an Agricultural Compliance Statement is not required to formally rate agricultural impacts by way of impact assessment tables.

An agricultural impact is a change to the future agricultural production potential of land. In most developments, including the one being assessed here, this is primarily caused by the exclusion of agriculture from the footprint of the development. Soil erosion and degradation may also contribute to loss of agricultural production potential. The significance of an agricultural impact is a direct function of the following three factors:

1. the size of the footprint of land from which agriculture will be excluded (or the footprint that will have its potential decreased)

2. the baseline production potential (particularly cropping potential) of that land
3. the length of time for which agriculture will be excluded (or for which potential will be decreased).

The most significant agricultural impact is therefore a loss of a large area of high yielding cropland and the least significant impact is a loss of a small area of low carrying capacity grazing land.

Cropping potential is highlighted in factor 2, above, because the threshold, above which it is a priority to conserve land for agricultural production, is determined by the scarcity of arable crop production land in South Africa and the relative abundance of land that is only good enough to be used for grazing. If land can support viable and sustainable crop production, then it is considered to be above the threshold and is a priority for being conserved as agricultural production land. If land is unable to support viable and sustainable crop production, then it is considered to be below the threshold and of much lower priority for being conserved.

In this case, the entire assessed area is considered to be below the threshold because of the limitations on its cropping potential. The use of this land for solar power generation represents a minimal loss of agricultural production potential in terms of national food security. Furthermore, the land occupied by PV panels can be used for the dual purposes of solar power generation and agricultural food production by way of sheep grazing. This has potential benefits for both activities and means that the land remains agriculturally productive. The benefit for sheep farming is that the security infrastructure of the solar facility will protect the sheep within it against stock theft. The benefit for the solar facility is that the sheep will control the height of the vegetation below the solar panels and make it unnecessary to mechanically control the height of vegetation.

At the farm level, the development will provide a positive economic impact. The income generated by the farming enterprises through the lease of the land to the energy facility is highly likely to exceed the potential agricultural income from the site. It will diversify the farm's income sources and provide reliable and predictable income that is independent of variable agricultural economic factors such as weather, agricultural markets and agricultural input costs. This is likely to increase cash flow and financial security and may improve farming operations and productivity on other, parts of the farm, through increased investment into farming.

Due to the fact that the solar facility will not occupy scarce, viable cropland, that it can still be used to graze sheep, and that its negative impact is offset by economic benefits to farming, the overall negative agricultural impact of the development (loss of future agricultural production potential) is assessed here as being of low significance and as acceptable.

6.5.1 Concluding statement – Agricultural Impacts

The overall conclusion of the agricultural specialist is that the proposed development is desirable because it can provide benefits to agriculture with minimal loss of future agricultural production potential.

The assessed area is classified as high agricultural sensitivity by the screening tool. This has been disputed by the agricultural specialist who has classified the sensitivity as being entirely of medium agricultural sensitivity.

The cropping potential of the site is severely limited by the combination of climate and soil constraints. The rainfall is low and consequently very marginal for crop production. The low water holding capacity, in combination with the rainfall, provides an insufficient moisture reservoir to reliably carry a crop through the season. The climate and soil constraints mean that the assessed area is not suitable for continuous, profitable crop production.

From an agricultural impact point of view, the specialist recommended that the proposed development be approved. The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions.

6.6 HERITAGE IMPACTS.

A Heritage Impact Assessment was undertaken by Jaco van der Walt from Beyond Heritage and is attached in Annexure E4**.** The following has been summarised from this assessment.

6.6.1 Construction Phase Heritage Impacts.

The following Heritage Impacts were assessed for the construction phase of the proposed PV facility and associated infrastructure.

Table 28: Assessment of Construction Phase Heritage Impacts.

Nature: Construction Phase Heritage Impacts associated with the damage to or destruction of archaeological sites.		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Local	Local
Duration	Permanent	Permanent
Magnitude / Severity	Medium	Low
Probability	Definite	Definite
Significance	**Medium**	**Low**
Status	Negative	Negative
Irreplaceable loss of resources / Sensitivity of receiving environment	Yes – archaeological resources cannot be replaced or recreated	None – archaeological data will have been rescued and preserved for further study
Can impact be mitigated	Yes	
Mitigation:	A pre-construction survey of the PV footprint should be caried out. Graded archaeological sites within the development footprint should be excavated if they cannot be avoided.	

Nature: Construction Phase Impacts to graves associated with damage to or destruction of graves.		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Local	Local
Duration	Permanent	Permanent
Magnitude / Severity	High	Low
Probability	Improbable	Improbable
Significance	**Low**	**Low**
Status	Negative	Negative
Irreplaceable loss of resources / Sensitivity of receiving environment	Yes – graves cannot be replaced or recreated	No – graves will have been rescued and protected or relocated
Can impact be mitigated	Yes	
Mitigation:	If found during development, graves must be protected in situ and reported to an archaeologist and/or SAHRA for further assessment.	

6.6.2 Operational Phase Heritage Impacts.

All impact on heritage resources will occur during the construction phase and are deemed to be permanent.

6.6.3 Closure and Decommissioning Phase Heritage Impacts.

All impact on heritage resources will occur during the construction phase and are deemed to be permanent.

6.6.4 Concluding Statement – Heritage Impacts

The sensitivity study did not identify any fatal flaws to the Project from a heritage point of view, although heritage resources are expected in the study area. An archaeological and Fossil Chance find procedure must be incorporated into the Environmental Management Programme for the project.

6.7 VISUAL IMPACTS

A Visual Impact Assessment was undertaken by Mr Stephen Stead from Visual Resource Management Africa and is attached in Annexure E5. The following has been summarised from this assessment.

6.7.1 Construction Phase Visual Impacts

The following Visual Impacts were assessed for the construction phase of the proposed PV facility and associated infrastructure.

Table 29: Assessment of construction phase visual impacts.

Nature: Short-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Local	Local
Duration	Short term	Short term
Magnitude / Severity	Medium to High	Medium to Low
Probability	Likely	Likely
Significance	**Medium - High**	**Medium**
Status	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources / Sensitivity of receiving environment	Reversible after decommissioning	Reversible after decommissioning
Can impact be mitigated?	Medium Mitigation viability	
Mitigation:	Mitigation measures outlined in section 8	

6.7.2 Operational Phase Visual Impacts

The following Visual Impacts were assessed for the operational phase of the proposed PV facility and associated infrastructure.

Table 30: Assessment of operational phase visual impacts.

Nature: Short-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape (Loss of site landscape character due to the operation of the PV structures and associated infrastructure).		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Local	Local

Duration	Long term	Long term
Magnitude / Severity	Medium	Medium to Low
Probability	Likely	Likely
Significance	**Medium**	**Medium - Low**
Status	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources / Sensitivity of receiving environment	Reversible after decommissioning	Reversible after decommissioning
Can impact be mitigated?	Medium	
Mitigation:	Mitigation measures outlined in section 8	

6.7.3 Decommissioning Phase Visual Impacts

The following Visual Impacts were assessed for the closure and decommissioning phase of the proposed PV facility and associated infrastructure.

Table 31: Assessment of Decommissioning phase visual impacts.

Nature: Short-term landscape change from the removal of the PV structures, followed by rehabilitation of the impacted areas back to agricultural lands.		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Local	Local
Duration	Short term	Short term
Magnitude / Severity	Medium	Medium
Probability	Likely	Likely
Significance	**Low**	**Low**
Status	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources / Sensitivity of receiving environment	Impact will persist until completion of rehabilitation.	Impact will persist until completion of rehabilitation.
Can impact be mitigated?	Medium	
Mitigation:	Mitigation measures outlined in section 8	

6.7.4 Concluding Statement - Visual

The visual specialist recommended that the proposed development should commence with mitigation for the following key reasons:

- Moderate Zone of Visual Influence with no tourism activities or tourist view-corridors.
- The area is remote, and few receptors were identified.
- Wide buffer areas and fragmented design elements of the two areas does reduce the massing effects to some degree.
- Acceptable level of intervisibility between other RE projects.
- Medium to Low Post Mitigation Impacts is likely where residual effects could degrade local landscape resources.
- The area is located within the Central Strategic Powerline Corridor with some local landscape degradation from existing Eskom powerlines.

6.8 SOCIAL IMPACTS

A social Impact Assessment was undertaken by Mr Tony Barbour and Mr Schalk van der Merwe from Tony Barbour Environmental Consulting and is attached in Annexure E6. The following has been summarised from this assessment.

6.8.1 Construction Phase Social Impacts

The following Social Impacts were assessed for the construction phase of the proposed PV facility and associated infrastructure.

Table 32: Assessment of Construction Phase Social Impacts

Nature: Creation of employment and business opportunities during the construction phase		
	Without Mitigation	**With Enhancement**
Extent	Local – Regional	Local – Regional
Duration	Short term	Short term
Magnitude	Moderate	Moderate
Probability	Highly probable	Highly probable
Significance	**Medium**	**Medium**
Status	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	N/A	N/A
Can impact be enhanced?	Yes	
Enhancement:	Mitigation and enhancement measures outlined in section 8	

Nature: Potential impacts on family structures and social networks associated with the presence of construction workers		
	Without Mitigation	**With Mitigation**
Extent	Local	Local
Duration	Short term for community as a whole	Short term for community as a whole
Magnitude	Moderate for the community as a whole	Low for community as a whole
Probability	Probable	Probable (3)
Significance	**Medium**	**Low**
Status	Negative	Negative
Reversibility	No in case of HIV and AIDS	No in case of HIV and AIDS
Irreplaceable loss of resources?	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	
Mitigation:	Mitigation measures outlined in section 8	

Nature: Potential impacts on family structures, social networks and community services associated with the influx of job seekers		
	Without Mitigation	**With Mitigation**
Extent	Local	Local (1)
Duration	Permanent (For job seekers that stay on in the area)	Permanent (For job seekers that stay on in the area)
Magnitude	Minor	Minor
Probability	Probable	Probable
Significance	**Low**	**Low**
Status	Negative	Negative
Reversibility	No in case of HIV and AIDS	No in case of HIV and AIDS
Irreplaceable loss of resources?	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	
Mitigation	Mitigation measures outlined in section 8	

Nature: Potential risk to safety of scholars, farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site		
	Without Mitigation	**With Mitigation**
Extent	Local	Local
Duration	Short term	Short term
Magnitude	Medium	Low
Probability	Probable	Probable
Significance	**Medium**	**Low**
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock losses and damage to farm infrastructure etc.	Yes, compensation paid for stock losses and damage to farm infrastructure etc.
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

Nature: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires		
	Without Mitigation	**With Mitigation**
Extent	Local	Local
Duration	Short term	short term

Magnitude	Moderate due to reliance on agriculture for maintaining livelihoods	Low
Probability	Probable	Probable (3)
Significance	**Medium**	**Low**
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock and crop losses etc.	Yes, compensation paid for stock and crop losses etc.
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

Nature: Potential noise, dust and safety impacts associated with construction related activities		
	Without Mitigation	**With Mitigation**
Extent	Local	Local
Duration	Short Term	Short Term
Magnitude	Medium	Minor
Probability	Probable	Probable (3)
Significance	**Medium**	**Low**
Status	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

Nature: The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the project etc. will damage farmlands and result in a loss of farmlands for grazing.		
	Without Mitigation	**With Mitigation**
Extent	Local	Local
Duration	Long term-permanent if disturbed areas are not effectively rehabilitated	Short term if damaged areas are rehabilitated
Magnitude	Medium	Minor
Probability	Probable	Highly Probable
Significance	**Medium**	**Low**
Status	Negative	Negative
Reversibility	Yes, disturbed areas can be rehabilitated	Yes, disturbed areas can be rehabilitated
Irreplaceable loss of resources?	Yes, loss of farmland. However,	Yes, loss of farmland. However, disturbed

	disturbed areas can be rehabilitated	areas can be rehabilitated
Can impact be mitigated?	Yes, however, loss of farmland cannot be avoided	Yes, however, loss of farmland cannot be avoided
Mitigation:	Mitigation measures outlined in section 8	

6.8.2 Operational Phase Social Impacts

The following Social Impacts were assessed for the operational phase of the proposed PV facility and associated infrastructure.

Table 33: Assessment of social impacts during the operational phase of the development.

