

Scoping and Environmental Impact
Assessment for the proposed development
of the Genesis DBF South Solar Energy
Facility and associated infrastructure near
Beaufort West in the Western Cape



FINAL
ENVIRONMENTAL
IMPACT
ASSESSMENT
REPORT



September 2023

Prepared for:
Genesis DBF South Solar
Farm (Pty) Ltd

Prepared by:
CSIR Environmental
Management Services,
PO Box 320, Stellenbosch
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Scoping and Environmental Impact Assessment for the
proposed development of the Genesis DBF South Solar
Energy Facility and associated infrastructure near
Beaufort West in the Western Cape



FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

PART A: MAIN REPORT



SCOPING AND ENVIRONMENTAL IMPACT ASSESSMENT

for the

**Proposed Development of the Genesis DBF South Solar
Energy Facility and Associated Infrastructure, near
Beaufort West, Western Cape Province**

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DFFE ref. no. 14/12/16/3/3/2/2317

September 2023

Prepared for:

Genesis DBF South Solar Farm (Pty) Ltd

Prepared by:

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REPORT DETAILS

Title:	Scoping and Environmental Impact Assessment (EIA) Process for the proposed development of the Genesis DBF South Solar Energy Facility and associated infrastructure, near Beaufort West in the Western Cape Province: ENVIRONMENTAL IMPACT ASSESSMENT REPORT
Purpose of this report:	The purpose of this EIA Report is to: - Present the details of and the need for the proposed project; - Describe the affected environment at a sufficient level of detail based on specialist input to facilitate informed decision-making; - Provide an overview of the EIA Process that has been followed, including public consultation; - Provide an overview of the potential positive and negative impacts of the proposed project on the environment; - Provide recommendations to avoid or mitigate negative impacts and to enhance the positive benefits of the project; and - Provide an Environmental Management Programme (EMPr) for the relevant phases of the project. The Draft EIA Report was made available to all Interested and/or Affected Parties (I&APs), Organs of State and relevant stakeholders for a 30-day review period extending from 11 August 2023 to 11 September 2023. All comments submitted during the 30-day review period have been incorporated in a Comments and Responses Report, and addressed, as applicable and where relevant, and have been included as Appendix E in the Final EIA Report. This Final EIA Report is being submitted to the National Department of Forestry, Fisheries and the Environment (DFFE) for decision-making in terms of Regulations 23(1) and 24 of the 2014 NEMA EIA Regulations, as amended.
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FINAL ENVIRONMENTAL IMPACT
ASSESSMENT REPORT

EXECUTIVE SUMMARY



September 2023

Prepared for:
Genesis DBF South Solar
Farm (Pty) Ltd

Prepared by:
CSIR Environmental
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INTRODUCTION AND PROJECT LOCALITY

The Project Developer, Genesis Eco-Energy Developments (Pty) Ltd (hereafter “GEED”) is proposing to develop a Renewable Energy Cluster located approximately 40 km north-west of Beaufort West within the Beaufort West Local Municipality and the Central Karoo District Municipality in the Western Cape Province. The proposed GEED Renewable Energy Cluster consists of 9 Renewable Energy Facilities (REFs) including 2 Solar Energy Facilities (SEFs) and 7 Wind Energy Facilities (WEFs). The **Northern Cluster** includes two WEFs, the **Middle Cluster** includes three WEFs, and the **Southern Cluster** includes two WEFs and two SEFs. Each of the REFs will be subjected to separate Scoping and Environmental Impact Assessments (S&EIA) processes and separate Applications for Environmental Authorisation (EA) from the National Department of Forestry, Fisheries and the Environment (DFFE), as the Competent Authority, in terms of the National Environmental Management Act (Act 107 of 1998, as amended) EIA Regulations, 2014, as amended.

The proposed Genesis DBF South Solar Farm, with a capacity of up to 400 MW and including the 132 kV overhead power line, is the subject of this S&EIA process (hereafter referred to as the “DBF South SEF” or the “proposed project”) as shown in Figure A. The proposed project is located on:

- Remaining extent of Doornboomfontyn Farm Nr. 89
- Remaining extent of Hartebeeste Vleis Berg Farm Nr. 213
- Portion 1 of Doornboomfontyn Farm Nr. 89

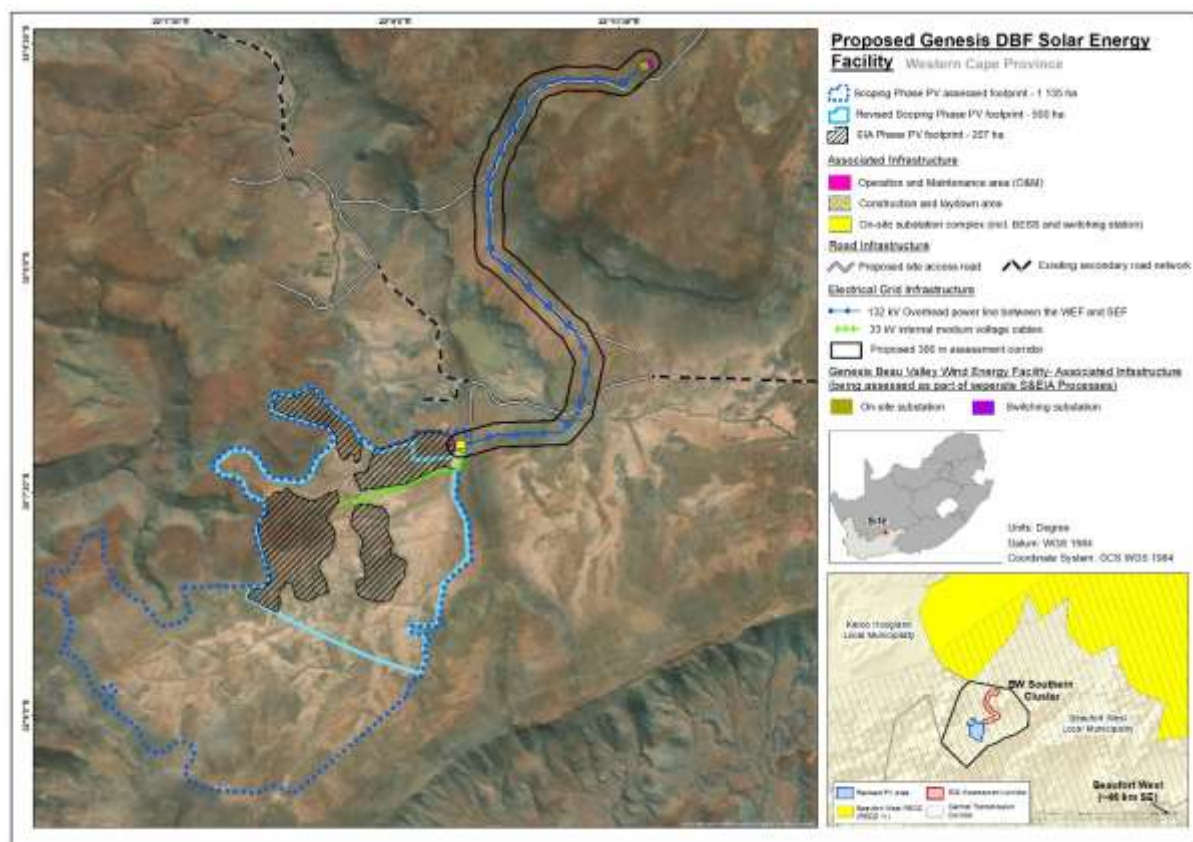


Figure A. Locality Map of the proposed DBF South SEF and associated infrastructure, including the 132 kV Overhead Transmission Power Line that is part of the current application and report.

The proposed project will make use of PV solar technology to generate electricity. The associated infrastructure on site includes various structures, buildings and internal electrical grid infrastructure (EGI), including but not limited to an on-site substation and a battery energy storage system at each SEF. The Applicant is also proposing the development of a 132 kV overhead transmission power line and associated EGI to facilitate the connection of the proposed SEF project directly to the national electrical grid network or via a collector substation. The 132 kV power line is included as part of this current S&EIA for the DBF South SEF. The proposed collector substation is located in the Middle Cluster and will facilitate the connection of the Genesis Southern and Middle Cluster REFs to the national electrical grid. A separate assessment process will be undertaken for the development of a 400 kV power line from the collector substation to feed Eskom's national electrical grid.

The proposed project is not located within any of the Renewable Energy Development Zones (REDZs) that were gazetted in GG 41445, GN 114 on 16 February 2018; and GG 44191, GN 144 on 26 February 2021, hence it is subjected to a full Scoping and EIA Process with a 107-day decision-making timeframe, as opposed to a BA Process and 57-day decision-making timeframe allowed for in the REDZs. The proposed project is located within the Central Strategic Transmission Corridor that was gazetted in GN 113 on 16 February 2018; however, the benefits only apply specifically to the EGI projects which are subjected to separate Basic Assessment processes, which is not applicable to the current project. Therefore, a full Scoping and EIA process with a 107-day decision-making timeframe is applicable to the proposed project.

The Competent Authority for this proposed project is the National DFFE, and the Project Applicant is Genesis DBF South Solar Farm (Pty) Ltd.

STUDY AREA DEFINITION

The study area or preferred site for the proposed DBF South SEF is the full extent of the affected farm properties on which the SEF is proposed to be constructed, as described above. The full extent of these properties has been assessed by the specialists to identify environmental sensitivities and no-go areas.

At the commencement of this Scoping and EIA Process, the Original Scoping Phase PV Assessment Area totalled 1 135 ha within the study area / preferred site. The preferred site or total study area for proposed DBF South SEF is approximately 1 135 hectares (ha). The preferred site serves as the study area for this Scoping and EIA Process. Therefore, the terms "site" and "study area" are used synonymously in this report. Following the identification of sensitivities by the specialists during the Scoping Phase, the Project Developer took such sensitivities, and other considerations, into account and formulated an approximately 500 ha Revised Scoping Development Area which was considered in the EIA phase. Informed by the EIA-level specialist assessments and the proposed specialist mitigation measures, the final PV design and PV footprint that is proposed for EA has been reduced to 207 ha (as described in Chapter 7 of the EIA Report). The development footprint is where the actual development will be located, i.e., the footprint containing the PV solar arrays. The buildable areas are the full extent to be approved for development, and the development footprint detailed in the layouts is based on the current proposal.

In summary, the full extent of the study area has been assessed by the specialists and mapped accordingly in the Specialist Assessments to identify environmental sensitivities and no-go areas. This approach uses environmental and social constraints to avoid sensitive features, thus applying the mitigation hierarchy, and it leads to the selection of the least environmentally sensitive development footprint.