Nature: Development of infrastructure to improve energy security and support renewable sector		
	Without Mitigation	**With Mitigation**
Extent	Local, Regional and National	Local, Regional and National
Duration	Long term	Long term
Magnitude	High	High
Probability	Highly Probable	Definite
Significance	**High**	**High**
Status	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources?	Yes, impact of climate change on ecosystems	Reduced CO2 emissions and impact on climate change
Can impact be mitigated?	Yes	
Enhancement:	Mitigation and Enhancement measures outlined in section 8	

Nature: Creation of employment and business opportunities associated with the operational phase		
	Without Mitigation	**With Enhancement**
Extent	Local and Regional	Local and Regional
Duration	Long term	Long term
Magnitude	Minor	Low
Probability	Highly Probable	Highly Probable
Significance	**Low**	**Medium**
Status	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	No	No
Can impact be enhanced?	Yes	
Enhancement: See below	Mitigation and Enhancement measures outlined in section 8	

Nature: The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed etc.		
	Without Mitigation	**With Enhancement**
Extent	Local	Local

Duration	Long term	Long term
Intensity	Low	Moderate
Likelihood	Probable	Definite
Significance	**Low**	**Medium**
Status	Positive	Positive
Reversibility	Yes	Yes
Can impact be enhanced?	Yes	
Enhancement:	Mitigation and Enhancement measures outlined in section 8	

Nature: Benefits associated with support for local community's form SED contributions		
	Without Mitigation	**With Enhancement[40]**
Extent	Local and Regional	Local and Regional
Duration	Long term	Long term
Intensity	Low	Moderate
Likelihood	Probable	Definite
Significance	**Medium**	**High**
Status	Positive	Positive
Reversibility	Yes	Yes
Can impact be enhanced?	Yes	
Enhancement:	Mitigation and Enhancement measures outlined in section 8	

Nature: Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.		
	Without Mitigation	**With Mitigation**
Extent	Local	Local
Duration	Long term	Long term
Magnitude	Minor	Minor
Probability	Probable	Probable
Significance	**Low**	**Low**
Status	Negative	Negative
Reversibility	Yes, SEF components and other infrastructure can be removed.	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation	Mitigation measures outlined in section 8	

[40] Enhancement assumes effective management of the community trust.

Nature: Potential impact of the Facility on local tourism		
	Without Mitigation	**With Enhancement / Mitigation**
Extent	Local	Local
Duration	Long term	Long term
Magnitude	Minor	Minor
Probability	Probable	Probable
Significance	**Low**	**Low**
Status	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impact be enhanced?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

6.8.3 Decommissioning Phase Social Impacts

Given the relatively small number of people employed during the operational phase (~20-30), the potential negative social impact on the local economy associated with decommissioning will be limited. In addition, the potential impacts associated with the decommissioning phase can also be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low Negative.

6.8.4 Concluding Statement – Social

The findings of the Social Impact Assessment indicate that the proposed Kareekloof Energy PV and BESS as well as associated infrastructure will result in several social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phases. The project will also create economic development opportunities for the local community. The enhancement measures listed in the report should be implemented in order to maximise the potential benefits. The significance of this impact is rated as High Positive. The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the negative environmental and socio-economic impacts associated a coal-based energy economy and the challenges created by climate change, represents a significant positive social benefit for society as a whole. The Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) has resulted in significant socio-economic benefits, both at a national level and at a local, community level. These benefits are linked to foreign Direct Investment, local employment and procurement and investment in local community initiatives.

The findings also indicate that the potential negative impacts associated with both the construction and operational phase are likely to be Low Negative with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented.

6.9 TRAFFIC IMPACTS

An assessment of potential traffic Impacts that are generally associated with PV facilities of such a scale was undertaken by the EAP. This assessment is based on the EAPs experience as Principal ECO in the construction phase of over 1000MW of PV and 1140MWh of Battery Storage. The Traffic Impacts associated with the construction and operation facilities are well understood and as such it was not deemed to obtain specialist input in this regard on provision that all conditions contained in the abnormal load permits, once granted are implemented in full.

6.9.1 Construction Phase Traffic Impacts

The following Traffic Impacts were assessed for the construction phase of the proposed PV Facility and Associated infrastructure.

Table 34: Assessment of Traffic impacts during the construction phase.

Nature: Increase in Traffic		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Local / District	Local / District
Duration	Short Term	Short Term
Magnitude / Severity	High	Medium
Probability	Definite	Definite
Significance	**Medium**	**Medium**
Status	Negative	Negative
Reversibility	Completely Reversible	Completely Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Marginal Loss of resources	Marginal Loss of resources
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

Nature: Increase of Incidents with pedestrians and livestock		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Local / District	Local / District
Duration	Short Term	Short Term
Magnitude / Severity	Medium	Low
Probability	Probable	Probable
Significance	**Medium**	**Low**
Status	Negative	Negative
Reversibility	Partly Reversible	Partly Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Complete loss of resources	Complete loss of resources
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

Nature: Increase in Dust from gravel roads		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Local / District	Local / District
Duration	Short Term	Short Term
Magnitude / Severity	Medium	Medium
Probability	Probable	Probable
Significance	**High**	**Medium**

Status	Negative	Negative
Reversibility	Partly Reversible	Partly Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Marginal Loss of Resources	Marginal Loss of Resources
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

Nature: Increase in Road Maintenance		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Local / District	Local / District
Duration	Medium Term	Short Term
Magnitude / Severity	Medium	Medium
Probability	Probable	Probable
Significance	**Medium**	**Medium**
Status	Negative	Negative
Reversibility	Partly Reversible	Partly Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Marginal Loss of Resources	Marginal Loss of Resources
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

Nature: Additional Abnormal Loads		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Province / Region	Province / Region
Duration	Short Term	Short Term
Magnitude / Severity	Low	Low
Probability	Probable	Possible
Significance	**Medium**	**Low**
Status	Negative	Negative
Reversibility	Completely Reversible	Completely Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Marginal Loss of Resources	Marginal Loss of Resources
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

6.9.2 Operational Phase Traffic Impacts

The following Traffic Impacts were assessed for the Operational phase of the proposed PV Facility and Associated infrastructure.

Table 35: Assessment of Operational Phase Traffic Impacts

Nature: Increase in Traffic

	Without Mitigation	With Mitigation
Extent / Spatial Scope	Local / District	Local / District
Duration	Long Term	Long Term
Magnitude / Severity	Low	Low
Probability	Unlikely	Unlikely
Significance	**Low**	**Low**
Status	Negative	Negative
Reversibility	Completely Reversible	Completely Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Marginal Loss of Resources	Marginal Loss of Resources
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

Nature: Increase of Incidents with pedestrians and livestock		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Local / District	Local / District
Duration	Long Term	Long Term
Magnitude / Severity	Low	Low
Probability	Unlikely	Unlikely
Significance	**Low**	**Low**
Status	Negative	Negative
Reversibility	Completely Reversible	Completely Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Marginal Loss of Resources	Marginal Loss of Resources
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

Nature: Increase in Dust from gravel roads		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Local / District	Local / District
Duration	Long Term	Long Term
Magnitude / Severity	Low	Low
Probability	Unlikely	Unlikely
Significance	**Low**	**Low**
Status	Negative	Negative
Reversibility	Completely Reversible	Completely Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Marginal Loss of Resources	Marginal Loss of Resources
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

Nature: Increase in Road Maintenance		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Local / District	Local / District
Duration	Long Term	Long Term
Magnitude / Severity	Low	Low
Probability	Unlikely	Unlikely
Significance	**Low**	**Low**
Status	Negative	Negative
Reversibility	Completely Reversible	Completely Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Marginal Loss of Resources	Marginal Loss of Resources
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

Nature: Additional Abnormal Loads		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Province / Region	Province / Region
Duration	Long Term	Long Term
Magnitude / Severity	Low	Low
Probability	Unlikely	Unlikely
Significance	**Low**	**Low**
Status	Negative	Negative
Reversibility	Completely Reversible	Completely Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Marginal Loss of Resources	Marginal Loss of Resources
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

6.9.3 Decommissioning Phase Traffic Impacts

The following Traffic Impacts were assessed for the Decommissioning and Closure phase of the proposed PV Facility and Associated infrastructure.

Table 36: Assessment of Decommissioning Phase Traffic Impacts

Nature: Increase in Traffic		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Local / District	Local / District
Duration	Short Term	Short Term
Magnitude / Severity	High	Medium
Probability	Definite	Definite
Significance	**Medium**	**Low**

Status	Negative	Negative
Reversibility	Completely Reversible	Completely Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Marginal Loss of Resources	Marginal Loss of Resources
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

Nature: Increase of Incidents with pedestrians and livestock		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Local / District	Local / District
Duration	Short Term	Short Term
Magnitude / Severity	Medium	Low
Probability	Probable	Probable
Significance	**Medium**	**Low**
Status	Negative	Negative
Reversibility	Partly Reversible	Partly Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Complete Loss of Resources	Complete Loss of Resources
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

Nature: Increase in Dust from gravel roads		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Local / District	Local / District
Duration	Short Term	Short Term
Magnitude / Severity	Medium	Medium
Probability	Probable	Probable
Significance	**Low**	**Low**
Status	Negative	Negative
Reversibility	Partly Reversible	Partly Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Complete Loss of Resources	Complete Loss of Resources
Can impact be mitigated?	Yes	
Mitigation:	Low	

Nature: Increase in Road Maintenance		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Local / District	Local / District
Duration	Medium Term	Short Term

Magnitude / Severity	Medium	Medium
Probability	Probable	Probable
Significance	**Low**	**Low**
Status	Negative	Negative
Reversibility	Partly Reversible	Partly Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Marginal Loss	Marginal Loss
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

Nature: Additional Abnormal Loads		
	Without Mitigation	**With Mitigation**
Extent / Spatial Scope	Province / Region	Province / Region
Duration	Short Term	Short Term
Magnitude / Severity	Low	Low
Probability	Possible	Possible
Significance	**Low**	**Low**
Status	Negative	Negative
Reversibility	Completely Reversible	Completely Reversible
Irreplaceable loss of resources / Sensitivity of receiving environment	Marginal Loss	Marginal Loss
Can impact be mitigated?	Yes	
Mitigation:	Mitigation measures outlined in section 8	

6.9.4 Concluding Statement - Traffic

The most significant traffic impact is associated with the increase of traffic during the construction phase of the development. This increase in construction traffic will generally create additional impacts associated with generation of dust and additional maintenance requirements on existing roads. All such impacts can be mitigated to a low and medium significance with the implementation of the various mitigation and management measures outlined in the EMPr. Notwithstanding these impacts, the applicant will need to get approval from the Department of Transport and Public Works for the continued use of the existing farm access points and will also be required to comply with all conditions of abnormal load permits.

6.10 Battery Energy Storage Risk Assessment.

The BESS Specialist ISHcon prepared a risk assessment for the Three main Battery Technologies that are being proposed as part of this assessment.

Please note that the BESS risk assessment does not follow the assessment methodology outlined in section 6.1 of this report but focusses potential risks. The table below outlines the receptor of the risk as well as the Raw and Residual risk to that receptor. Please refer to the detailed BESS Risk Assessment appended to this Draft Environmental Impact Report.

Table 37: Summary of BESS Risk Assessment for Solid State Battery Technologies (ISHcon, 2024).

Impact / Receptor	Project Phase	Raw Risk	Residual Risk

Impact / Receptor	Project Phase	Raw Risk	Residual Risk
Human Health - chronic exposure to toxic chemical or biological agents	Construction	Moderate	Low
Human Health - exposure to noise	Construction	Moderate	Low
Human Health - exposure to temperature extremes and/or humidity	Construction	Low	Very Low
Human Health - exposure to psychological stress	Construction	Low	Low
Human Health - exposure to ergonomic stress	Construction	Low	Low
Human and Equipment Safety - exposure to fire radiation	Construction	Moderate	Low
Human and Equipment Safety - exposure to fire radiation	Construction	Moderate	Low
Human and Equipment Safety - exposure to explosion over pressures	Construction	Moderate	Low
Human and Equipment Safety - exposure to acute toxic chemical and biological agents	Construction	Moderate	Low
Human and Equipment Safety - exposure to acute toxic chemical and biological agents	Construction	Moderate	Low
Human and Equipment Safety - exposure to violent release of kinetic or potential energy	Construction	High	Low
Human and Equipment Safety - exposure to electromagnetic waves	Construction	Moderate	Low
Environment - emissions to air	Construction	Low	Very Low
Environment - emissions to water	Construction	Low	Low
Environment - emissions to earth	Construction	Low	Low
Environment - waste of resources e.g., water, power etc	Construction	Low	Very Low
Public - Aesthetics	Construction	Low	Low
Investors - Financial	Construction	Low	Low
Employees and investors - Security	Construction	Moderate	Low
Emergencies	Construction	Moderate	Low
Investors - Legal	Construction	Moderate	Low

Impact / Receptor	Project Phase	Raw Risk	Residual Risk
Human Health - chronic exposure to toxic chemical or biological agents	Operations	Moderate	Low
Human Health - chronic exposure to toxic chemical or biological agents	Operations	Moderate	Low
Human Health - exposure to noise	Operations	Moderate	Low
Human Health - exposure to temperature extremes and/or humidity	Operations	Low	Very Low
Human Health - exposure to ergonomic stress	Operations	Moderate	Low
Human Health - exposure to psychological stress	Operations	Low	Very Low
Human and Equipment Safety - exposure to fire radiation	Operations	High	Low
Human and Equipment Safety - exposure to explosion over pressures	Operations	Moderate	Low
Human and Equipment Safety - exposure to fire radiation	Operations	High	Low
Human and Equipment Safety - exposure to acute toxic chemical and biological agents	Operations	Low	Low
Human and Equipment Safety - exposure to acute toxic chemical and biological agents	Operations	Moderate	Low
Human and Equipment Safety - exposure to violent release of kinetic or potential energy	Operations	Moderate	Low
Human and Equipment Safety - exposure to electromagnetic waves	Operations	Moderate	Low
Environment - emissions to air	Operations	Low	Very Low
Environment - emissions to water	Operations	Low	Very Low
Environment - emissions to earth	Operations	Low	Very Low
Environment - waste of resources e.g., water, power etc	Operations	Low	Very Low
Public - Aesthetics	Operations	Low	Low
Investors - Financial	Operations	Moderate	Low
Employees and investors - Security	Operations	Moderate	Low

Impact / Receptor	Project Phase	Raw Risk	Residual Risk
Employees and investors - Security	Operations	Moderate	Low
Emergencies	Operations	Moderate	Low
Investors - Legal	Operations	Moderate	Low

The above Risk Assessment shows that, provided the preventative and mitigative measures are incorporated, the construction and operational phase of the project does not present any high risks nor any fatal flaws for solid state BESS.

Table 38: Summary of BESS Risk Assessment for Redox Flow Technologies (ISHcon, 2024).

Impact / Receptor	Project Phase	Raw Risk	Residual Risk
Human Health - chronic exposure to toxic chemical or biological agents	Construction	Moderate	Low
Human Health - exposure to noise	Construction	Moderate	Low
Human Health - exposure to temperature extremes and/or humidity	Construction	Low	Very Low
Human Health - exposure to psychological stress	Construction	Low	Low
Human Health - exposure to ergonomic stress	Construction	Low	Low
Human and Equipment Safety - exposure to fire radiation	Construction	Low	Low
Human and Equipment Safety - exposure to explosion over pressures	Construction	None	None
Human and Equipment Safety - exposure to acute toxic chemical and biological agents	Construction	Moderate	Low
Human and Equipment Safety - exposure to violent release of kinetic or potential energy	Construction	High	Low
Human and Equipment Safety - exposure to electromagnetic waves	Construction	Moderate	Low
Environment - emissions to air	Construction	Low	Very Low
Environment - emissions to water	Construction	Low	Low
Environment - emissions to earth	Construction	Low	Low
Environment - waste of resources e.g., water, power etc	Construction	Moderate	Low
Public - Aesthetics	Construction	Moderate	Low
Investors - Financial	Construction	Moderate	Low

Impact / Receptor	Project Phase	Raw Risk	Residual Risk
Employees and investors - Security	Construction	Moderate	Low
Emergencies	Construction	Moderate	Low
Investors - Legal	Construction	Moderate	Low
Human Health - chronic exposure to toxic chemical or biological agents	Operation	Moderate	Low
Human Health - chronic exposure to toxic chemical or biological agents	Operation	Moderate	Low
Human Health - exposure to temperature extremes and/or humidity	Operation	Low	Low
Human Health - exposure to noise	Operation	Moderate	Low
Human Health - exposure to psychological stress	Operation	Low	Very Low
Human Health - exposure to ergonomic stress	Operation	Moderate	Low
Human and Equipment Safety - exposure to fire radiation	Operation	Moderate	Low
Human and Equipment Safety - exposure to fire radiation	Operation	Moderate	Low
Human and Equipment Safety - exposure to explosion over pressures	Operation	Moderate	Low
Human and Equipment Safety - exposure to acute toxic chemical and biological agents	Operation	Low	Low
Human and Equipment Safety - exposure to acute toxic chemical and biological agents	Operation	Moderate	Low
Human and Equipment Safety - exposure to violent release of kinetic or potential energy	Operation	Moderate	Low
Human and Equipment Safety - exposure to electromagnetic waves	Operation	Moderate	Low
Environment - emissions to air	Operation	Low	Very Low
Environment - emissions to water	Operation	Low	Low
Environment - emissions to earth	Operation	Moderate	Low
Environment - waste of resources e.g., water, power etc	Operation	Low	Very Low

Impact / Receptor	Project Phase	Raw Risk	Residual Risk
Public - Aesthetics	Operation	Moderate	Low
Investors - Financial	Operation	Moderate	Low
Employees and investors - Security	Operation	Moderate	Low
Employees and investors - Security	Operation	Moderate	Low
Emergencies	Operation	Moderate	Low
Investors - Legal	Operation	Moderate	Low

According to the specialist, from the details of accidents that have happened both with BESS installations and chemical plants in general, it is clear that many potential problems manifest during the commissioning phase when units are first powered up to test functionality. This phase is critical and all controls, procedures, mitigation measures etc that would be in place for full operation should be in place before commissioning commences.

The above Risk Assessment shows that, provided the preventative and mitigative measures are incorporated, the construction and operational phase of the project does not present any high risks nor any fatal flaws for Redox Flow Technologies.

Table 39: Summary of BESS Risk Assessment for Molten Metal BESS Technologies (ISHcon, 2024).

Impact / Receptor	Project Phase	Raw Risk	Residual Risk
Human Health - chronic exposure to toxic chemical or biological agents	Construction	Moderate	Low
Human Health - exposure to noise	Construction	Moderate	Low
Human Health - exposure to temperature extremes and/or humidity	Construction	Low	Very Low
Human Health - exposure to psychological stress	Construction	Low	Very Low
Human Health - exposure to ergonomic stress	Construction	Low	Low
Human and Equipment Safety - exposure to fire radiation	Construction	Moderate	Low
Human and Equipment Safety - exposure to explosion over pressures	Construction	Moderate	Low
Human and Equipment Safety - exposure to acute toxic chemical and biological agents	Construction	Moderate	Low
Human and Equipment Safety - exposure to violent release of kinetic or potential energy	Construction	High	Low
Human and Equipment Safety - exposure to electromagnetic waves	Construction	Moderate	Low
Environment - emissions to air	Construction	Low	Very Low

Impact / Receptor	Project Phase	Raw Risk	Residual Risk
Environment - emissions to water	Construction	Low	Low
Environment - emissions to earth	Construction	Low	Low
Environment - waste of resources e.g. water, power etc	Construction	Low	Very Low
Public - Aesthetics	Construction	Moderate	Low
Investors - Financial	Construction	Moderate	Low
Employees and investors - Security	Construction	Moderate	Low
Emergencies	Construction	Moderate	Low
Investors - Legal	Construction	Moderate	Low
Human Health - chronic exposure to toxic chemical or biological agents	Operations	Moderate	Low
Human Health - chronic exposure to toxic chemical or biological agents	Operations	Moderate	Low
Human Health - exposure to noise	Operations	Moderate	Low
Human Health - exposure to temperature extremes and/or humidity	Operations	Low	Very Low
Human and Equipment Safety - exposure to fire radiation	Operations	Moderate	Low
Human and Equipment Safety - exposure to fire radiation	Operations	Moderate	Low
Human and Equipment Safety - exposure to explosion over pressures	Operations	Moderate	Low
Human and Equipment Safety - exposure to acute toxic chemical and biological agents	Operations	Moderate	Low
Human and Equipment Safety - exposure to acute toxic chemical and biological agents	Operations	Moderate	Low
Human and Equipment Safety - exposure to violent release of kinetic or potential energy	Operations	Moderate	Low
Human and Equipment Safety - exposure to electromagnetic waves	Operations	Moderate	Low
Environment - emissions to air	Operations	Low	Very Low
Environment - emissions to	Operations	Low	Low

Impact / Receptor	Project Phase	Raw Risk	Residual Risk
water			
Environment - emissions to earth	Operations	Low	Low
Environment - waste of resources e.g. water, power etc	Operations	Low	Very Low
Public - Aesthetics	Operations	Moderate	Low
Investors - Financial	Operations	Moderate	Low
Employees and investors - Security	Operations	Moderate	Low
Employees and investors - Security	Operations	Moderate	Low
Emergencies	Operations	Moderate	Low
Investors - Legal	Operations	Moderate	Low

According to the specialist. from the details of accidents that have happened both with BESS installations and chemical plants in general, it is clear that many potential problems manifest during the commissioning phase when units are first powered up to test functionality. This phase is critical and all controls, procedures, mitigation measures etc that would be in place for full operation should be in place before commissioning commences.

The above Risk Assessment shows that, provided the preventative and mitigative measures are incorporated, the construction and operational phase of the project does not present any high risks nor any fatal flaws for Molten Metal Technologies.

6.10.1 BESS Risk Assessment Conclusion and Recommendations.

The Specialist (Appendix E8) concluded the following with regards to the potential risk of the BESS technologies under investigation in this Environmental Process

The study proceeded based on the assumption that redox flow batteries (typically vanadium) could be installed within a building and solid-state batteries (typically lithium) and liquid metal batteries would be installed in containers. Flow batteries can also be installed in containers, but the building option has been chosen in order to highlight possible major differences between technologies.

This Risk Assessment has found that with suitable preventative and mitigative measures in place, none of the identified potential risks are excessively high, i.e., from a Safety, Health and Environment (SHE) perspective no fatal flaws were found with either type of technology (solid state - lithium-ion, redox flow – vanadium, or molten liquid metal - Ambri) for the BESS installations at the proposed Kareekloof Energy PVs near de Aar in the Northern Cape.

At a large facility, without installation of the state-of-the art battery technology that includes protective features, there can be significant risks to employees and first responders. The latest battery designs include many preventatives and mitigative measures to reduce these risks to tolerable levels. State-of-the-art technology should be used, i.e., not old technology, such as liquid phase lithium-ion batteries, which may have been prone to fire and explosion risks.

The design should be subject to a full Hazard and Operability Study (HAZOP) prior to commencement of procurement. A HAZOP is a detailed technical systematic study that looks at the intricacies of the

design, the control system, the emergency system etc. and how these may fail under abnormal operating conditions. Additional safeguards may be suggested by the team doing the study.

From a short-term health and safety point of view and ignoring the fact that this project may in the long run help to mitigate possible adverse impacts of climate change, the No-Go option will always be a preferred option since there are no immediate health and safety risks associated with not doing a project.

6.10.2 Lithium solid state containerized batteries

- With lithium solid-state batteries, the most significant hazard with battery units is the possibility of thermal runaway and the generation of toxic and flammable gases. There have been numerous such incidents around the world with lithium-ion batteries at all scales and modern technology providers include many preventatives and mitigative features in their designs, e.g. solid-state electrolytes being one of these improvements. This type of event also generates heat which may possibly propagate the thermal runaway event to neighbouring batteries if suitable state of the art technology is not employed.
- The flammable gases generated may ignite leading to a fire which accelerates the runaway process and may spread the fire to other parts of the BESS or other equipment located near-by.
- If the flammable gases accumulate within the container before they ignite, they may eventually ignite with explosive force. This type of event is unusual with solid state batteries but has happened with an older technology container installed at McMicken in the USA in 2019.
- Due to a variety of causes, thermal runaway could happen at any point during transport to the facility, during construction or operation / maintenance at the facility or during decommissioning and safe making for disposal.
- Due to the containerized approach as well as the usual good practice of separation between containers, which should be applied on this project, and therefore the likely restriction of events to one container at a time, the main risks are close to the containers i.e., to transport drivers, employees at the facilities and first responders to incidents.
- In terms of a worst conceivable case container fires, the significant impact zone is likely to be limited to within 10m of the container and mild impacts to 20m. Based on the current proposed layouts, impacts at the closest isolated farmhouses or other independent facilities are not expected.
- In terms of a worst conceivable case explosion, the significant impact zone is likely to be limited to with 10m of the container and minor impacts such as debris within 50m. Based on the current proposed layouts, impacts at the closest isolated farmhouses or other independent facilities are not expected.
- In terms of a worst reasonably conceivable toxic smoke scenario, provided the units are placed suitably far apart to prevent propagation from one unit to another and large external fires are prevented, the amount of material burning should be limited to one container at any one time. In this case, beyond the immediate vicinity of the fire, the concentrations of harmful gases within the smoke should be low.
- For the Kareekloof Energy PV, the BESS location is over 100m from busy public roads and 500m from any occupied farmhouse and in this context the location is therefore considered suitable in terms of toxic gas risks. This does not mean that as a precaution persons, particularly employees on site, should not be advised to shelter-in-place if there is a fire with toxic smoke, it only means that severe impacts are highly unlikely and the risks is sufficiently low.