PROJECT ENVIRONMENTAL IMPACT ASSESSMENT TEAM

In accordance with Regulation 12 (1) of the 2014 NEMA EIA Regulations (as amended), GEED has appointed the Council for Scientific and Industrial Research (CSIR) to undertake the required Scoping and EIA Process in order to determine the potential biophysical, social and economic impacts associated with undertaking the proposed development. The project team and the relevant specialists are indicated in Table A below.

Table A. Project Team for the Scoping and EIA Process

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
<i>CSIR Environmental Management Services</i>		
Paul Lochner (<i>Registered EAP (2019/745)</i>)	CSIR	EAP, Technical Advisor and Quality Assurance
Willan Adonis	CSIR	Project Manager
Helen Antonopoulos	CSIR	Project Officer
Dhiveshni Moodley (<i>Cand. Sci.Nat.</i>)	CSIR	GIS Specialist
Sonto Mkize	CSIR	Project Officer
<i>Specialists</i>		
Johann Lanz (<i>Pr.Sci.Nat.</i>)	Private	Agriculture and Soils Compliance Statement
Simon Todd (<i>Pr.Sci.Nat.</i>)	3Foxes Biodiversity Solutions	Terrestrial Biodiversity, Terrestrial Plant Species, and Terrestrial Animal Species
Toni Belcher (<i>Pr.Sci.Nat.</i>)	Private	Aquatic Biodiversity Impact Assessment
Chris van Rooyen Albert Froneman (<i>Pr.Sci.Nat.</i>)	Chris van Rooyen Consulting AfriAvian Environmental (Pty) Ltd	Avifauna Impact Assessment
Lourens Du Plessis	LOGIS	Visual Impact Assessment
John Gribble	ACO Associates	Heritage Impact Assessment (Archaeology and Cultural Landscape)
Elize Butler	BANZAI Environmental	Palaeontology Site Sensitivity Verification Report
Sue Reuther Christopher Dalglish	SRK Consulting	Socio-Economic Impact Assessment
Athol Schwartz (<i>Pr. Tech.</i>)	Private	Traffic Impact Assessment
Debbie Mitchell (<i>Pr Eng</i>)	Ishecon cc	Battery Storage High Level Safety, Health and Environment Risk Assessment
Louis Jonk (<i>Pr.Sci.Nat.</i>)	GEOSS South Africa (PTY) Ltd	Geohydrology Assessment
Louis Jonk (<i>Pr.Sci.Nat.</i>) Shane Teek (<i>Pr.Sci.Nat.</i>)	GEOSS South Africa (PTY) Ltd	Desktop Geotechnical Assessment
Helen Antonopoulos	CSIR	Civil Aviation Site Sensitivity Verification
Paul Lochner (Reg. EAP (2019/745))	CSIR	Defence Site Sensitivity Verification

The specialist assessments have been detailed during the EIA Phase and comply with Appendix 6 of the 2014 NEMA EIA Regulations (as amended), or the Assessment Protocols published in GN 320 on March 2020; or the Assessment Protocols published in GN 1150 on October 2020. However, the BESS High Level Safety, Health and Environment Risk Assessment serves as a technical report and the aforementioned legislation is thus not be applicable.

PROJECT DESCRIPTION

A summary of the key components of the proposed project is provided in Table B below.

Table B. Summary of the proposed project components and associated infrastructure.

Component	Description
Solar Field	
Type of Technology	▪ Solar Photovoltaic (PV) Technology ▪ Bifacial or Monofacial, or a combination of both
Generation Capacity (Maximum Installed)	▪ 400 MW
Total developable area that includes all associated infrastructure within the fenced off area of the PV facility	▪ 207 ha ▪ Note that 1 135 ha constituted the draft Scoping project area of interest which was assessed by the EAP and specialists. Following input from specialist findings and taking into consideration comments received during the draft scoping comment period, the project area of interest was revised to 500 ha. The final transformation footprint of the proposed PV development has been further reduced to 207 ha in the EIA phase taking into account environmental sensitivities, specialists mitigation measures and other considerations raised by I&APs.
PV Panel Structure	▪ <u>Possible tracking and mounting systems:</u> ○ Single Axis Tracking structures (aligned north-south); ○ Dual Axis Tracking (aligned east-west and north-south); ○ Fixed Tilt Mounting Structure; ○ Mono-facial Solar Modules; or ○ Bifacial Solar Modules. ▪ <u>Height:</u> Approximately 3.5 m (maximum)
132 kV Overhead Transmission Power Line (OHPL)	
Line capacity	▪ 132 kV
Pylon height	▪ 17.4m – 21m
Pylon type, span, working area and footprint	▪ <u>Type:</u> Monopole or steel lattice type pylons, or combination of both where required. ▪ <u>Span:</u> The pylons will have a span of 200 m to 350 m for monopole pylons and up to approximately 500 m for lattice structures. ▪ <u>Working area:</u> The working area required around a pylon position during the construction phase is approximately 30 m x 30 m. ▪ <u>Footprint:</u> The size of the final constructed pylon footprint depends on the type of structure used, which will typically range from approximately 0.5 m² to 8 m² for monopole pylons, and 36 m² to 64 m² for steel lattice pylons.
Tower type	▪ Self-supporting and Angle Strain towers
Registered servitude	▪ Up to 50 m wide (where multiple adjacent power lines occur, in line with the Eskom Distribution Guideline for OHPL. Note that the entire servitude will not be cleared of vegetation.

Component	Description
Assessment corridor	Specialists assessed an approximately 300 m wide corridor (i.e., 150 m on either side of centreline) for all power lines to identify sensitivities and features that need to be avoided.
Building Infrastructure and substations	
Auxiliary Buildings	<u>Type</u>: These include, but are not limited to, Operation and Maintenance (O&M) building / centre, site office, workshop, staff lockers, bathrooms/ablutions, warehouses, guard houses, etc. <u>Cumulative Footprint</u>: Approximately up to 5000 m² <u>Height</u>: Up to 10 m
Inverter/Transformer Stations	Several transformers will be installed with the following specifications: <u>Height</u>: Approximately 3 m <u>Footprint</u>: Approximately 220 m² each
On-site Substation and Switching Substation	<u>Footprint</u>: Approximately 1 ha <u>Height of the on-site substation complex (including switching substation)</u>: Up to 10 m. However, the on-site substation will include switchgear portals up to 15 m and lightning masts up to 25 m in height. <u>Capacity of the on-site substation complex</u>: 132 kV <u>Fence</u>: Galvanized palisade fencing to be used at the substations <u>Fence height</u>: Up to 2.5 m
Associated Infrastructure	
Battery Energy Storage System (BESS)	<u>Preferred Technology</u>: Lithium-Ion or Sodium-Ion (Solid State) <u>Alternative Technology</u>: Redox Flow BESS <u>Footprint</u>: Up to 2 ha <u>Height</u>: Up to 10 m <u>Capacity</u>: Up to 1 200 MWh
On-site medium voltage internal cables	<u>Placement</u>: Underground (maybe above ground pending technical constraints) <u>Capacity</u>: 33 kV <u>Depth</u>: Maximum depth of 1.5 m
Access roads (including upgrading and widening of existing roads, where relevant)	- Existing roads will be used as far as practically achievable. The proposed project site can be accessed via the following roads: - Divisional Road 2312 (DR02312); - Trunk Road 5801 (TR05801); and - Trunk Road 7301 (TR07301). - Refer to the Traffic Impact Assessment (Appendix G.9 of the EIA Report) and Chapter 2 of the EIA Report for additional information on the route options per project. - Some of the existing intersections along the above roads may need to be widened to accommodate the turning movement of the trucks. Exact specifications of the widening will be confirmed during the detailed engineering design phase prior to construction.
Internal roads	<u>Internal access roads</u>: Permanent roads will be up to 6 m wide and may require side drains on one or both sides. All roads may have underground cables running next to them. A 12 m wide road corridor may be temporary impacted during construction and rehabilitated to 6 m wide after construction. Temporary clearing of up to 50 m may be required in areas where cut and fill may be required as well for the construction of the bell mouth road junction, turning circles and temporary passing lanes. <u>Details</u>: New internal service roads will need to be established. These would either comprise farm roads (compacted dirt/gravel) or paved roads. <u>Width</u>: Approximately 4 – 6 m

Component	Description
Fencing around the PV Facility Perimeter	▪ <u>Type</u>: Could be palisade or mesh or fully electrified ▪ <u>Height</u>: Up to 3 m
Storm water channels	▪ Details to be confirmed once the Engineering, Procurement and Construction (EPC) contractor has been selected and the design is finalised. Where necessary, a detailed storm water management plan would need to be developed.
Work area during the construction phase (i.e. laydown area)	▪ Temporary Laydown: Up to 4.5 ha.
Water Requirements	▪ Approximately 90 000 m³ of water is estimated to be required per year for the construction phase. ▪ Approximately 30 000 m³ of water is estimated to be required per year for the operational phase. ▪ Water requirements during the decommissioning phase are unknown at this stage. ▪ Potential sources: Local municipality, third-party water supplier, existing boreholes, newly drilled boreholes on site or a combination of existing and newly drilled boreholes on site. ▪ Water supplied to site from an external source will be trucked to the site. ▪ Water supplied from either a nearby bulk supply pipeline (to be confirmed) or on-site borehole will most likely be piped via a temporary HDPE pipe. Should these same sources be utilised during the operations phase then these pipes will most likely be buried.
Construction Period	▪ 24 to 30 months
Operational Period	▪ Once the commercial operation date is achieved, the proposed facility will generate electricity for 20 to 25 years.

NEED FOR AND APPROACH TO THE ENVIRONMENTAL IMPACT ASSESSMENT

As noted above, in terms of the 2014 NEMA EIA Regulations (as amended) published in GN R326, R327, R325 and R324 and further amended on 11 June 2021 in GN 517; and on 3 March 2022 in GN 1816, a full Scoping and EIA Process is required for the proposed project. The need for the Scoping and EIA is triggered by, amongst others, the inclusion of Activity 1 listed in GN R325 (Listing Notice 2):

- *“The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs (a) within an urban area; or (b) on existing infrastructure”.*

Chapter 4 of the EIA Report contains the detailed list of activities contained in GN R327, R325 and R324 which are triggered by the various proposed project activities and thus form part of the assessment in this Scoping and EIA Process.