6.10.3 Vanadium redox flow battery installations

- The most significant hazard with VRF battery units is the possibility of spills of corrosive and environmentally toxic electrolyte. Many preventative and mitigative features will be included in

the design and operation, e.g., full secondary containment, level control/monitoring on bulk tanks, leak detection on equipment etc.
- For the Kareekloof Energy PV, the BESS locations should be over 100m from any water source / course and is therefore considered suitable in terms of spill management.
- VRF batteries do not present significant fire and electrical arcing hazards provided they are correctly designed, operated, maintained and managed. Suitable Battery Management System (BMS), safety procedures, operating instructions, maintenance procedures, trips, alarms and interlocks should be in place.

6.10.4 Liquid metal battery installations

- The most significant hazard with liquid metal battery units is the possibility of injury to personnel mishandling hot items. Suitable on-site procedures and PPE for operations and maintenance need to be in place.
- Fires in the event of battery leaks are not impossible, but these should be limited to the combustible materials in a container, e.g. cable coatings etc. and is not likely to be the result of thermal runaway of the battery. The fire is not inherently electrical and normal fire suppression could be used. Note water on hot surfaces would not be advised.
- For the Kareekloof Energy PV, the BESS location is suitable for molten metal batteries.

6.10.5 Technology and location of BESS facilities

- From a safety and health point of view, the above Risk Assessment shows that risks posed by VRFB systems may be slightly lower than those of SSL facilities, particularly with respect to fire and explosion risks. From an environmental spill and pollution point of view the VRFB systems present higher short-term risks than the SSL systems. Liquid metal batteries present lower risks than both the SSL and VRF battery systems as both the risks of fire and spills are significantly lower. However, the above conclusions may be due to the fact that the VRFB and Liquid Metal technology is not as mature as SSL technology and there is not as much operating experience and accident information available. Overall, from a SHE RA points of view, there is no specific preference for a type of technology.
- From a SHE risk assessment point of view, where there is a choice of location that is further from public roads, water courses, isolated farmhouses or other occupied facilities, this would be preferred. VRFB hazards are mostly related to possible loss of containment of electrolyte, SSL batteries to fires producing toxic smoke and fire fighting which may result in contaminated of firewater runoff and liquid metal hazards are mostly limited to onsite operational issues. The current chosen locations are suitably far from the above with a very low risk of any significant impacts.

6.11 CUMULATIVE IMPACTS

This section is summarised from the cumulative impact assessments that took place by each of the participating specialists. For further details in this regard, the reader is referred to the specialist assessments contained in **Appendix E1 – E8**.

The specialists assessed cumulative impacts based on a dataset provided with all similar projects within a 30km radius. This dataset made use of the projects listed in the Departments latest REEA dataset as well as others identified by the Applicant and the EAP.

The 2014 EIA Regulations (as amended) (GNR 326) define a cumulative impact as follows:

"Cumulative impact in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities."

There are a number of other renewable energy facilities in the vicinity of the proposed Kareekloof Energy PV and BESS as shown in the Figure below.

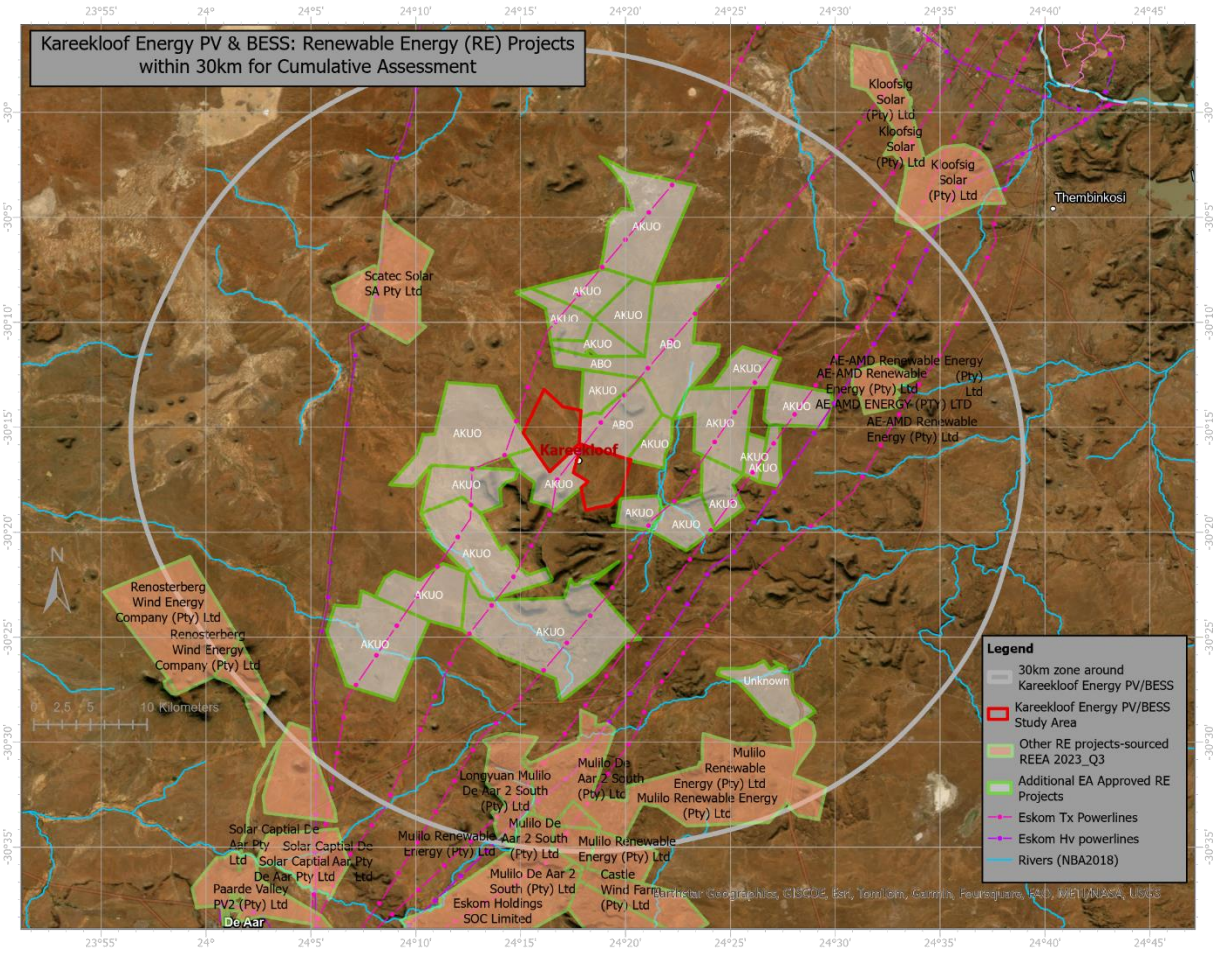


Figure 56: Renewable Energy Facilities within proximity of the proposed Kareekloof Energy PV and BESS.

According the DFFE Database of renewable energy facilities as well as additional projects known to Cape EAPrac and the applicant, there are 10 other renewable energy projects (with an unknown number of phases or sub projects) within 30km of Kareekloof PV. This can be attributed to the large number of HV and TX powerlines as well as the proposed location of the Krypton MTS.

In terms of possible cumulative impacts, one needs to look at the presence of similar facilities on the farm portions as well as the greater landscape, namely:

- Cumulative impacts due to the cumulative effects of Kareekloof Solar added to all other renewable energy facilities in the De Aar area have been assessed. These impacts however need to be managed through strategic spatial planning documents such as an SEA and SDF and not through individual EIA processes.
- Cumulative impacts due to the cumulative effects of the 18 PV areas proposed as part of the Kareekloof Solar PV project to be co-located on one site.
- Cumulative impact of the Kareekloof Solar PV along with its Electrical Grid Connection Infrastructure[41].

[41] Due to the very short connection, the cumulative impact of the EGI with the PV facility is deemed to be low.

Cape EAPrac does not have details on the exact configuration of these facilities, however, based on the conservative assumption that approximately 1.3ha is required per megawatt of energy generated, one can assume the following transformation of the vegetation types associated with the greater area[42].

Table 40: Potential cumulative habitat transformation associated with renewable energy within 30km of Kareekloof Solar.

Status	Transformation Area in Hectares
In operation	0
Under construction	0
Authorised	1700
EIA in Progress (including Kareekloof Solar)	4330

It is impossible to foresee how many of these projects will reach preferred bidder status in terms of the REIPPPP or other pro and will eventually be constructed. Due current and future Transmission capacity associated with the new MTS, it is highly unlikely that all these projects will be constructed. As a worst-case scenario one can assume a total transformation of 6030ha habitat.

Potential cumulative impacts identified for the project include various negative impacts such as loss of habitat, visual massing, loss of agricultural land, an influx of jobseekers and change in the area's sense of place, but also include positive cumulative impacts on the economy, business development, and employment.

Furthermore, the BESS specialist confirmed that unless another BESS is installed within 500m of the BESS locations, cumulative impacts of other developments in the greater area do not affect the safety and health of employees, contractors of members of the public within the BESS impact zone. The same can be said of the BESS electrical infrastructure and grid connection. These projects do not plan additional BESS within 500m and future projects in the area should not install new BESS within 500m of any existing BESS. Therefore, from a safety and health point of view, there are no significant cumulative impacts from any other BESS installation in the greater area.

The table below provides a summary of the significance and status of cumulative impacts associated with the Kareekloof Solar PV in conjunction with all other proposed facilities within 30km.

Table 41: Assessment of Cumulative Impacts Associated with the Proposed Kareekloof Solar PV and BESS.

Nature of Cumulative Impact	Description	Significance[43]	Status
Terrestrial Biodiversity Impacts.			
Loss of indigenous vegetation and species of conservation concern	The loss of indigenous vegetation and SCC will be compounded by the EGI as well as other projects occurring within the area.	Low	Negative
Increased reduction in faunal habitat and increase disturbance of faunal species	The impacts associated with this development will be compounded by other projects in the area.	Low	Negative
Avifaunal Impacts			
Displacement of avifauna during construction.	Displacement due to disturbance associated with the construction of the Kareekloof PV SEF and other	Low	Negative

[42] Where generation capacity is not known, it has been assumed as 100 Megawatts.

[43] The Significance reflected in this table depicts the post mitigation significance of the cumulative impact.

Nature of Cumulative Impact	Description	Significance[43]	Status
	projects including the EGI		
Displacement of avifauna during operations	Displacement of avifauna due to habitat transformation associated with the presence of Kareekloof PV SEF and other projects including the EGI	Medium	Negative
Mortality due to collisions	Mortality due to collisions with the solar panels will be a feature of all other proposed SEF projects within a 30km radius	Low	Negative
Mortality due to entanglement in perimeter fences	Mortality due to entanglement in perimeter fences associated with the SEF Projects will be a feature of all other proposed renewable energy projects within a 30km radius.	Low	Negative
Displacement due to disturbance associated with the decommissioning activities	Displacement due to disturbance associated with the decommissioning activities will be a feature of all other proposed renewable energy projects.	Low	Negative
Agricultural Impacts			
Loss of Agricultural Land	The potential cumulative agricultural impact of importance is a regional loss (including by degradation) of future agricultural production potential.	Low	Medium
Heritage Impacts			
Impact on Archaeological Resources		Low	Negative
Impacts on Graves		Low	Negative
Visual Impacts			
Short-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape.	Due to topographic screening from low hills and undulating terrain, the risk from intervisibility and cumulative negative effects from RE massing are limited and unlikely to take place.	Low	Negative
Long Term landscape change from the current rural agricultural sense of place to the semi-industrial RE landscape.	Due to topographic screening from low hills and undulating terrain, the risk from intervisibility and cumulative negative effects from RE massing are limited and unlikely to take place.	Low	Negative
Social Impacts			
Cumulative impacts on sense of place and the landscape	Visual impacts associated with the establishment of associated grid infrastructure and the potential impact on the area's rural sense of place and character of the landscape	Medium	Negative
Cumulative impacts on local services	The establishment of a number of renewable energy facilities and associated projects, such as the proposed Solar PV Facility, in the Municipality has the potential to place pressure on local services, specifically medical, education and accommodation.	Medium	Negative
Cumulative impacts on local economy.	The establishment of renewable energy facilities and associated projects, in the Municipality will create employment, skills development and training opportunities, creation of downstream business	High	Positive

Nature of Cumulative Impact	Description	Significance[43]	Status
	opportunities		

As can be seen in the table above, the cumulative impacts range from Medium negative to High positive and no High and very High cumulative impacts are expected. This is considered to be acceptable on a regional scale. Due to the limited capacity Grid Capacity and the highly competitive bid process, it is a reasonable assumption that not all the projects in the area will be developed.