The purpose of the Scoping and EIA Process is to identify, assess and report on any potential impacts the proposed project, if implemented, may have on the receiving environment. The Scoping and EIA therefore needs to show the Competent Authority, the National DFFE; and the Project Applicant what the consequences of their choices will be in terms of impacts on the biophysical and socio-economic environment and how such impacts can be, as far as possible, enhanced or mitigated and managed as the case may be.

The Public Participation Process (PPP) for this Scoping and EIA Process is being undertaken in compliance with Chapter 6 of the 2014 NEMA EIA Regulations (as amended). The Draft Scoping Report was released to all Interested and/or Affected Parties (I&APs), Organs of State and relevant stakeholders for a 30-day review period extending from 4 March 2023 to 3 April 2023, excluding public holidays. All comments received during the 30-day review were incorporated into a detailed Comments and Responses Report, and addressed, as applicable and where relevant in the Final Scoping Report. The Final Scoping Report was then submitted to the DFFE on 17 April 2023, in accordance with Regulation 21 (1) of the 2014 NEMA EIA Regulations (as amended), for consideration. The Final Scoping Report was accepted by the DFFE on 1 June 2023 in terms of Regulation 22 (a) of the 2014 NEMA EIA Regulations (as amended).

The Draft EIA Report was made available to all I&APs, Organs of State and relevant stakeholders for a 30-day review period. Copies of all written comments received during the 30-day review of the Draft EIA Report have been incorporated into a detailed Comments and Responses Report, and addressed, as applicable and where relevant, and included as Appendix E in the Final EIA Report. The Final EIA Report is being submitted to the DFFE, in accordance with Regulation 23 of the 2014 NEMA EIA Regulations (as amended), for decision-making.

SUMMARY OF IMPACT ASSESSMENT FINDINGS AND RECOMMENDED MANAGEMENT ACTIONS

The findings and impact assessment of the detailed specialist assessments (included in Appendix G of the EIA Report), as well as other relevant project information are included and integrated into the EIA Report. An Environmental Management Programme (EMPr) for the Solar PV Facility, as well as two Generic EMPrs for the on-site substation complex and 132 kV power line are included in Appendix H of this EIA Report. The EMPrs are based on the recommendations for mitigation measures and management actions provided by the specialist team for the planning and design, construction, operational and decommissioning phases of the proposed project.

This section provides a summary of the key impacts that were identified and assessed in detail by the specialists during the EIA Phase. Note that several mitigation measures have also been provided by the specialists, however only selected key measures are noted in Table C below.

Table C. Summary of Key Impacts that were identified and assessed during the EIA Phase as part of the Specialist Assessments, including key recommended mitigation measures

Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
Appendix G.1: Agriculture Compliance Statement	<u>Negative Direct Impacts:</u> Construction Phase: - Loss of agricultural potential by occupation of land. - Loss of agricultural potential by soil degradation. Soil can be degraded by impacts in three different ways: erosion; topsoil loss; and contamination.	Planning Phase: - Design an effective system of stormwater run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion. Construction and Decommissioning Phases: - Implement an effective system of stormwater run-off control, where it is required (as specified above). Any occurrences of erosion must be attended to immediately

Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
	Decommissioning Phase: - Loss of agricultural potential by soil degradation. Soil can be degraded by impacts in three different ways: erosion; topsoil loss; and contamination. <u>Positive Indirect Impacts (mainly during operations):</u> - Increased financial security for farming operations.	and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there. - Any excavations done during the construction phase, in areas that will be re-vegetated at the end of the construction phase, must separate the upper 20 cm of topsoil from the rest of the excavation spoils and store it in a separate stockpile. When the excavation is back-filled, the topsoil must be back-filled last, so that it is at the surface. Topsoil should only be stripped in areas that are excavated. Operational Phase: - Maintain the stormwater run-off control system. Monitor erosion and remedy the stormwater control system in the event of any erosion occurring.
Appendix G.2: Terrestrial Biodiversity, Terrestrial Plant Species, and Terrestrial Animal Species Assessment	<u>Negative Direct Impacts:</u> Construction Phase: - Impacts on CBAs, ESAs and ecological processes within the site - Impact on habitat loss within NPAES Focus Areas Operational Phase: - Impact on ecological processes within the site - Impact on Karoo Dwarf Tortoises at the site during operation due to operational activities (vehicles/disturbance) as well as predation by crows. Cumulative Impacts: - Cumulative habitat loss and impact on broad-scale ecological processes	Construction Phase: - Minimise the development footprint as far as possible. - Locate temporary-use areas such as construction camps and lay-down areas in low sensitivity or previously disturbed areas. - Avoid mapped No-Go areas in the placement of pylons, switching stations and access tracks. - Clearly demarcate riparian areas near to the development footprint as No-Go areas with appropriate signage and barriers. - Appropriate design of roads and other infrastructure to minimise faunal impacts. - The fencing around infrastructure should not have any electrified strands within 30cm of the ground as this may result in tortoises being electrocuted. Alternatively, guard wires or mesh can be placed outside of the fence to prevent tortoises from accessing the electrified fence. - Investigate options in collaboration with SANParks as to ways in the potential impact of the development on the NPAES can be reduced and mitigated. Operational Phase: - Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h. - Service staff should remain within the development footprint and not be allowed to wander into the veld. - No fauna including tortoises should be disturbed or removed from the veld. - A log should be kept detailing and fauna-related incidences or mortalities that occur on site. These should be reviewed annually by the Environmental Officer and used to inform operational management and mitigation measures. - Crow nests along any overhead lines within the site, identified during annual surveys and located within 1km of suitable Karoo Dwarf Tortoise habitat should be removed following consultation with an avifaunal specialist to discourage predation of Karoo Dwarf Tortoise by crows.

Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
Appendix G.3: Aquatic Biodiversity	<u>Negative Direct Impacts:</u> Construction Phase: - Decrease in habitat integrity. - Decrease in aquatic ecosystem integrity (removal of aquatic vegetation). - Stress on a water resource. - Decrease in aquatic ecosystem integrity (alien vegetation infestation). - Decrease in water quality. Operational Phase: - Decrease in aquatic ecosystem integrity (ongoing disturbance). - Decrease in aquatic ecosystem integrity (disturbance of cover vegetation and soil). - Modified hydraulics in the watercourses Decommissioning Phase: - Increased disturbance of aquatic habitat due to the increased activity on the site. - Increased sedimentation and risks of contamination of surface water runoff. <u>Negative Cumulative Impacts:</u> Construction and Decommissioning Phases: - Increased disturbance of aquatic habitat due to the increased activity in the wider area. Operational Phases: - Degradation of ecological condition of aquatic ecosystems	Construction Phase: - The medium sensitivity aquatic habitats should be avoided in the layout design, with only low sensitivity habitats being disturbed during construction. - Place PV modules and associated infrastructure outside of aquatic features and recommended development setbacks to minimise works within aquatic ecosystems (i.e. recommended buffer of at least 35 m for the smaller drainage features; and a 50m setback from the larger rivers) - Clearing of indigenous vegetation should not take place within the aquatic features and the recommended buffers. - Water use for construction should be minimised as much as possible. - The road crossing structures should be designed to not impede flow in watercourses - low water crossing is preferred. - The existing road infrastructure should be utilised as far as possible to access new infrastructure to minimise the overall disturbance. It is recommended that any new linear type of infrastructure crossings over watercourses be placed where there are existing structures or road crossings within the watercourse corridors. - Sources of alien seed should be prevented from being brought onto the site with imported materials. - Rehabilitate disturbed aquatic habitats once construction works are complete. - Undertake monitoring for the growth of alien vegetation during the post-construction phase. - Any works within aquatic features should be undertaken in the dry season where possible. - Sediment traps should be used where necessary. - Good housekeeping and site management measures must be implemented at the laydown areas and the construction site as per the project EMP and monitored by the appointed ECO. Operational Phase: - Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areas do not become infested with invasive alien plants. - Develop a stormwater management plan for the proposed development that addresses the stormwater runoff from the developed areas. - Stormwater run-off infrastructure must be designed to mitigate both the flow and water quality impacts of any stormwater leaving the developed areas. The runoff should rather be dissipated over a broad area covered by natural vegetation or managed using appropriate shaping of the road with berms or channels and swales adjacent to hardened surfaces where necessary.

Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
		Decommissioning Phase: - Minimise works within aquatic ecosystems. If the project layout avoided these areas, the decommissioning works would also be able to avoid aquatic habitats on the property. - Rehabilitate and revegetate disturbed areas, where required. - Mitigation and follow-up monitoring of residual impacts (alien vegetation growth and erosion) may be required. - The road network should be returned to that resembling pre-construction, with all additional roads removed where possible. - Decommissioning activities within aquatic features should be undertaken in the dry season where possible. - Sediment traps should be used where necessary. - Laydown areas should be placed within approved PV footprint and layout. - Good housekeeping measures should be implemented as per the project EMP and monitored by the appointed ECO.
Appendix G.4: Avifauna Assessment	<u>Negative Direct Impacts:</u> Construction Phase: - Displacement due to disturbance associated with the construction of the solar PV plant and associated infrastructure. Operational Phase: - Displacement due to habitat transformation associated with the presence of the solar PV plant and associated infrastructure. - Collisions with the solar panels. - Entrapment in perimeter fences. - Electrocutions on the internal 33kV powerlines (if above ground) and in the onsite substation complex. - Collisions with the internal 33kV powerlines (if above ground) and the 132kV grid connection. Decommissioning Phase: - Displacement due to disturbance associated with the decommissioning of the solar PV plant and associated infrastructure. <u>Negative Cumulative Impacts:</u> Construction and Decommissioning Phases: - Displacement due to disturbance associated with the construction and decommissioning of the solar PV plants and associated infrastructure.	Construction Phase: - Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum as far as practical. - The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint is concerned. - A 1 km all infrastructure exclusion zone around the Verreaux's Eagle nests (at -32° 7'18.77"S, 22° 6'39.32"E and at 32°10'18.71"S, 22° 8'41.47"E) is recommended prevent disturbance of the breeding pair. Operational Phase: - The recommendations of the botanical specialist must be strictly implemented, especially as far as limiting the vegetation clearance to what is absolutely necessary, and rehabilitation of transformed areas are concerned. - Where possible, surface water (dams and drainage lines) must be buffered according to the freshwater specialists' recommendations to ensure unhindered access of priority species to the water. No PV panels should be constructed in this zone. - A single perimeter fence should be used. - The hardware within the proposed substation yards is too complex to warrant any mitigation for electrocution at this stage. It is recommended that if on-going impacts are recorded once operational, site-specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red List priority species are unlikely to frequent the substation and be electrocuted. - In instances where the medium voltage cables cannot be buried due to technical constraints, a bird-friendly pole design must be used for the overhead lines. The avifaunal specialist must approve the pole design. - Bird Flight Diverters must be fitted to all overhead lines according to the applicable Eskom Engineering

Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
	Operational Phase: - Displacement due to habitat transformation associated with the presence of the solar PV plants and associated infrastructure. - Collisions with the solar panels. - Entrapment in perimeter fences. - Electrocutions on the internal 33kV powerlines (if above ground) and in the onsite substation complex.	Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines). Decommissioning Phase: - Activity should as far as possible be restricted to the footprint of the infrastructure. - Maximum use should be made of existing access roads during the decommissioning phase and the construction of new roads should be kept to a minimum as far as practical.
Appendix G.5: Visual Impact Assessment	<u>Negative Direct Impacts:</u> Construction Phase: - Potential visual impact of construction activities on sensitive visual receptors in close proximity (within 1 km) to the proposed PV facility. Operational Phase: - Potential visual impact on sensitive visual receptors located within a 1km radius of the PV Facility - Potential visual impact on sensitive visual receptors within the 1 – 3km radius - Potential visual impact on sensitive visual receptors within the 3 – 6km radius - Potential visual impact on sensitive visual receptors within the greater area (beyond 6km radius) - Potential visual impact of operational, safety and security lighting of the facility at night - Potential visual impact of solar glint and glare as a visual distraction and possible air/road travel hazard - Potential visual impact of solar glint and glare on static ground-based receptors (residents of homesteads) in close proximity (within 1km) to the PV facility - Visual impact of the ancillary infrastructure on observers in close proximity to the structures. Decommissioning Phase: - Visual impact of construction activities on sensitive visual receptors in close proximity (within 1km) to the proposed facility. <u>Negative Indirect Impacts:</u> Operational Phase: - The potential impact on the sense of place of the region.	Planning Phase: - Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. - Use anti-reflective panels and dull polishing on structures, where possible and industry standard. - Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) where possible. Construction Phase: - Ensure that vegetation is not unnecessarily removed during the construction period. - Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. - Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at licensed waste facilities. - Reduce and control construction dust using approved dust suppression techniques as and when required - Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts. - Rehabilitate all disturbed areas immediately after the completion of construction works. Operational Phase: - Maintain the general appearance of the facility as a whole. - Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint, where possible. - Shield the sources of light by physical barriers (walls, vegetation, or the structure itself). - Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights. - Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes. - Use anti-reflective panels and dull polishing on structures, where possible and industry standard. - If specific sensitive visual receptors are identified during operation, investigate screening at the receptor site, where possible

Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
	<u>Negative Cumulative Impacts:</u> Construction, Operational and Decommissioning Phases: The potential cumulative visual impact of PV facilities on the visual quality of the landscape.	Decommissioning Phase: - Remove infrastructure not required for the post-decommissioning use of the site. - Rehabilitate all areas as per the rehabilitation plan undertaken. Consult an ecologist regarding rehabilitation specifications. - Monitor rehabilitated areas post-decommissioning and implement remedial actions as required.
Appendix G.6: Heritage Impact Assessment (Archaeology and Cultural Landscape)	<u>Negative Direct Impacts:</u> Construction Phase: - Damage to or disturbance of archaeological sites and materials - Alteration of the cultural landscape Operational Phase: - Alteration of the cultural landscape. Decommissioning Phase: - Alteration of the cultural landscape. <u>Negative Cumulative Impacts:</u> Construction and Decommissioning Phases: - Potential impacts on archaeology. Operational Phase: - Potential impacts on the cultural landscape.	Construction Phase: - Finds of archaeological material are reported to Heritage Western Cape (HWC) and the project archaeologist - Implementation of recommendations of the Visual Impact Assessment to reduce impacts to the cultural landscape. Operational Phase: - Implementation of recommendations of the Visual Impact Assessment to reduce impacts to the cultural landscape Decommissioning Phase: - Implementation of recommendations of the Visual Impact Assessment to reduce impacts to the cultural landscape.
Appendix G.7: Palaeontology Impact Assessment	<u>Negative Direct and Cumulative Impacts:</u> Construction Phase: Loss of fossil heritage	Construction Phase: Implement the Chance Fossil Finds Protocol that has been incorporated into the project EMPs (Appendix H of this EIA Report).
Chapter 13: Socio-Economic Assessment	<u>Direct Negative Impacts</u> Construction Phase: - Social disruption and change in social dynamics; and - Reduced quality of life and increased risks due to construction near residences Decommissioning Phase: - Reduced employment and funding. <u>Direct Positive Impacts</u> Construction Phase: - Capital investment (CapEx) contributing to the national, regional and local economy; - Generation of employment, income and skills.	Note that several mitigation and enhancement measures have been identified in the assessment. The list below is only a summary of some of the recommendations. Positive Impacts – Enhancement Measures: Construction Phase: - Source as many goods and services as far as possible from the local and regional economy - Provide training to staff and service providers before and/or during the construction phase, where possible and practicable. - Ensure diversity and gender equality in recruitment, as far as possible. Operational Phase: - Provide suitable training to service providers, where possible and practicable. - Develop and implement a fair and transparent procurement policy.

Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
	Operational Phase: - Operational investment (OpEx) contributing to the national, regional and local economy; - Generation of employment, income and skills; - Increased community prosperity through contributions and income from the SEF; and - Increased power generation reducing the probability of load shedding. <u>Cumulative Positive Impacts:</u> - Stimulation of economic and employment growth; and - Increased community prosperity through contributions and income from IPPs.	- Maximise use of local skills and resources through preferential employment of locals where practicable. - Regularly engage with community stakeholders to develop meaningful strategies for community development. - Ensure that funding requirements for each project are considered into the future so that projects are viable and sustainable. Negative Impacts – Mitigation Measures: Construction Phase: - Work together with impartial local representatives to identify local people during the recruitment process. - Provide transport to site and other incentives to reduce the number of workers accommodated in EPC accommodation to an absolute minimum. - Consult with the municipality regarding the capacity of existing services and infrastructure to cope with additional workers brought into the area during the construction period. - Consider supporting projects that improve local services and infrastructure and/or deal with social problems or conflicts through the social upliftment programme, if the need arises. - Maintain a visible security presence on site. - Implement a grievance mechanism during the construction phase. - Control site access. - Declare areas outside of the construction site as no-go areas for construction staff. Decommissioning Phase: - Clearly communicate project duration to staff and communities. - Prolong the operational life of the project as much as possible. - Assist with the sustainable administration of funds throughout the project lifetime.
Appendix G.9: Traffic Impact Assessment	<u>Indirect Negative Impacts</u> Construction Phase: - Increased Road Incidents - Road degradation - Dust - Intersection Safety Operational Phase: - Intersection Safety. <u>Cumulative Negative Impacts</u> Construction and Operational Phases: - The cumulative impact due to the increased traffic volumes at intersections will increase the potential	Construction Phase: - Post relevant road signage along affected routes. - Create a local WhatsApp Group, notifying other road users of expected deliveries and associated routes. - Ensure all vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator. - Traffic Management Plan (TMP) is to be compiled once the contractor has been appointed and all the relevant details of the construction process are known. - Developer to contribute to the maintenance of the public roads in the area during the construction phase of the development/s. - A photographic record of the road condition should be maintained throughout the various phases of the development/s. This provides an objective assessment and mitigates any subjective view from road users.

Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
	risk of accidents at the intersections, resulting in serious injuries or even fatalities, especially at the intersection on the main roads, when vehicles from the site need to cross over oncoming traffic.	▪ Upgrade unpaved roads to a suitable condition for proposed construction vehicles. ▪ Ensure that the roads are left in the same or better condition, post-construction. ▪ Dust suppression of the roads in the immediate vicinity of the site where feasible. ▪ Regular preventative maintenance of roads within the immediate vicinity of the site. ▪ Reduce speed at intersections and use appropriate traffic warning signs. Operational Phase: ▪ Compile a Traffic Management Plant (TMP). ▪ Reduce speed at intersections and use appropriate traffic warning signs.
Appendix G.10: Battery Energy Storage System High Level Safety, Health and Environment Risk Assessment	Various risks were identified in terms of safety, health and the environment due to the proposed BESS. The BESS High Level Safety, Health and Environment Risk Assessment identified risks, hazards, and consequences, such as, but not limited to: ▪ Human Health - chronic exposure to toxic chemical or biological agents. Causes - Construction materials such as cement, paints, solvents, welding fumes, truck fumes etc. Consequences - Employee / contractor illness. ▪ Human Health - exposure to noise. Causes - Drilling, piling, generators, air compressors. Consequences - Adverse impact on hearing of workers. Possible nuisance factor in near-by areas. ▪ Human and Equipment Safety - exposure to fire radiation Causes – ▪ Involvement in an external fire. Fire involving fuels used in construction vehicles or vehicles themselves (e.g., tyre fire). Fire due to uncontrolled welding or other hot-work. Consequences - Injuries due to radiation especially amongst first responders and bystanders. Fatalities unlikely from the heat radiation as not highly flammable nor massive fire. ▪ Human and Equipment Safety - exposure to explosion over pressures. Transformer shorting / overheating / explosion. Consequences - Potential fatalities, e.g., amongst first responders. Damage to nearby equipment.	▪ There are numerous different battery technologies but using one consistent battery technology system for the BESS installations associated with all the developments in the Beaufort West area associated with the Genesis Renewable Energy Cluster would allow for ease of training, maintenance, emergency response and could significantly reduce risks. ▪ 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 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. ▪ Location of the facilities needs to ensure a suitable separation distance from public facilities/residences etc. The DBF BESS is partially located within 500m of an occupied farmstead complex. This is not ideal, especially as there is a dominant wind from the south east. The DBF BESS should preferably be located slightly further (>100m) to the south. If this is not possible, it is noted that the risks are low and advice of

Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
		mitigative measures included in the EMPr (Appendix H) should be provided to the farm occupants, e.g. shelter in place indoors. The relocation of the BESS 100m to the south can be accommodated/ micro-sited within the assessed on-site substation complex area. Where there is a choice of alternative locations for the BESS, those that are further from water courses would be preferred. It is noted that there are no tributaries of the main water courses in the area within 200m of the proposed BESS Location.
Appendix G.11: Geohydrology Assessment	Construction Phase - Groundwater impact (lowering) as a result of groundwater abstraction for construction requirements; - Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages, and cleaning agents. Operational Phase - Groundwater impact (lowering) as a result of groundwater abstraction for operational requirements. - Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages, and cleaning agents. Decommissioning Phase - Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages, and cleaning agents. - Groundwater impact (lowering) as a result of groundwater abstraction for decommissioning requirements.	Construction, Operation and Decommissioning Phases: - A quarterly groundwater monitoring programme is recommended to ensure that groundwater abstraction is sustainable due to the high number of existing boreholes in the area. The programme should ideally be initiated at least one year prior to the commencement of construction if the project timeframes permit. This would serve to confirm the baseline water levels throughout one wet and dry season cycle, as well as confirm the baseline water quality. The monitoring will also indicate if the groundwater resource is impacted and mitigation measures can be instituted before long term impacts occur. Mitigation for over-abstraction would be reduction in abstraction. It is therefore highly improbable that the groundwater resource will be depleted as a result of over abstraction, should a quarterly monitoring programme be instated. - Monitoring would also ensure that the extracted volumes comply with relevant authorised abstraction volumes. - Vehicles must be regularly serviced and maintained to check and ensure there are no leakages. A designated area should be established at the construction site camp for this purpose. - Any engines that stand in one place for an excessive length of time must have drip trays. - Construction vehicles and equipment should also be refuelled on an impermeable surface. A designated area should be established at the construction site camp for this purpose, if off-site refuelling is not possible. - If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, and reported. - Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes. - Chemical contamination of the soils, rocks and groundwater beneath the sites that have been proposed for development also pose risk to the environment due to cleaning of solar panels, albeit low. However, it is advised that (chemical) groundwater monitoring be conducted on at least a quarterly basis as precaution for contamination during the construction phase and for a year following. If changes in the groundwater chemistry are detected (e.g. chemicals derived from cleaning agents or compounds derived from petroleum), the advice of a specialist subcontractor should be sought for remediation of the groundwater chemistry

Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
Appendix G.12: Geotechnical Assessment	<u>Direct and Cumulative Negative Impacts during the Construction, Operational and Decommissioning phases:</u> - Displacement of geologic materials - Contamination of subsoils and loss of topsoil.	Construction Phase: - Favour dolerite as an aggregate (as opposed to Karoo sandstones and mudstones). - Any road cuttings should be designed by an appropriately qualified professional. - Drainage on site should be designed and managed appropriately. - Investigate and confirm the geotechnical suitability of each structure prior to construction (i.e. determine that soil with an adequate bearing capacity is obtained beneath each footing). - Only strip vegetation necessary for the next phase of construction. - Install temporary drainage to divert stormwater away from active construction activities, where required. - Stormwater Management Plan must be developed in the preconstruction phase. It should detail the stormwater structures and management interventions that must be installed to manage the increase of surface water flow directly into any natural systems (in consultation with suitably qualified professionals). - Suitable stormwater management systems must be installed along roads and other areas and be monitored during the first few months of use. Any erosion/sedimentation must be resolved through any additional interventions that may be necessary. - Where impacted through construction-related activities, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled. - Any rehabilitation should be scheduled to ensure rehabilitation can take place at the optimal time for vegetation establishment. - Where earthwork is being undertaken near any watercourses, slopes must be stabilised using suitable materials. - Provision must be made for refuelling at the storage area/site camp, and workshop by protecting the soil with an impermeable groundcover or drip trays must be used. - A spill kit should be maintained on site. If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes. Operational Phase: - Install drainage to divert stormwater away from activities, roads/tracks, structures, where required. - Stormwater Management Plan must be developed in the preconstruction phase and should detail the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems, where possible and lawful. - During the execution of the operations, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented.

Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
		- Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover/bunding. Where dispensing equipment is used, a drip tray must be used. - If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material. Proof of disposal should be obtained and retained on file for auditing purposes. Construction Phase: - Only drive and park vehicles where necessary. - Land rehabilitation to near natural state, i.e. removal of foundations and backfilling of any resultant voids within the soil, as well as removal of hard surfaced areas. Replacement soil should be sourced locally to ensure homogeneity. Reseeding with natural vegetation grasses, and seeds will further mitigate future displacement. - Reinstate natural topography where cut-to-fill embankments have been constructed. - Appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that equipment is well maintained. - Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. - A spill kit should be maintained on site. If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material. Proof of disposal should be obtained and retained on file for auditing purposes.

SUMMARY OF KEY IMPACT ASSESSMENT FINDINGS

Based on the findings of the detailed specialist impact assessments, which are included in Appendix G of this EIA Report, the proposed project is considered to have an **overall Moderate to Very Low negative environmental impact** and an **overall Moderate to Low positive socio-economic impact** (with the implementation of respective mitigation and enhancement measures). Table D below provides a summary of the impact assessment for the proposed project post mitigation for direct impacts. Table E provides the same information for the cumulative impacts.

As indicated in Table D, the **direct negative impacts** were rated with an overall **Low to Very Low** post-mitigation impact significance for the **construction phase**, with the exception of Terrestrial Biodiversity, Aquatic Biodiversity and Visual impacts being rated as Moderate. In terms of the **operational and decommissioning phases**, the majority of the direct negative impacts were rated with a **Low to Very Low** post-mitigation impact significance. In terms of **direct positive impacts**, the Socio-Economic impacts are rated as having a **Moderate** impact significance post-mitigation for the construction phase; and **Low** impact significance post-mitigation for the operational phase.

Based on Table E, the majority of the **cumulative negative impacts** were rated with a **Low** post-mitigation impact significance for the **construction phase**, with the exception of Terrestrial Biodiversity and Visual impacts being rated as Moderate. In terms of the **operational phase**, the majority of the cumulative negative impacts were rated with a **Low to Very Low** post-mitigation impact significance; with the exception of Avifauna Biodiversity, Traffic impacts and Visual impacts being rated as Moderate. In terms of the **decommissioning phase**, the majority of the cumulative negative impacts were rated with a **Low to Very Low** post-mitigation impact significance; with the exception of Visual impacts being rated as Moderate. In terms of **cumulative positive impacts**, the Socio-Economic impacts are rated as having a **Moderate** impact significance post-mitigation for the construction phase; and **Low** impact significance post-mitigation for the operational phase.

Table D: Overall Impact Significance with the Implementation of Mitigation Measures for Direct Negative and Positive Impacts

Specialist Study	Construction	Operational	Decommissioning
Direct Negative Impacts			
Agriculture	Very Low	Very Low	Very Low
Terrestrial Biodiversity and Terrestrial Animal Species	Moderate	Low	Low
Karoo Dwarf Tortoise Species Assessment	Low	Low	Low
Terrestrial Plant Species	Low	Low	Low
Aquatic Biodiversity and Species	Moderate	Moderate	Low
Avifauna Assessment	Low	Low	Low
Visual Impact Assessment	Moderate	Low	Moderate
Heritage Impact Assessment (Archaeology and Cultural Heritage)	Low	Low	Low
Palaeontological Impact Assessment	Low	No impact	No impact
Socio-Economic Assessment	Insignificant and/or not identified and/or not applicable	Insignificant and/or not identified and/or not applicable	Low
Traffic Impact Assessment	Low	Moderate	New TIA to be undertaken at decommissioning
Geohydrology Assessment	Low	Very Low	Very Low
Geotechnical Assessment	Very Low	Very Low	Very Low
Direct Positive Impacts			
Socio-Economic Assessment	Moderate	Low	Insignificant and/or not identified and/or not applicable

Table E: Overall Impact Significance with the Implementation of Mitigation Measures for Cumulative Negative and Positive Impacts

Specialist Study	Construction	Operational	Decommissioning
Direct Negative Impacts			
Agriculture	Low	Low	Low
Terrestrial Biodiversity and Terrestrial Animal Species	Moderate	Low	Low
Karoo Dwarf Tortoise Species Assessment	Low	Low	Low
Terrestrial Plant Species	Low	Low	Low
Aquatic Biodiversity and Species	Low	Low	Very Low
Avifauna Assessment	Low	Moderate	Low
Visual Impact Assessment	Moderate	Moderate	Moderate
Heritage Impact Assessment (Archaeology and Cultural Heritage)	Low	Low	Low
Palaeontological Impact Assessment	Low	No impact	No impact
Socio-Economic Assessment	Insignificant and/or not identified and/or not applicable	Insignificant and/or not identified and/or not applicable	Low
Traffic Impact Assessment	Moderate	Moderate	New TIA to be undertaken at decommissioning
Geohydrology Assessment	Low	Very Low	Very Low
Geotechnical Assessment	Low	Low	Low
Direct Positive Impacts			
Socio-Economic Assessment	Moderate	Low	Insignificant and/or not identified and/or not applicable

OVERALL ENVIRONMENTAL IMPACT ASSESSMENT AND REASONED OPINION FROM THE EAP

The information presented above, contributes to this overall environmental impact statement and reasoned opinion from the EAP as to whether the proposed project should or should not be authorised, including any conditions that should be made in respect of the authorisation (should it be granted).

Based on the findings of the detailed specialist assessments and technical studies, which all recommend that the proposed project can proceed and should be authorised by the DFFE, the proposed project is considered to have an **overall Moderate to Low negative environmental impact, and an overall Low to Moderate positive socio-economic impact** (with the effective implementation of respective mitigation and enhancement measures).

The proposed project will take place within the development footprint on the preferred project site, as contemplated in the accepted Final Scoping Report. The development footprint and buildable areas

will avoid the “no-go” sensitive features identified and mapped by the respective specialists, where relevant and applicable.

This EIA has considered the nature, scale and location of the development as well as the wise use of land. The need for new solar PV generation capacity is specified in the energy planning for the country. When considering the timing of this project, the IRP 2019 proposes to secure 17 800 MW of renewable energy capacity by 2030. It is the Project Applicant’s intention to bid this project in the future bidding rounds of the REIPPPP. The proposed project will therefore assist in generating additional electricity that is urgently required to address the shortage of generation capacity in the country.

The proposed project will be in line with and will be supportive of the objective of the BWLM IDP in terms of leveraging the competitive advantages of the region’s significant renewable energy resources. If approved by DFFE, the proposed Solar PV Facility will provide skills development opportunities, create contractual and permanent employment in the area, and consequently provide catalytic opportunities for downstream economic development.

Section 24 of the Constitutional Act states 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, that prevents pollution and ecological degradation; promotes conservation; and secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”*. Based on this, this EIA was undertaken to ensure that these principles are met through the inclusion of appropriate management and mitigation measures, and monitoring requirements. These measures will be undertaken to promote conservation by avoiding the sensitive environmental features present on site and through appropriate monitoring and management plans (refer to the EMPr in Appendix H of this EIA Report).