6.12 IMPACT SUMMARY

The table below summarises the status and significance of all impacts (with and without mitigation) as assessed in the sections above.

Table 46: Impact Summary of the proposed Kareekloof Energy PV & BESS and associated infrastructure.

Terrestrial Biodiversity Construction Phase		
Nature: Direct Loss of Habitat		
	Without Mitigation	**With Mitigation**
Significance	**High**	**Medium**
Status	Negative	Negative
Nature: Establishment and Spread of Alien and Invasive Species		
	Without Mitigation	**With Mitigation**
Significance	**Moderate**	**Low**
Status	Negative	Negative
Nature: Erosion and Soil Compaction		
	Without Mitigation	**With Mitigation**
Significance	**High**	**Medium**
Status	Negative	Negative
Nature: Ecotoxicity associated with Chemical use.		
	Without Mitigation	**With Mitigation**
Significance	**High**	**Low**
Status	Negative	Negative
Terrestrial Biodiversity Operational Phase		
Nature: Loss of Habitat associated with the shading from PV panels and the Maintenance of vegetation.		
	Without Mitigation	**With Mitigation**
Significance	**High**	**Medium**
Status	Negative	Negative
Nature: Establishment and Spread of Alien and Invasive Species		
	Without Mitigation	**With Mitigation**
Significance	**Moderate**	**Low**
Status	Negative	Negative
Nature: Erosion and Soil Compaction		
	Without Mitigation	**With Mitigation**

Significance	**High**	**Medium**
Status	Negative	Negative
Nature: Ecotoxicity associated with Chemical use.		
	Without Mitigation	**With Mitigation**
Significance	**High**	**Low**
Status	Negative	Negative
Avifaunal Construction		
Nature: Direct Loss of Avifaunal Habitat		
	Without Mitigation	**With Mitigation**
Significance	**Medium**	**Low**
Status	Negative	Negative
Nature: Sensory Disturbance		
	Without Mitigation	**With Mitigation**
Significance	**Low**	**Low**
Status	Negative	Negative
Avifaunal Operation		
Nature: Direct Mortality through collision and electrocution		
	Without Mitigation	**With Mitigation**
Significance	**Medium**	**Low**
Status	Negative	Negative
Nature: Attraction of Commensal species to the facility.		
	Without Mitigation	**With Mitigation**
Significance	**Medium**	**Low**
Status	Negative	Negative
Nature: Ecotoxicity associated with chemical use.		
	Without Mitigation	**With Mitigation**
Significance	**Low**	**Low**
Status	Negative	Negative
Avifaunal Decomissioning		
Nature: Direct Loss of Avifaunal Habitat		
	Without Mitigation	**With Mitigation**
Significance	**Medium**	**Low**
Status	Negative	Negative
Nature: Sensory Disturbance		
	Without Mitigation	**With Mitigation**
Significance	**Low**	**Low**
Status	Negative	Negative
Heritage Construction		
Nature: Construction Phase Heritage Impacts associated with the damage to or destruction of archaeological sites.		

	Without Mitigation	With Mitigation
Significance	**Medium**	**Low**
Status	Negative	Negative
Nature: Construction Phase Impacts to graves associated with damage to or destruction of graves.		
	Without Mitigation	**With Mitigation**
Significance	**Low**	**Low**
Status	Negative	Negative
Visual Construction		
Nature: Short-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape		
	Without Mitigation	**With Mitigation**
Significance	**Medium - High**	**Medium**
Status	Negative	Negative
Visual Operation		
Nature: Short-term landscape change from the current rural agricultural sense of place to the semi-industrial Renewable Energy landscape (Loss of site landscape character due to the operation of the PV structures and associated infrastructure).		
	Without Mitigation	**With Mitigation**
Significance	**Medium**	**Medium - Low**
Status	Negative	Negative
Visual Decomissioning		
Nature: Short-term landscape change from the removal of the PV structures, followed by rehabilitation of the impacted areas back to agricultural lands.		
	Without Mitigation	**With Mitigation**
Significance	**Low**	**Low**
Status	Negative	Negative
Construction Phase Social Impacts		
Nature: Creation of employment and business opportunities during the construction phase		
	Without Mitigation	**With Enhancement**
Significance	**Medium Positive**	**Medium Positive**
Nature: Potential impacts on family structures and social networks associated with the presence of construction workers		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Nature: Potential impacts on family structures, social networks and community services associated with the influx of job seekers		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**
Nature: Potential risk to safety of scholars, farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**

Operational Phase Social Impacts		
Nature: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Nature: Potential noise, dust and safety impacts associated with construction related activities		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Nature: The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the project etc. will damage farmlands and result in a loss of farmlands for grazing.		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Nature: Development of infrastructure to improve energy security and support renewable sector		
	Without Mitigation	**With Mitigation**
Significance	**High Positive**	**High Positive**
Nature: Creation of employment and business opportunities associated with the operational phase		
	Without Mitigation	**With Enhancement**
Significance	**Low Positive**	**Medium Positive**
Nature: The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed etc.		
	Without Mitigation	**With Enhancement**
Significance	**Low Positive**	**Medium Positive**
Nature: Benefits associated with support for local community's form SED contributions		
	Without Mitigation	**With Enhancement**[44]
Significance	**Medium Positive**	**High Positive**
Nature: Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**
Nature: Potential impact of the Facility on local tourism		
	Without Mitigation	**With Enhancement / Mitigation**
Significance	**Low Negative**	**Low Negative**
Construction Phase Traffic Impacts		
Nature: Increase in Traffic		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Medium Negative**

[44] Enhancement assumes effective management of the community trust.

Nature: Increase of Incidents with pedestrians and livestock		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Nature: Increase in Dust from gravel roads		
	Without Mitigation	**With Mitigation**
Significance	**High Negative**	**Medium Negative**
Nature: Increase in Road Maintenance		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Medium Negative**
Nature: Additional Abnormal Loads		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Operational Phase Traffic Impacts		
Nature: Increase in Traffic		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**
Nature: Increase of Incidents with pedestrians and livestock		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**
Nature: Increase in Dust from gravel roads		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**
Nature: Increase in Road Maintenance		
Significance	**Low Negative**	**Low Negative**
Nature: Additional Abnormal Loads		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**
Closure and Decomissioning Traffic Impacts		
Nature: Increase in Traffic		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Nature: Increase of Incidents with pedestrians and livestock		
	Without Mitigation	**With Mitigation**
Significance	**Medium Negative**	**Low Negative**
Nature: Increase in Dust from gravel roads		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**
Nature: Increase in Road Maintenance		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**

Nature: Additional Abnormal Loads		
	Without Mitigation	**With Mitigation**
Significance	**Low Negative**	**Low Negative**

6.13 IMPACT STATEMENT

As can be seen in the table above, all impacts associated with the proposed Kareekloof Energy PV and BESS range from high – positive to Medium – Negative. All High and very high negative Impacts have been avoided by the avoidance of sensitive features or mitigated to acceptable levels.

None of the participating specialists identified any impacts that remain high or very high after mitigation. The mitigated preferred layout (Layout Alternative 3) avoids the main sensitive features including visual setbacks, aquatic features and rocky outcrops.

The Terrestrial Biodiversity specialist concluded that there are no fatal flaws are evident for the proposed project and that the average post-mitigation impact significance for the project is moderately low.

The Avifaunal Specialist concluded that no fatal flaws were identified during the avifaunal assessment, but recommended monitoring protocols (post construction monitoring) be implemented during the lifecycle of the project.

The visual specialist has concluded that the proposed development can commence subject to the implementation of mitigation measures.

The Social specialist concluded that the proposed PV Facility and associated infrastructure will result in several social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phase. The project will also contribute to local economic development though socio-economic development (SED) contributions. In addition, the development will improve energy security and reduce the carbon footprint associated with energy generation.

As such there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. Based on the layout provided for the assessment, Kareekloof Energy PV and BESS can be supported from a terrestrial biodiversity, aquatic biodiversity, avifaunal, visual, social, heritage, agricultural and traffic point of view.

A map showing the proposed activity in relation to the key sensitive features is in attached in Appendix D. All sensitive features along with their appropriate buffers are shown in this plan. As required by the EMPr, all areas outside of the proposed development footprint are to be demarcated as no go areas.

It is Cape EAPrac's reasoned opinion that the mitigated preferred Alternative (Layout Alternative 3) can be approval by the competent Authority subject to the outcome of the public participation process and on condition that all the suggested mitigation measures are implemented, all other legislative approvals be obtained, and that the final EMPr be strictly adhered to.

7. MANAGEMENT AND MITIGATION OF IMPACTS

Please refer to the table below, which summarises the mitigation measures recommended by both the Specialists and Cape EAPrac. This table summarises the mitigations, and details whether they should be included as conditions of approval, or whether they have been included as actions in the EMPr. The mitigations reflected in this table must be read in conjunction with the EMPr attached in Appendix H, where the Environmental Impact Management Outcomes and responsible parties for the

implementation of these mitigations are provided in more detail (in compliance with appendix 4 of the 2014 EIA regulations).

The table furthermore reflects to which stage of the development the proposed mitigation measures are applicable. In instances where suggested mitigations have already been incorporated into the design phase, they have been reflected as such[45].

Table 42: Recommended mitigation measures required for the construction, operation and decommissioning of the proposed Kareekloof Energy PV and BESS development.

Mitigation Measures and Environmental Impact Management Actions	Condition of Approval	Included in EMPr	Construction[46] Phase	Operational Phase	Decommissioning Phase
Terrestrial Biodiversity					
Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. Brush cutting of vegetation beneath the panels should be, implemented, otherwise controlled grazing by small livestock like sheep. No topsoil stripping or complete vegetation removal beneath the panels. No imported material to be placed under the modules		✓	✓	✓	
Where possible, existing access routes and walking paths must be made use of.		✓	✓	✓	
All laydown, chemical toilets etc. should be restricted to medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded. No storage of vehicles or equipment will be allowed outside of the designated project areas.		✓	✓	✓	
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species.		✓		✓	
Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion.		✓		✓	✓
A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment		✓	✓	✓	✓

[45] There are overlapping mitigations suggested between different specialists. In such instances, they have been reflected for each specialist discipline.

[46] In this instance, the construction phase includes mitigation measures associated with pre-construction and planning.