Furthermore, mitigation measures such as committing some of the land adjacent to the Karoo National Park (KNP) to stewardship or similar conservation commitment are being investigated. The purpose of these engagements is to co-generate a mechanism that balances and achieves the imperatives of both biodiversity conservation and renewable energy development. The conclusion of an agreement between SANParks, the Project Applicant and the affected landowners is recommended by the EAP as a condition to be included in the EA by the Competent Authority, the DFFE.

The outcomes of this project therefore succeed in meeting the environmental management objectives of protecting the ecologically sensitive areas and supporting sustainable development and the use of natural resources, whilst promoting justifiable socio-economic development in the towns nearest to the project site. The findings of this EIA show that all natural resources will be used in a sustainable manner (i.e., this project is a renewable energy project, and the majority of the negative site specific and cumulative environmental impacts are considered to be of low significance with mitigation measures implemented), while the benefits from the project will promote justifiable economic and social development. Furthermore, additional specialist studies (not recommended by the Screening Tool) have been undertaken as part of the EIA Process to ensure that all potential environmental impacts are addressed and assessed.

Taking into consideration the findings of the Scoping and EIA Process and given the national and provincial strategic requirements for infrastructure development, particularly from an electricity generation perspective, and based on the fact that the environmental sensitivity of the study area is

largely medium to low, with a few isolated high and very high sensitivity areas, it is the opinion of the EAP, that the project benefits outweigh the costs and that the project will make a positive contribution to sustainable infrastructure development in the Beaufort West Local Municipality, as well as Central Karoo District.

Provided that the specified mitigation measures and management actions are applied effectively throughout, it is recommended that the proposed project receive EA in terms of the 2014 NEMA EIA Regulations (as amended). It is recommended that the EA (should it be granted) be **valid for a period of 10 years**. It is understood that the information contained in this EIA Report and appendices is sufficient to make a decision in respect of the activity applied for.

Scoping and Environmental Impact Assessment for the
proposed development of the Genesis DBF South Solar
Energy Facility and associated infrastructure near
Beaufort West in the Western Cape



FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER I: Introduction



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1.INTRODUCTION

Genesis Eco-Energy Developments (Pty) Ltd (hereafter referred to as “GEED” or the “Project Developer”) intends to develop a Renewable Energy Cluster located north-west of Beaufort West within the Beaufort West Local Municipality and the Central Karoo District Municipality in the Western Cape Province (Figure 1.1.)

Three separate clusters are proposed as follow, which are also shown in Table 1.1 with the corresponding Project and Applicant names:

- Northern Cluster
- Middle Cluster
- Southern Cluster

Table 1.1: GEED Renewable Energy Cluster Proposed Projects

Project	Applicant
NORTHERN CLUSTER	
Eland WEF, 132 kV EGI, BESS and associated infrastructure	Genesis Eland Wind Farm (Pty) Ltd
Windy Plains WEF, 132 kV EGI, BESS and associated infrastructure	Genesis Windy Plains Wind Farm (Pty) Ltd
MIDDLE CLUSTER	
Aloe WEF, 132 kV EGI, BESS and associated infrastructure	Genesis Aloe Wind Farm (Pty) Ltd
Elegia WEF, 132 kV EGI, BESS and associated infrastructure	Genesis Elegia Wind Farm (Pty) Ltd
Gazania WEF, 132 kV EGI, BESS and associated infrastructure	Genesis Gazania Wind Farm (Pty) Ltd
SOUTHERN CLUSTER	
Beau Valley WEF, 132 kV EGI, BESS and associated infrastructure	Genesis Beau Valley Wind Farm (Pty) Ltd
Beau Valley SEF, 132 kV EGI, BESS and associated infrastructure	Genesis Beau Valley Solar Farm (Pty) Ltd
DBF South WEF, 132 kV EGI, BESS and associated infrastructure	Genesis DBF South Wind Farm (Pty) Ltd
DBF South SEF, 132 kV EGI, BESS and associated infrastructure	Genesis DBF South Solar Farm (Pty) Ltd
SUPPORTING 400 kV EGI	
400 kV Overhead Transmission Power Line and a 132/400 kV Collector Substation and Associated Infrastructure	Genesis Eco-Energy Developments (Pty) Ltd

Separate Applications and EIA Reports for each of the above-mentioned projects will be submitted to DFFE for decision-making. **This Environmental Impact Assessment (EIA) Report only addresses the proposed Genesis DBF South Solar Energy Facility (hereafter referred to as the “DBF South SEF” or “proposed project”).**

The proposed DBF South SEF will comprise a maximum of 400 MW and will be located approximately 45 km north-west of Beaufort West. The proposed project will make use of PV solar technology to generate electricity from energy derived from the sun. The associated infrastructure on site includes various structures, buildings and internal electrical grid infrastructure (“EGI”),

including but not limited to an on-site substation and a battery energy storage system. The Applicant is also proposing the development of a 132 kV overhead transmission power line (OHPL) and associated EGI, located within a 300 m assessment corridor, to facilitate the connection of the proposed project to the national electrical grid network via a collector substation. A separate environment application and assessment will be undertaken for the development of a 400 kV power line from the proposed GEED Collector Substation to the national electrical grid.

The proposed DBF SEF (Figure 1.2) will be constructed on Doornboomfontyn Farm RE/89 with a 132 kV Overhead Transmission Power Line (OHPL) extending from the DBF SEF on-site substation to the Beau Valley WEF on-site substation on Portion 1 of Doornboomfontyn Farm 89.

The Scoping Report and Specialists reports (see Appendix G) assessed a larger scoping phase PV area which extended on to Hartebeeste Vleis Berg Farm 213. However, following environmental sensitivity inputs from the specialists assessments, the revised EIA phase layout has been reduced and therefore only affects:

- Doornboomfontyn Farm RE/89
- Doornboomfontyn Farm 1/89

This chapter provides an introduction of the proposed project, and includes the following:

- An overview of the proposed project and associated infrastructure;
- Project Motivation;
- The legal requirements for an EIA;
- Information on the Project Developer and Project Applicant;
- The Competent Authority and EIA Project Team;
- Details and Expertise of the CSIR EIA Project Management Team;
- Need and Desirability;
- The objectives of the Scoping Report; and
- Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended).

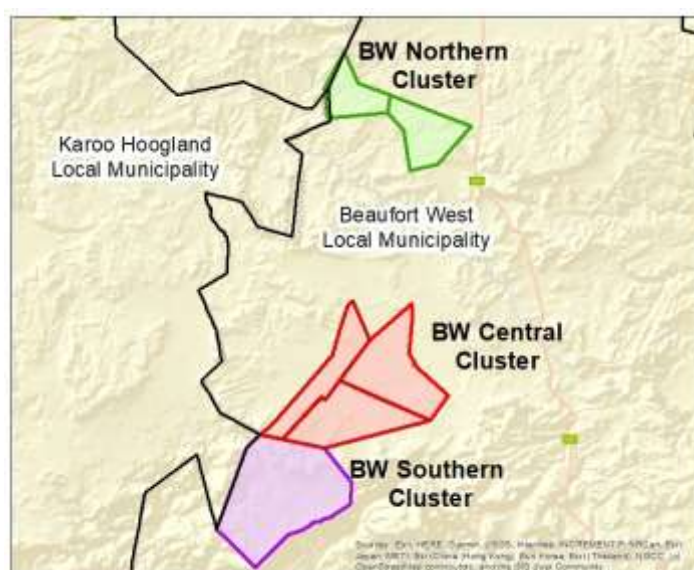


Figure 1.1: GEED Renewable Energy Cluster, approximately 40 km northwest of Beaufort West

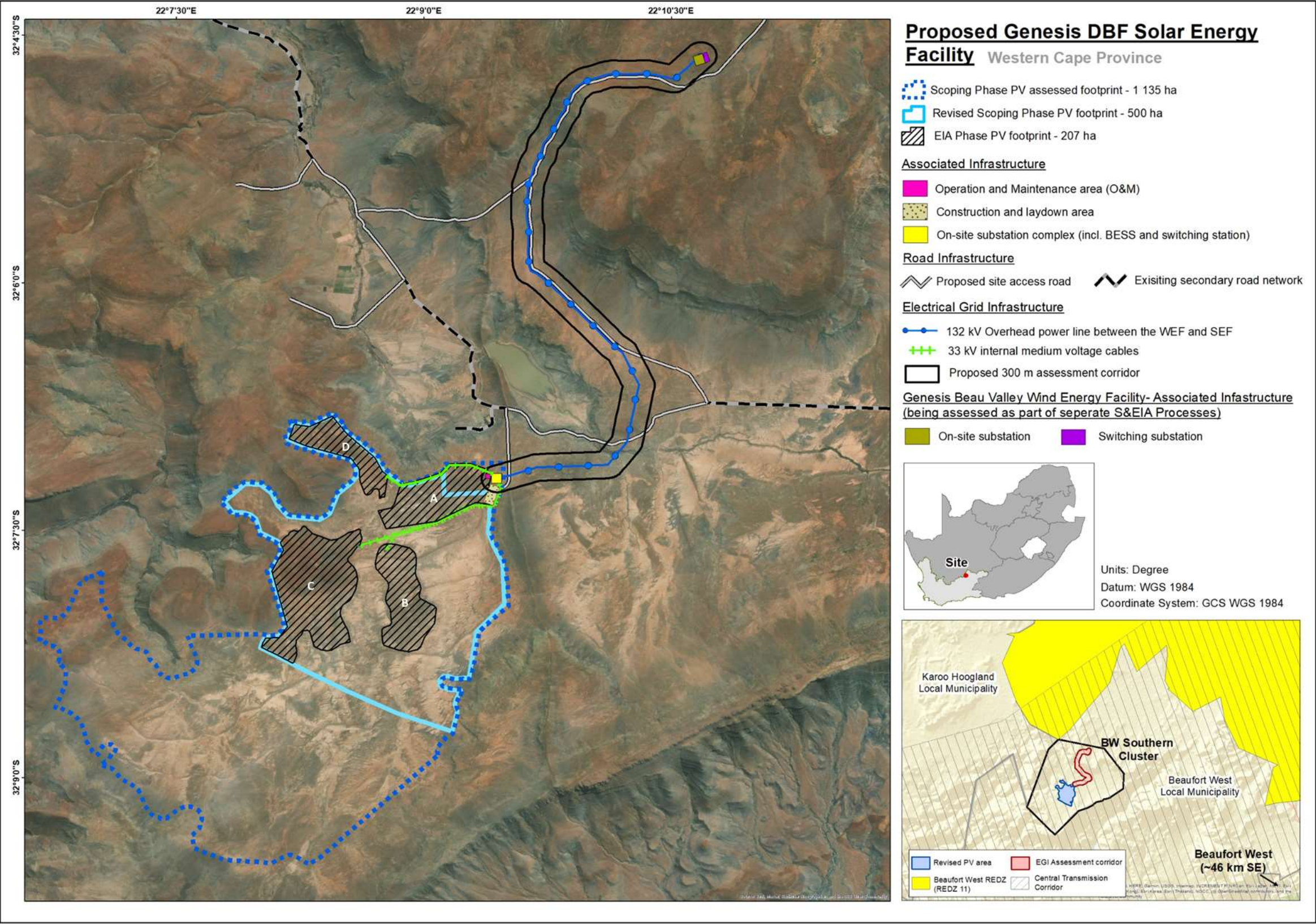


Figure 1.2: Locality map for the proposed Genesis DBF South SEF and EGI near Beaufort West in the Western Cape. Note that the on-site substation and 132 kV power line to connect the proposed project to the Genesis Collector Substation form part of the current application and report.