Mitigation Measures and Environmental Impact Management Actions	Condition of Approval	Included in EMPr	Construction[46] Phase	Operational Phase	Decommissioning Phase
A carefully considered surface water/drainage management plan must be developed for the site including attention to the use of environmentally friendly cleaning chemicals for cleaning of panels during the operational phase. No mass herbicide application to be applied beneath modules during operation.		✓	✓	✓	✓
It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants		✓	✓	✓	✓
A fire management plan needs to be complied and implemented to restrict the impact fire might have on the surrounding areas.		✓	✓	✓	✓
Rocks removed in the construction phased may not be dumped, but can be used in areas where erosion control needs to be performed		✓		✓	
Any individual of the nationally protected trees or protected plants that was observed needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. Preferably, the trees/plants should be avoided. Hi visibility flags must be placed near any protected plants in order to avoid any damage or destruction of the species. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program		✓	✓	✓	✓
The Solar panel surfaces may not have reflective surfaces which can lead to veld fires		✓		✓	
The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments, signs must be put up to enforce this.		✓	✓	✓	
Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals		✓	✓	✓	
No trapping, killing, or poisoning of any wildlife is to be allowed. Signs must be put up to enforce this;		✓	✓	✓	✓
Try incorporating motion detection lights as much as possible to reduce the duration of illumination. Heights of light columns to be minimised to reduce light spill. Baffles, hoods, or louvres to also be used to reduce light spill		✓	✓		
Facility lighting during construction & operation should be kept to a minimum and should make use of latest technology to ensure that light disturbance is minimised. This will also reduce the attraction of insects (and in turn insectivorous bats) to the facility. Lighting to be limited to O&M complex and substation. No Perimeter security lighting to be allowed (if perimeter security is a concern, security cameras rather than lighting.)		✓	✓	✓	
Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible.		✓	✓	✓	
All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.		✓	✓	✓	✓
Schedule activities and operations during least sensitive periods, to avoid migration, nesting, and breeding seasons.		✓	✓	✓	✓
Heat generated from the substations must be monitored to ensure it does not		✓	✓	✓	✓

Mitigation Measures and Environmental Impact Management Actions	Condition of Approval	Included in EMPr	Construction[46] Phase	Operational Phase	Decommissioning Phase
negatively affect the local fauna					
All areas to be developed must be walked through prior to any activity to ensure no nests or fauna species are found in the area. Should any Species of Conservation Concern not move out of the area, or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.	✓	✓	✓		
Any holes/deep excavations must be dug and planted in a progressive manner; Should the holes overnight they must be covered temporarily to ensure no small fauna species fall in and subsequently inspected prior to backfilling		✓	✓		
Wildlife-permeable fencing with holes large enough for mongoose and other smaller mammals should be installed, the holes must not be placed in the fence where it is next to a major road as this will increase road killings in the area		✓	✓		
Use environmentally friendly cleaning and dust suppressant products		✓	✓		
Fencing mitigations: - Top 2 strands must be smooth wire. - Routinely retention loose wires - Minimum 30cm between wires - Place markers on fences		✓	✓		
Once the development layout has been confirmed, the open areas must be fenced off appropriately pre-construction in order to allow animals to move or be moved into these areas before breaking ground activities occur. Construction activities must take place systemically. The perimeter fence should not be completed -i.e. leaving sections unfenced to allow fauna to escape. Drilling etc should start one side of the site and progress towards the section of the site where fences are incomplete.		✓	✓		
The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprint of the roads must be kept to prescribed widths		✓	✓	✓	
An alien management plan must be implemented quarterly for 2 years after initial clearing phase.		✓	✓		✓
Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces. No non environmentally friendly suppressants may be used as this could result in pollution of water sources		✓	✓		✓
Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site. Refuse bins will be emptied and secured; Temporary storage of domestic waste shall be in covered waste skips; and Maximum domestic waste storage period will be 10 days.		✓	✓		
Toilets at the recommended Health and Safety standards must be provided. These should be emptied twice a day, to prevent staff from using the surrounding vegetation		✓	✓		
The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility. Under no circumstances may domestic waste be burned on site		✓	✓		
Refuse bins will be emptied and secured. Temporary storage of domestic		✓	✓		

Mitigation Measures and Environmental Impact Management Actions	Condition of Approval	Included in EMPr	Construction[46] Phase	Operational Phase	Decommissioning Phase
waste shall be in covered waste skips. Maximum domestic waste storage period will be 10 days.					
Suitable temporary solid waste facilities are to be incorporated into the design to prevent unsanitary conditions. These are to be cleared weekly and waste collected by the local waste management department. The residents must be encouraged to recycle.		✓		✓	
All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red / Orange List species, their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr		✓	✓	✓	✓
Speed limits must be put in place to reduce erosion.		✓	✓	✓	✓
Where possible, existing access routes and walking paths must be made use of.		✓	✓		
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events and strong winds.		✓	✓	✓	
A stormwater management plan must be compiled and implemented.		✓	✓		
A spill response kit must be available at all times. The incident must be reported on and if necessary, a biodiversity specialist must investigate the extent of the impact and provide rehabilitation recommendations.		✓	✓	✓	
Appropriate/Adequate fire management plan need to be implemented.		✓	✓	✓	
Avifauna					
Concentrate all surface infrastructure on habitat of medium to low avifaunal sensitivity. The development footprint of the various individual facilities must be kept as small as possible and sensitive habitats must be avoided.		✓	✓		
Where possible, existing access roads should be used and the construction of new roads should be kept to a minimum.		✓	✓		
Prevent an overspill of construction activities into areas that are not part of the proposed construction site.		✓	✓		
Use indigenous plant species native to the study area during landscaping and rehabilitation.		✓	✓		
All AC internal electrical reticulation should be placed underground		✓	✓		
Reduce or minimise the use of outdoor lighting to avoid attracting birds to the lights or to reduce potential disorientation to migrating birds.		✓		✓	
Use indigenous plant species native to the study area during landscaping and rehabilitation.		✓	✓	✓	
Implement at least an additional bird survey on commencement of operations.	✓		✓		
Apply systematic reflective/dynamic markers to the boundary fence to increase the visibility of the fence for approaching birds (e.g. korhaan taxa) and to avoid potential bird collisions with the fence structure.	✓		✓		
Remove/relocates artificial watering holes. It is recommended that watering holes be relocated at least 200m from any PV arrays.	✓		✓		
All construction sites/areas must be demarcated on site layout plans (preferably), and no construction personnel or vehicles may leave the demarcated area except those authorised to do so. Those areas surrounding the construction sites that are not part of the demarcated development area		✓	✓		

Mitigation Measures and Environmental Impact Management Actions	Condition of Approval	Included in EMPr	Construction[46] Phase	Operational Phase	Decommissioning Phase
should be considered as "no-go" areas for employees, machinery or even visitors.					
All road networks must be planned with care to minimise dissection or fragmentation of important avifaunal habitat type. Where possible, the use of existing roads is encouraged.		✓	✓		
Killing or poaching of any bird species should be avoided by means of awareness programs presented to the labour force. The labour force should be made aware of the conservation issues pertaining to the bird taxa occurring on the study site. Any person found deliberately harassing any bird species in any way should face disciplinary measures, following the possible dismissal from the site.		✓	✓	✓	✓
Checks must be carried out at regular intervals to identify areas where erosion is occurring. Appropriate remedial action, including the rehabilitation of eroded areas should be undertaken.		✓	✓	✓	
Open fires are strictly prohibited and only allowed at designated areas		✓	✓	✓	✓
Agricultural					
Vegetation clearance must be restricted to areas where infrastructure is constructed.		✓	✓		
No materials removed from development area must be allowed to be dumped in nearby livestock farming areas.		✓	✓		
Prior arrangements must be made with the landowners to ensure that livestock and game animals are moved to areas where they cannot be injured by vehicles traversing the area		✓	✓		
No boundary fence must be opened without the landowners' permission		✓	✓		
Access to areas outside of the authorised development footprint should be strictly prohibited.		✓	✓		
All left-over construction material must be removed from site once construction on a land portion is completed		✓	✓		
No open fires made by the construction teams are allowable during the construction phase.		✓	✓		
Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint;		✓	✓		
Unnecessary land clearance must be avoided;		✓	✓		
Level any remaining soil removed from excavation pits (where the PV modules will be mounted) that remained on the surface, instead of allowing small stockpiles of soil to remain on the surface		✓	✓		
Where possible, conduct the construction activities outside of the rainy season;		✓	✓		
Stormwater channels must be designed to minimise soil erosion risk resulting from surface water runoff.		✓	✓		
Maintenance must be undertaken regularly on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills;		✓	✓		
Any waste generated during construction must be stored into designated containers and removed from the site by the construction teams;		✓	✓		
Any left-over construction materials must be removed from site;		✓	✓		
The construction site must be monitored by the Environmental Control Officer (ECO) to detect any early signs of fuel and oil spills and waste dumping;		✓	✓		
Ensure battery transport and installation by accredited staff / contractors;		✓	✓		
Compile (and adhere to) a procedure for the safe handling of battery cells during transport and installation		✓	✓		

Mitigation Measures and Environmental Impact Management Actions	Condition of Approval	Included in EMPr	Construction[46] Phase	Operational Phase	Decommissioning Phase
The area around the project, including the internal access roads, must regularly be monitored to detect early signs of soil erosion on-set		✓		✓	
If soil erosion is detected, the area must be stabilised using geo-textiles and facilitated re-vegetation		✓		✓	
Maintenance must be undertaken regularly on all vehicles and maintenance machinery to prevent hydrocarbon spills		✓		✓	
No domestic and other waste must be left at the site and must be transported with the maintenance vehicles to an authorised waste dumping area		✓		✓	
Heritage					
Implementation of a chance find procedure for the project;		✓	✓		
Construction monitoring and mitigation by Archaeological monitoring during bulk earthworks.	✓		✓		
Monitoring of the project area during construction by the ECO.	✓		✓		
Visual					
Continuation of Agricultural activities on remaining undeveloped agricultural lands.		✓	✓		
The area needs to be managed such that there is no risk from wildfire and may require tractor-mowing to reduce veld grass growth.		✓	✓		
Rehabilitation of impacted areas to agriculturally viable areas or natural vegetation		✓			✓
Social					
Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.		✓	✓		
Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.		✓	✓		
Before the construction phase commences the proponent should meet with representatives from the Local Municipality to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase.		✓	✓		
The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.		✓	✓		
Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.		✓	✓		
The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.		✓	✓		
The proponent should liaise with the Local Municipality with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work.		✓	✓		
The Local Municipality, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.		✓			

Mitigation Measures and Environmental Impact Management Actions	Condition of Approval	Included in EMPr	Construction[46] Phase	Operational Phase	Decommissioning Phase
The proponent should consider the option of establishing a Monitoring Forum (MF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from Local Municipality, farmers, and the contractor(s). The MF should also be briefed on the potential risks to the local community associated with construction workers.		✓	✓		
The proponent and the contractor(s) should, in consultation with representatives from the MF, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation.		✓	✓		
The proponent and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase.		✓	✓		
The construction area should be fenced off before construction commences and no workers should be permitted to leave the fenced off area.		✓	✓		
The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site.		✓	✓		
The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days of their contract coming to an end.		✓	✓		
It is recommended that no construction workers, except for security personnel, should be permitted to stay over-night on the site.		✓	✓		
The proponent should implement a policy that no employment will be available at the gate.		✓	✓		
The proponent should prepare a Stakeholder Engagement Plan (SEP) and Community Health, Safety and Security Plan (CHSSP) prior to commencement of the construction phase.		✓	✓		
The proponent should enter into an agreement with local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.		✓	✓		
Traffic movement and construction related activities should be contained within clearly designated areas.		✓	✓		
Strict traffic speed limits must be enforced.		✓	✓		
All farm gates must be closed after passing through.		✓	✓		
Contractors appointed by the proponent should provide daily transport for construction workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties.		✓	✓		
The proponent should hold contractors liable for compensating farmers in full for any stock losses and/or damage to farm infrastructure that can be linked to construction related activities and or workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities		✓	✓		
The Environmental Management Plan (EMP) must outline procedures for		✓	✓		

Mitigation Measures and Environmental Impact Management Actions	Condition of Approval	Included in EMPr	Construction[46] Phase	Operational Phase	Decommissioning Phase
managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.					
Contractors appointed by the proponent must ensure that construction workers found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation.		✓	✓		
Establishment of a fire break around the construction area before work commences should be investigated.		✓	✓		
Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas.		✓	✓		
Smoking on site should be confined to designated areas.		✓	✓		
Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high-risk dry, windy winter months		✓	✓		
Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle.		✓	✓		
Contractor should provide fire-fighting training to selected construction staff.		✓	✓		
The movement of construction vehicles on the site should be confined to agreed access road/s.		✓	✓		
The movement of heavy vehicles associated with the construction phase should be timed to avoid times days of the week, such as weekends, when the volume of traffic travelling along the access roads may be higher.		✓	✓		
Dust suppression measures should be implemented, such as wetting on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.		✓	✓		
All vehicles must be road worthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.		✓	✓		
An Environmental Control Officer (ECO) should be appointed to monitor the construction phase.		✓	✓		
Existing internal roads should be used where possible. In the event that new roads are required, these roads should be rehabilitated on the completion of the construction phase.		✓	✓		
The footprint associated with the construction related activities (access roads, construction camps, workshop etc.) should be minimised.		✓	✓		
All areas disturbed by construction related activities, such as access roads on the site, construction camps etc., should be rehabilitated at the end of the construction phase.		✓	✓		
The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme should be included in the EMP.		✓	✓		
The implementation of the Rehabilitation Programme should be monitored by the ECO.		✓	✓		
Implement a skills development and training programme aimed at maximizing the number of employment opportunities for local community members		✓		✓	
Maximise opportunities for local content, procurement, and community shareholding.		✓		✓	
The enhancement measures listed in SIA, i.e. to enhance local employment		✓		✓	