1.1. Overview of the Proposed Project

The proposed project will consist of the key infrastructure components listed in Chapter 2 of this EIA Report, as summarised below:

- Solar Field, comprising Solar Arrays with a maximum height of approximately 4 m.
- Building Infrastructure (e.g., on-site substation complex; offices; operational and maintenance building and control centre; warehouse/workshop; ablution facilities; Inverter-Transformer stations; and guard house).
- An on-site substation complex including the following:
 - On-site Substation.
 - Lithium-Ion, Sodium-Ion, or Redox Flow BESS (only 1 technology to be selected for construction).
- A 132 kV OHPL and associated EGI, located within a 300 m assessment corridor, to facilitate the connection of the proposed project to the national electrical grid network via a collector substation.
- Associated Infrastructure (e.g. temporary construction laydown area; internal roads up to 6 m wide; widening and/or upgrading of existing access roads (where required); fencing; storm water channels; panel maintenance and cleaning area; underground low voltage cables or cable trays; and 33 kV internal underground power lines¹).

The generation capacity for the DBF South SEF is estimated at 400 Megawatts (MW)². The construction period is estimated to extend 24 to 30 months. Once the commercial operation date is achieved, the proposed facility will generate electricity for 20 to 25 years.

1.2. Project Motivation

The need for renewable energy is clear, in both a local and international context, with South Africa becoming an integral part of the global transition towards renewable sources of electricity generation. South Africa is one of the highest per capita producers of carbon emissions in the world. These emissions are largely a result of an energy-intensive economy and high dependence on coal-based electricity generation to meet more than 90% of its energy needs. Consequently, the South African government is committed to supplementing the existing generation capacity of thermal and nuclear power plants with renewable energy power generation, thus creating the framework that will lead to an increase in the supply of clean energy for the nation. The development of renewable energy is important for South Africa to reduce its overall environmental footprint from power generation (including externality costs), and thereby to steer the country on a pathway towards sustainability.

¹ The internal reticulation would be 33 kV, and most likely underground. In the isolated event of crossing a feature hindering underground cabling (e.g. a road, topographical or environmental constraint) the reticulation line may better be suited to be above ground in certain sections. Therefore, both below and above ground routings need to be covered in this Application for EA.

² Subject to engineering design and energy yield assessment to be undertaken by the applicant following the environmental authorization process.

Commitment toward decarbonisation of the economy is clearly illustrated in the South Africa's National Development Plan (NDP) Vision 2030 published in 2012. Chapters 4 and 5 of the NDP advocates for increased investment in an energy sector that is both economically inclusive and environmentally sustainable – with renewable energy at the core of enabling this transition. The plan identifies, as a priority, the production of sufficient energy to support industry at competitive prices, ensuring access for poor households, while reducing the carbon intensity of the economy.

In addition, due to the current constrained energy landscape and frequent loadshedding, the South African Government has articulated a plan to address the energy crisis. The President of South Africa delivered a speech on 25 July 2022 to inform the public of the plan towards achieving a reliable, affordable and sustainable energy supply (The Presidency, 2022³). In addition, the Minister of Forestry, Fisheries and the Environment also held a stakeholder engagement session on 21 July 2022 during which she highlighted proposed mechanisms for streamlining environmental approvals for solar energy development in low and medium sensitivity areas throughout the country; as well as power line and substation development within low and medium sensitivity areas within the gazetted EGI corridors (DFFE, 2022⁴). One of those mechanisms has already been gazetted for implementation, as noted above (i.e., the EGI Standard published in GG 47095; GN 2313, dated 27 July 2022).

Further, the Integrated Resource Plan (IRP) for South Africa for the period 2010 to 2030 (referred to as "IRP2010") was released by government in 2010, and an updated report was published in 2013, which proposed to secure 17 800 MW of renewable energy capacity by 2030 (including solar, wind and other energy sources). In August 2011, the Department of Energy (DoE) (currently operating as the Department of Mineral Resources and Energy (DMRE)) launched the Renewable Energy Independent Power Producer Programme (REIPPPP) and invited potential IPPs to submit proposals for the financing, construction, operation and maintenance of the first 3 725 MW of onshore wind, solar thermal, PV, biomass, biogas, landfill gas or small hydropower projects. On 18 August 2015, an additional procurement target of 6 300 MW to be generated from renewable energy sources was added to the REIPPPP for the years 2021 - 2025, as published in GN 733, GG 39111. Of this, the additional target allocated for solar PV was 2 200 MW.

The most recent update to the IRP i.e., the IRP 2019, was gazetted by the Minister of Mineral Resources and Energy, Gwede Mantashe, in October 2019. The update revised the energy forecast for South Africa to the year 2030. Provision has been made for new additional capacity by 2030 including in particular 14 400 MW of wind and 6 000 MW of solar PV. In terms of the REIPPPP, submitted proposals are then evaluated according to a Request for Proposal (RFP). Bidding Window 5 had the same two main evaluation criteria for compliant proposals as the previous Bidding Windows 1-4, namely price and economic development. However, for Bidding Window 5, the point allocation changed to 90/10 compared to 70/30 for the previous Bidding Windows.

³ The Presidency (2022). *Address by President Cyril Ramaphosa on actions to address the electricity crisis, Union Buildings, Tshwane*. Accessed online: <https://www.thepresidency.gov.za/speeches/address-president-cyril-ramaphosa-actions-address-electricity-crisis%2C-union-buildings%2C-tshwane> [August 2022]

⁴ DFFE (2022). *Minister Creecy announces improved environmental assessment processes for solar energy*. Accessed online: https://www.dffe.gov.za/creecy_environmentalassessmentprocesses_solarenergy [August 2022]

The overview summary document (DMRE, 2022⁵) on the RFP issued for Bidding Window 6 notes that Bid responses will be assessed firstly in terms of Functional and Qualification Criteria to determine if they are compliant. These criteria include the structure of the project; legal aspects; land acquisition and land use; environmental; financial; technical; economic development; and value for money. Secondly, the compliant Bids are proposed to be evaluated on a comparative basis (out of 100 points) in terms of price (maximum of 90 points) and economic development (maximum of 10 points). Therefore, economic development has been retained as a qualification criterion based on the RFP for Bidding Window 5, but it is also considered in the comparative scoring (DMRE, 2022). The bidders whose responses rank the highest (according to the aforementioned criteria) generally have the greatest potential to be appointed as “Preferred Bidders” by the DMRE.

Bidding Window 5 was conducted during 2021 with an allocation of 2 600 MW for new wind and solar energy. The successful bidders were announced on 28 October 2021. Bidding Window 6 was announced in April 2022 with an allocation of 4 200 MW of renewable energy of which solar comprises 1 000 MW.

Should this proposed project be acceptable and authorised, it is considered viable that long-term benefits for the community and society in the Beaufort West area would be realised. The proposed project will provide an opportunity for additional employment in an area where job creation is identified as a key priority. Approximately 300-400 employment opportunities will be created during the construction phase, and approximately 40-50 during the operational phase of the proposed project. The proposed project will make use of local labour as much as possible.

The project is intended to address the current energy shortages in South Africa and assist in meeting the need for additional renewable energy generation capacity, as required by the IRP of 2019. The proposed project will provide up to 400 MW electricity,

The proposed project would also have international significance as it contributes to South Africa being able to meet some of its international obligations by aligning domestic policy with internationally agreed strategies and standards as set by the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Agreement on Climate Change, Kyoto Protocol, and United Nations Convention on Biological Diversity (UNCBD), all of which South Africa is a signatory to. Renewable energy is critical to South Africa as this source of energy is recognised as a major contributor to climate protection, has a much lower environmental impact significance, as well as advancing economic and social development.

It is intended that this project will be bid into a future bidding program of the REIPPPP (or another future process linked to the IRP). To submit a Bid in terms of the REIPPPP, the Project Applicant is required to have obtained an EA in terms of the 2014 NEMA EIA Regulations (as amended), as well as several additional authorisations or consents. Alternatively, the project may be considered for private-offtake and/or any other viable commercial and industrial agreements.

⁵ DMRE (2022). Overview of the Request for Qualification and Proposals for New Generation Capacity under Sixth Bid Submission Phase of the Renewable Energy Independent Power Producer Procurement Programme. Accessed online: <https://www.ipp-renewables.co.za/> [June 2022]

1.3. Legal Requirements for an EIA

Section 24(1) of the NEMA, states that “In order to give effect to the general objectives of integrated environmental management laid down in this Chapter, the potential impact on the environment of listed activities must be considered, investigated, assessed and reported to the competent authority charged by this Act with granting the relevant EA”. The reference to “listed activities” relates to the regulations promulgated in GN R982, R983, R984 and R985 in GG 38282, dated 4 December 2014, which came into effect on 8 December 2014. These were amended on 7 April 2017, specifically promulgated in GN R326, R327, R325 and R324 in GG 40772; and further amended on 11 June 2021 in GN 517; and on 3 March 2022 in GN 1816. GN R327 and GN R324 includes listed activities that trigger the need for a BA Process, whereas GN R325 includes listed activities that trigger the need for a full Scoping and EIA Process. Additional detail is provided in Chapter 4 of this Scoping Report.

In terms of the NEMA and the 2014 NEMA EIA Regulations (as amended), a full Scoping and EIA Process is required for the proposed project.