Mitigation Measures and Environmental Impact Management Actions	Condition of Approval	Included in EMPr	Construction[46] Phase	Operational Phase	Decommissioning Phase
and business opportunities during the construction phase, also apply to the operational phase.					
The proponents should liaise with the DLM to identify projects that can be supported by SED contributions.		✓		✓	
Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community.		✓		✓	
Traffic					
Ensure staff transport is done in the 'off peak' periods and by bus, if possible		✓	✓		
Stagger material, component, and abnormal loads delivery		✓	✓		
Implement control and Monitoring programme		✓	✓		
Reduction in the speed of vehicles		✓	✓		
Implementation of pedestrian safety initiatives.		✓	✓		
Regular maintenance of farm fences & access cattle grids		✓	✓		
Maintenance of Existing Gravel Roads		✓	✓		
Implement a road maintenance program under the auspices of the respective transport department.		✓	✓		
BESS					
Where reasonably practicable, state-of-the-art battery technology should be used with all the necessary protective features e.g., draining of cells during shutdown and standby-mode, full BMS with deviation monitoring and trips, leak detection systems		✓	✓		
The overall design should be subject to a full Hazop prior to finalization of the design	✓		✓		
For the VRFB systems an environmentally friendly method of filling the system with electrolyte upon startup and an end of life (and for possible periodic purging requirements) solution for the large quantities of hazardous electrolyte should be investigated, e.g., can it be returned to the supplier for re-conditioning.	✓	✓	✓		
Prior to bringing any solid-state battery containers into the country, the contractor should ensure that: - An Emergency Response Plan is in place that would be applicable for the full route from the ship to the site. This plan would include details of the most appropriate emergency response to fires both while the units are in transit and once they are installed and operating. - An End-of-Life plan is in place for the handling, repurposing or disposal of dysfunctional, severely damaged batteries, modules and containers.	✓		✓		
The site layout and spacing between lithium solid-state containers should be such that it mitigates the risk of a fire or explosion event spreading from one container to another.		✓	✓		
Under certain weather conditions, the noxious smoke from a fire in a lithium battery container could travel some distance from the unit. The smoke will most likely be acrid and could cause irritation, coughing, distress etc. Close to the source of the smoke, the concentration of toxic gases may be high enough to cause irreversible harmful effects. Location of the facilities needs to ensure a suitable separation distance from public facilities/residences etc. The current proposed BESS location is over 450m from isolated farmhouses / other		✓	✓		

Mitigation Measures and Environmental Impact Management Actions	Condition of Approval	Included in EMPr	Construction[46] Phase	Operational Phase	Decommissioning Phase
occupied facilities and over 100m from watercourses and busy public roads and is therefore suitable.					
For molten metal batteries the most significant hazards are to persons working with the facilities, e.g. operation and maintenance personnel. Suitable procedures will need to be in place and PPE to be specified.		✓	✓		
Once the BESS technology has been selected and further specifics of the final design are available, verify that all recommendations as provided in this risk assessment are adhered to, including the mitigation measures provided by the BESS supplier.	✓		✓		

8. 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.

Please refer to **Appendix F**, where all evidence of public participation is included.

Table 43: 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) Sub regulation (1) does not apply in respect of-. (a) linear activities;	Proof of landowner consent for Kareekloof Solar PV is attached in **Annexure G2.** .
The person conducting a public participation process must take into account any relevant guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of an application or proposed application which is subjected to public participation by -	
(a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of - (i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and (ii) any alternative site;	A site notice was placed at three positions along the R48 and at a number of positions at the various farm gates. Photographic evidence and the location 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	There are no occupiers on the study site other than the current landowners who have provided consent for the development. The landowners will be requested to notify tenants of other occupiers that may reside elsewhere on the

Regulated Requirement	Description
any alternative site where the activity is to be undertaken;	property/
(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 Emthanjeni municipality (Planning and Technical Services) as well as the Pixley ka Seme District Municipality 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 **Annexure F1** 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;	The DFFE has been given an opportunity to comment on this Draft Environmental Impact, any other parties identified will be given an opportunity to comment.
(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;	Please refer to **Annexure F3** for a copy of Advert. 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; (ii) disability; or (iii) any other disadvantage.	Notifications have included provision for alternative engagement in the event of illiteracy, disability or any other disadvantage. In such instances, Cape EAPrac will engage with such individuals in such a manner as agreed on with the competent authority.
(3) A notice, notice board or advertisement referred to in sub regulation (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	Please refer to **Annexure F3**.

Regulated Requirement	Description
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.	
(4) A notice board referred to in sub regulation (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, sub regulation (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 sub regulation (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 (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	All reports that are submitted to the competent authority will be subject to a public participation process. These include: - Draft Scoping Report - Draft Environmental Impact Report - Draft EMPr - All specialist reports that form part of this environmental process.

Regulated Requirement	Description
processes.	

8.1 REGISTRATION OF KEY STAKEHOLDERS

A number of key stakeholders were automatically registered and were given an opportunity to comment on the Draft Scoping Report. Copies and proof of these notifications are included in **Annexure F4**. A list of key stakeholders registered for this process included in the table below.

Table 44: Key Stakeholders automatically registered as part of the Environmental Process

Stakeholders Registered		
Neighbouring property owners	Department of Agriculture, Environmental Affairs, Rural Development and Land Reform	Department of Water and Sanitation
Northern Cape Department of Transport and Public Works	Emthanjeni Municipality	Department of Science and Technology
Emthanjeni Municipality: Ward Councillors	South African National Roads Agency Limited	The Council for Scientific and Industrial Research
South African Heritage Resources Agency	Ngwao Boswa Jwa Kapa Bokone	The South African Square Kilometre Array
Catchment Management Agency	Department of Health	The South African Civil Aviation Authority
Department of Forestry, Fisheries and the Environment: Biodiversity Conservation Directorate	Department of Minerals and Energy	Affected Landowner
Provincial Department of Agriculture	Eskom	Department of Communications
Endangered Wildlife Trust.	Department of Mineral Resources	SENTECH
Cape Nature	Birdlife South Africa.	South African National Defence Force.
Pixley ka Seme District Municipality		

8.2 AVAILABILITY OF DRAFT SCOPING REPORT.

The Draft Scoping report was available to all automatically registered and potential Interested and Affected Parties for a 30 day-comment period extending from **29 September 2023 – 09 November 2023.**

Copies of the report were available at the following locations:

- Cape EAPrac Website: www.cape-eaprac.co.za.
- Direct download link via both WeTransfer and Dropbox

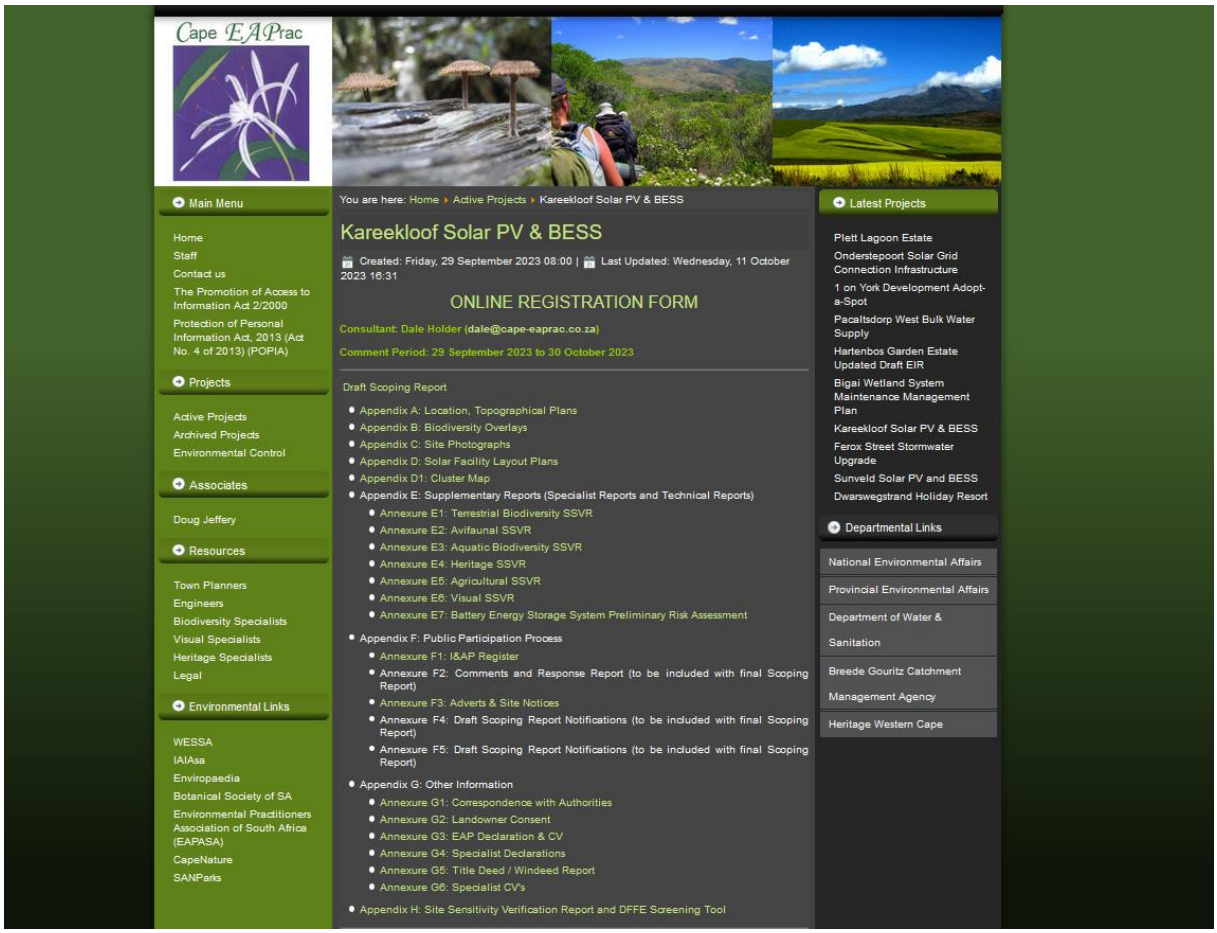


Figure 57: Draft Scoping Report as available on the Cape EAPrac Website

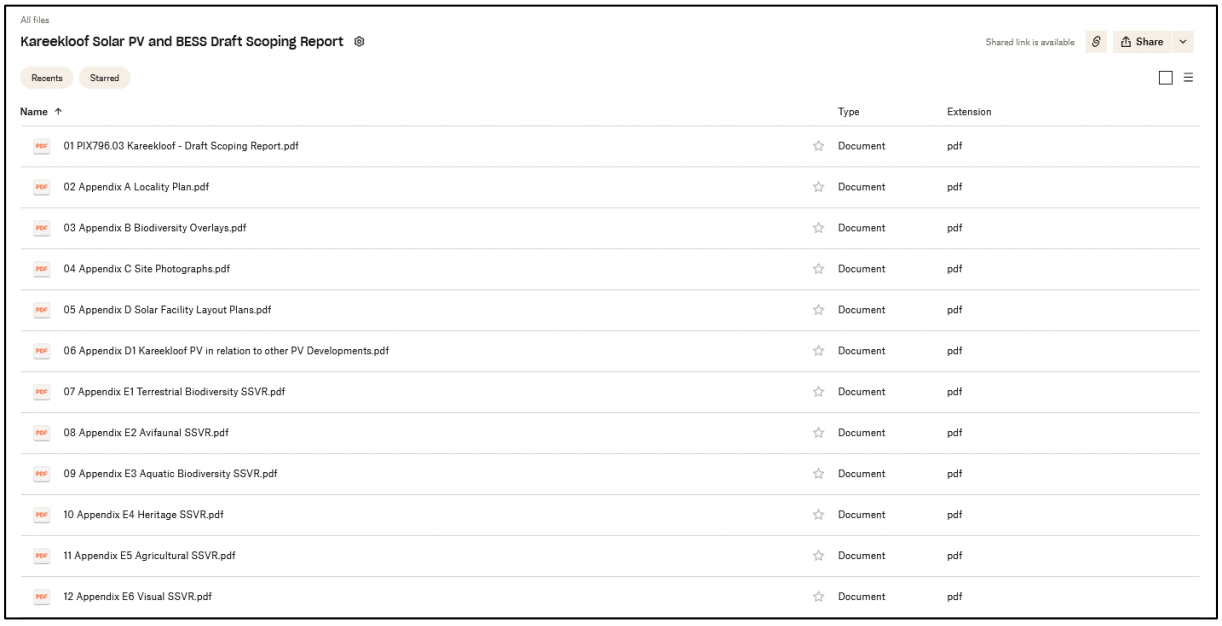
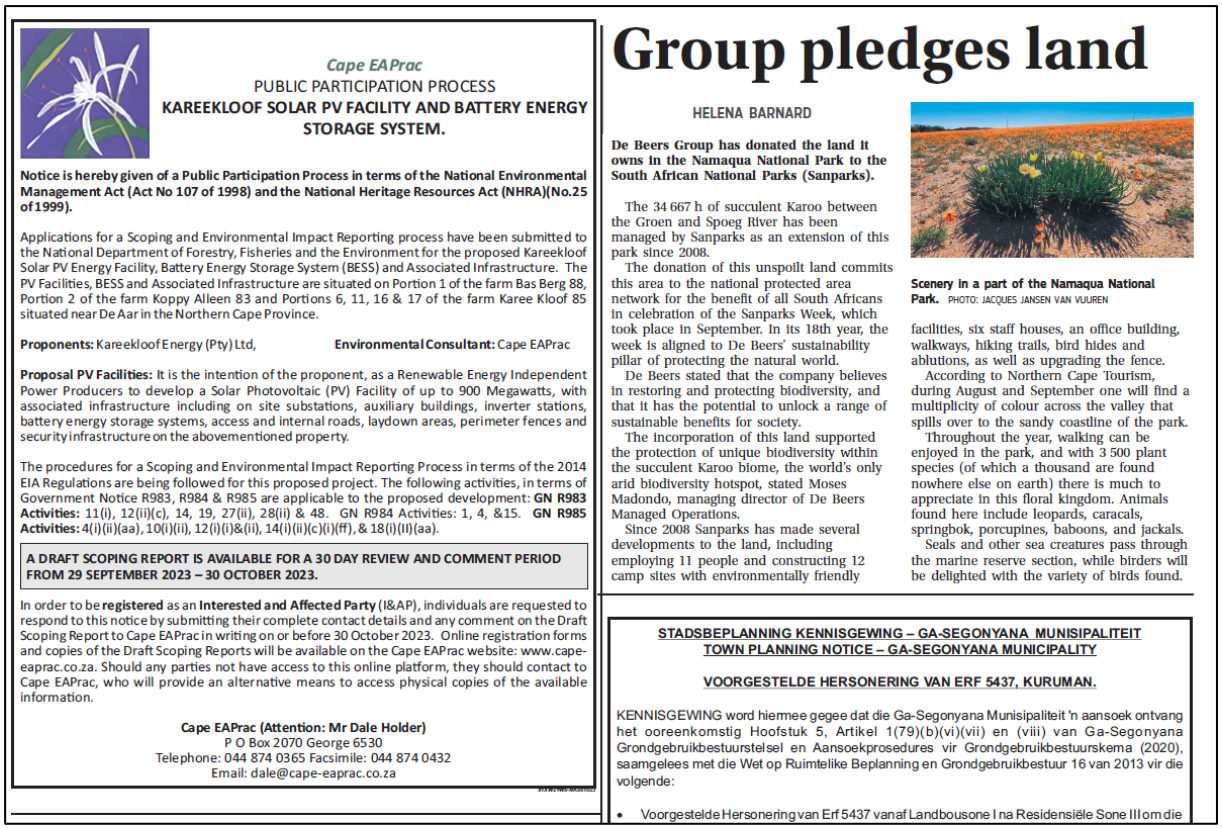


Figure 58: Draft Scoping Report as available via Dropbox Direct Download Link.



Cape EAPrac
PUBLIC PARTICIPATION PROCESS
KAREEKLOOF SOLAR PV FACILITY AND BATTERY ENERGY STORAGE SYSTEM.

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

Applications for a Scoping and Environmental Impact Reporting process have been submitted to the National Department of Forestry, Fisheries and the Environment for the proposed Kareekloof Solar PV Energy Facility, Battery Energy Storage System (BESS) and Associated Infrastructure. The PV Facilities, BESS and Associated Infrastructure are situated on Portion 1 of the farm Bas Berg 88, Portion 2 of the farm Koppy Alleen 83 and Portions 6, 11, 16 & 17 of the farm Karee Kloof 85 situated near De Aar in the Northern Cape Province.

Proponents: Kareekloof Energy (Pty) Ltd, **Environmental Consultant:** Cape EAPrac

Proposal PV Facilities: It is the intention of the proponent, as a Renewable Energy Independent Power Producers to develop a Solar Photovoltaic (PV) Facility of up to 900 Megawatts, with associated infrastructure including on site substations, auxiliary buildings, inverter stations, battery energy storage systems, access and internal roads, laydown areas, perimeter fences and security infrastructure on the abovementioned property.

The procedures for a Scoping and Environmental Impact Reporting Process in terms of the 2014 EIA Regulations are being followed for this proposed project. The following activities, in terms of Government Notice R983, R984 & R985 are applicable to the proposed development: **GN R983 Activities:** 11(i), 12(ii)(c), 14, 19, 27(ii), 28(ii) & 48. GN R984 Activities: 1, 4, &15. **GN R985 Activities:** 4(i)(ii)(aa), 10(i)(ii), 12(i)(i)&(ii), 14(i)(ii)(c)(i)(ff), & 18(i)(II)(aa).

A DRAFT SCOPING REPORT IS AVAILABLE FOR A 30 DAY REVIEW AND COMMENT PERIOD FROM 29 SEPTEMBER 2023 – 30 OCTOBER 2023.

In order to be **registered** as an **Interested and Affected Party** (I&AP), individuals are requested to respond to this notice by submitting their complete contact details and any comment on the Draft Scoping Report to Cape EAPrac in writing on or before 30 October 2023. Online registration forms and copies of the Draft Scoping Reports will be available on the Cape EAPrac website: www.cape-eaprac.co.za. Should any parties not have access to this online platform, they should contact to Cape EAPrac, who will provide an alternative means to access physical copies of the available information.

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

Group pledges land

HELENA BARNARD

De Beers Group has donated the land it owns in the Namaqua National Park to the South African National Parks (Sanparks).

The 34 667 h of succulent Karoo between the Groen and Spoeg River has been managed by Sanparks as an extension of this park since 2008.

The donation of this unspoilt land commits this area to the national protected area network for the benefit of all South Africans in celebration of the Sanparks Week, which took place in September. In its 18th year, the week is aligned to De Beers' sustainability pillar of protecting the natural world.

De Beers stated that the company believes in restoring and protecting biodiversity, and that it has the potential to unlock a range of sustainable benefits for society.

The incorporation of this land supported the protection of unique biodiversity within the succulent Karoo biome, the world's only arid biodiversity hotspot, stated Moses Madondo, managing director of De Beers Managed Operations.

Since 2008 Sanparks has made several developments to the land, including employing 11 people and constructing 12 camp sites with environmentally friendly facilities, six staff houses, an office building, walkways, hiking trails, bird hides and ablutions, as well as upgrading the fence.

Scenery in a part of the Namaqua National Park. PHOTO: JACQUES JANSEN VAN VUUREN

According to Northern Cape Tourism, during August and September one will find a multiplicity of colour across the valley that spills over to the sandy coastline of the park.

Throughout the year, walking can be enjoyed in the park, and with 3 500 plant species (of which a thousand are found nowhere else on earth) there is much to appreciate in this floral kingdom. Animals found here include leopards, caracals, springbok, porcupines, baboons, and jackals.

Seals and other sea creatures pass through the marine reserve section, while birders will be delighted with the variety of birds found.

STADSBEPLANNING KENNISGEWING – GA-SEGONYANA MUNISIPALITEIT
TOWN PLANNING NOTICE – GA-SEGONYANA MUNICIPALITY

VOORGESTELDE HERSONERING VAN ERF 5437, KURUMAN.

KENNISGEWING word hiermee gegee dat die Ga-Segonyana Munisipaliteit 'n aansoek ontvang het ooreenkomstig Hoofstuk 5, Artikel 1(79)(b)(vi)(vii) en (viii) van Ga-Segonyana Grondgebruikbestuurstelsel en Aansoekprosedures vir Grondgebruikbestuurskema (2020), saamgelees met die Wet op Ruimtelike Beplanning en Grondgebruikbestuur 16 van 2013 vir die volgende:

- Voorgestelde Hersonering van Erf 5437 vanaf Landbousone I na Residensiële Sone III om die

Figure 59: Excerpt of Advert in Noord Kaap Buletin

All notifications (including the site notice and advert) have made provisions for potential I&AP's to contact Cape EAPrac, should they not have access to the digital platforms provided. In such instances, Cape EAPrac will arrange other suitable mechanisms for them to be able to access the relevant information.

A copy of the notifications regarding the availability of the Draft Scoping Report are attached in Appendix F4 and the Newspaper Article advertising the availability of the Draft Scoping Report is attached in Appendix F3.

8.3 COMMENTS AND RESPONSES ON DRAFT SCOPING REPORT

During the comment period comments were received from:

- The Department of Forestry Fisheries and the Environment, Chief Director Integrated Environmental Authorisations
- The Department of Forestry Fisheries and the Environment, Directorate Biodiversity Conservation.
- Adjacent Landowners[47].
- Tafelkop Trust (requesting access to information)
- Leads to Business (Registration only)
- ABO Wind Renewable Energies (Registration only).

[47] The adjacent landowners raised concern regarding the development of more than 10% of the properties and the Socio-Economic Impact on the surrounding area.

All comments received on the Draft scoping report were considered, responded to and included in the final scoping report that was submitted to the DFFE for consideration and acceptance.

8.4 AVAILABILITY OF DRAFT ENVIRONMENTAL IMPACT REPORT.

The Draft Environmental Impact Report is available to all registered Interested and Affected Parties for a 30 day-comment period**.**

Copies of the report were available at the following locations:

- Cape EAPrac Website: www.cape-eaprac.co.za.
- Direct download link.

All notifications (including the site notice and advert) made provisions for potential I&AP's to contact Cape EAPrac, should they not have access to the digital platforms provided. In such instances, Cape EAPrac will arrange other suitable mechanisms for them to be able to access the relevant information.

Proof of the availability of the Draft Environmental Impact Report will be provided in the Final Environmental Impact Report.

8.5 REMAINDER OF THE ENVIRONMENTAL ASSESSMENT PROCESS

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

- The Draft EIR is herewith available for public review and comment period of 30-days;
- All comments received will be responded to, addressed and the proposal adapter where necessary and the Final EIR will be submitted to the DFFE for consideration and decision-making;
- The DFFE's decision (Environmental Authorisation) on the FEIR will be communicated with all registered I&APs.

9. CONCLUSION AND RECOMMENDATIONS

This environmental process is currently being undertaken to present proposals to the public and potential I&APs and to identify and assess environmental impacts, issues and concerns raised as a result of the proposed development.

Cape EAPrac is of the opinion that the information contained in this Draft Environmental Report and the documentation attached hereto is sufficient to allow the I&APs to apply their minds to the potential negative and/or positive impacts associated with the development, in respect of the activities applied for. Kareekloof Energy PV and BESS has been analysed from Ecological, Agricultural, Heritage, Avifaunal, Social and Visual perspectives, and site constraints and potential impacts identified and assessed.

This environmental process has not identified any fatal flaws with the proposal and as such it is our reasoned view that the project should be considered for authorisation, subject to the outcome of the public participation process and on condition that all the mitigation measures outlined in section 7 of the report are adopted and implemented. All specialists concur that the development as proposed (Layout Alternative 3) can be considered for approval subject to the implementation of all mitigation measures. All impacts range from high positive to medium negative and all high, very high and critical negative impacts have been avoided by the risk adverse approach or mitigated to acceptable levels.

All stakeholders are requested to review the Draft EIR and the associated appendices, and provide comment, or raise issues of concern, directly to Cape EAPrac within the specified 30-day comment period. All comments received during this comment period will be considered, responded and included in the Final EIR that will be submitted to DFFE for decision making.

10. 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
DFFE	Department of Forestry, Fisheries and the Environment
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
EIR	Environmental Impact Report
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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