The proposed project is not located within any of the Renewable Energy Development Zones (REDZs) that were gazetted in GG 41445, GN 114 on 16 February 2018; and GG 44191, GN 144 on 26 February 2021, hence it is subjected to a full Scoping and EIA Process with a 107-day decision-making timeframe, as opposed to a BA Process and 57-day decision-making timeframe allowed for in the REDZs. It should be noted however that the proposed project falls within 1.5 km at its closest point to the Beaufort West REDZ 10. The proposed project is located within the Central Strategic Transmission Corridor that was gazetted in GN 113 on 16 February 2018.

The need for the full Scoping and EIA is triggered by, amongst others, the inclusion of Activity 1 listed in GN R325 (Listing Notice 2):

- ***“The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facility or infrastructure is for photovoltaic installations and occurs (a) within an urban area; or (b) on existing infrastructure”.***

Chapter 4 of this Scoping Report contains the detailed list of activities contained in GN R327, R325, and R324, which may be triggered by the various project components and thus form part of the Scoping and EIA Process.

1.4. Project Developer

Genesis Eco-Energy Developments (Pty) Ltd (GEED) was established in 2001 and is one of South Africa’s pioneering renewable energy companies providing project development, management and operations services across a range of renewable energy technologies. Their focus is on free fuel renewable energy (wind, solar PV and marine technologies) as well as bio-energy.

GEED employs a team of highly experienced people who have worked locally and internationally in areas ranging from energy strategy, policy formulation, energy trading, financial services, land, agriculture and rural development, through to project design, development, management and

implementation. Their team has developed and implemented projects in a number of countries and bring this expertise and experience to bear when designing and implementing projects in South Africa and the SADC region.

Genesis has helped to develop a number of solar PV projects with two 50 MW projects having been selected as Preferred Bidders in Round 1 of the REIPPPP.

The Droogfontein and De Aar projects have both completed construction and Genesis exited these projects through sale to incoming investors.

Currently Genesis is developing a number of solar PV projects in the Northern Cape and Free State province which it will be submitting for future rounds of REIPPPP.

1.5. Project Applicant

The Project Applicant for the proposed project is **Genesis DBF South Solar Farm (Pty) Ltd**, a special purpose vehicle set up by the Project Developer to undertake the proposed project.

1.6. Competent Authority and EIA Project Team

In accordance with Regulation 12 (1) of the 2014 NEMA EIA Regulations (as amended), GEED has appointed the Council for Scientific and Industrial Research (CSIR) to undertake the Scoping and EIA Process to determine the potential biophysical, social and economic impacts associated with the proposed project, and to identify how such negative impacts can be avoided, remedied, mitigated or managed; and how positive impacts can be enhanced. Public participation forms an integral part of the Scoping and EIA Process and assists in identifying issues and possible alternatives to be considered. The CSIR is also undertaking the Public Participation Process (PPP) for this Scoping and EIA Process. Details on the PPP are included in Chapter 4 of this Scoping Report.

The 2014 NEMA EIA Regulations, as amended in GN 517 on 11 June 2021 states that the Competent Authority (CA) in respect of the listed activities *“is the CA in the province in which the activity is to be undertaken, unless: (a) it is an application for an activity contemplated in Section 24C(2) of the Act, in which case the CA is the Minister or an organ of state with delegated powers in terms of Section 42(1) of the Act; or (b) the application is a mining application in which case the CA is the Minister responsible for mineral resources”*.

With relevance to the proposed project, Section 24C (2) (a) (i) of NEMA states *“(2) the Minister must be identified as the competent authority in terms of subsection (1), unless otherwise agreed to in terms of section 24C (3), if the activity (a) has implications for international environmental commitments or relations, and where (i) it is identified by the Minister by notice in the Gazette”*.

Related to this, GN 779 states that, in terms of Sections 24C(1), 24C(2)(a)(i) and 24D of the NEMA, the Minister of Environmental Affairs (now Forestry, Fisheries and the Environment) is the CA for activities which are identified as activities in terms of Section 24(2)(a) of NEMA, which may not commence without an EA, and which relates to the Integrated Resources Plan (IRP) 2010 - 2030

and any updates thereto. The proposed project triggers various listed activities and thus requires EA. As noted above, the proposed project will be bid into a future bidding program of REIPPPP. Based on the above, the National DFFE serves as the CA for the proposed project.

The project team, which is involved in this Scoping and EIA Process, is listed in Table 1.2 below. This team includes several specialists who have extensive experience in conducting specialist studies for renewable energy projects in South Africa.

Table 1.2: The EIA Project Team

NAME	ORGANISATION	ROLE/STUDY UNDERTAKEN
CSIR Environmental Management Services		
Paul Lochner (<i>Registered EAP (2019/745)</i>)	CSIR	EAP, Technical Advisor and Quality Assurance
Willan Adonis	CSIR	Project Manager
Helen Antonopoulos	CSIR	Project Officer
Dhiveshni Moodley (<i>Cand.Sci.Nat.</i>)	CSIR	GIS Specialist
Sonto Mkize	CSIR	Project Officer
Specialists		
Johann Lanz (<i>Pr.Sci.Nat.</i>)	Private	Agriculture and Soils Compliance Statement
Simon Todd (<i>Pr.Sci.Nat.</i>)	3Foxes Biodiversity Solutions	Terrestrial Biodiversity, Terrestrial Plant Species, and Terrestrial Animal Species
Toni Belcher (<i>Pr.Sci.Nat.</i>)	Private	Aquatic Biodiversity Impact Assessment
Chris van Rooyen ⁶ Albert Froneman (<i>Pr.Sci.Nat.</i>)	Chris van Rooyen Consulting, AfriAvian Environmental (Pty) Ltd	Avifauna Impact Assessment
Lourens Du Plessis	LOGIS	Visual Impact Assessment
John Gribble	ACO Associates	Heritage Impact Assessment (Archaeology and Cultural Landscape)
Elize Butler	BANZAI Environmental	Palaeontology Site Sensitivity Verification Report
Sue Reuther Christopher Dalgliesh	SRK Consulting	Socio-Economic Impact Assessment
Athol Schwartz (<i>Pr. Tech.</i>)	Private	Traffic Impact Assessment
Debbie Mitchell (<i>Pr Eng</i>)	Ishecon cc	Battery Storage High Level Safety, Health and Environment Risk Assessment
Louis Jonk (<i>Pr.Sci.Nat.</i>)	GEOSS South Africa (PTY) Ltd	Geohydrology Assessment
Louis Jonk (<i>Pr.Sci.Nat.</i>) Shane Teek (<i>Pr.Sci.Nat.</i>)	GEOSS South Africa (PTY) Ltd	Desktop Geotechnical Assessment
Helen Antonopoulos Paul Lochner (Reg. EAP (2019/745))	CSIR	Civil Aviation Site Sensitivity Verification
	CSIR	Defence Site Sensitivity Verification

⁶ Please note that the Avifauna Impact Assessment was authored by Chris van Rooyen before his passing in June 2023. Mr van Rooyen worked under the supervision and in association with Albert Froneman. Following Mr van Rooyen's passing, Albert Froneman has assumed lead authorship as the avifaunal specialist and will continue to provide specialist input on the proposed project under AfriAvian Environmental (Pty) Ltd.

Feedback on the specialist studies commissioned as part of this Scoping and EIA Process is also included in Chapter 3, Chapter 4, Chapter 6 and Chapter 7 of this EIA Report. Chapter 4 also includes motivation for not undertaking certain studies identified by the Screening Tool.

1.7. Details and Expertise of the CSIR EIA Project Management Team

This section provides information on the expertise of the CSIR EIA Project Management Team and Environmental Assessment Practitioner (EAP).

Paul Lochner (Registered EAP; Technical Advisor and Quality Assurance):

Paul Lochner is an EAP at the CSIR in Stellenbosch, with 30 years of experience in a wide range of environmental assessment and management studies. Paul commenced work at CSIR in 1992, after completing a B.Sc. degree in Civil Engineering and a Masters in Environmental Science, both at the University of Cape Town. His initial work at focused on wetlands and estuarine management; environmental engineering in the coastal zone; and coastal zone management plans. Since 2008, Paul has been the leader and manager of the Environmental Management Services (EMS) group within CSIR that has been at the forefront of advancing environmental assessment in South Africa. This group currently consists of approximately 10 environmental scientists, planners and engineers, with offices in Stellenbosch, Cape Town and Durban. Paul's particular experience is in environmental planning and assessment for renewable energy, EGI, desalination, oil and gas, wetlands and coastal zone management, and industrial and port development. He has been closely involvement in the research and application of Strategic Environmental Assessment (SEA) in South Africa, and also has wide experience in Environmental and Social Impact Assessment, Environmental Management Programmes (EMPRs) and Environmental Screening Studies. He has been the project leader for over 40 SEAs and EIAs. He also served as project leader for a suite of SEAs commissioned by the DFFE from 2014 to 2020. Paul is a Registered EAP (2019/745) with the Environmental Assessment Practitioners Association of South Africa (EAPASA).

Willan Adonis (Project Manager):

Willan Adonis is an environmental consultant in the CSIR's EMS group. Willan holds a BA, a PGDip and an MPhil (all Cum Laude) in Development and Environmental Management from Stellenbosch University. Willan has experience in on-site compliance monitoring, he has authored BA and Scoping and EIA Reports, compiled EMPRs, and undertook several public participation processes for renewable energy, municipal services, and industrial developments. His key interest is in how the multi-disciplinary interfaces between Environmental, Social and Governance systems can be used to build stakeholder partnerships and promote sustainable human-environment relationships.

Helen Antonopoulos (Project Officer):

Helen Antonopoulos is an intern Environmental Consultant in the EMS group of the CSIR and holds BSc, BSc Honours, and MSc degrees in Environmental and Geographical Science from the University of Cape Town. She has assisted with compiling EA applications for Wind Energy Facilities in the Western Cape, as well as BA and Scoping Reports for Solar Facilities in the Northern Cape. She is interested in using renewable energy projects to promote sustainable development in South Africa.

Dhiveshni Moodley (Cand. Sci. Nat., GIS Specialist):

Dhiveshni Moodley is environmental scientist at the CSIR in Durban. Dhiveshni holds a BSc, BSc Honours (cum laude) and MSc (cum laude) degrees in Environmental Science from the University of KwaZulu-Natal. She has more than two year's work experience in flood risk, hydrogeological and wetland functional assessment specialist studies, as well as conducting BAs and S&EIAs in the Renewable Energy sector. Her key interest lies in applying GIS analyses analysing the formation of accurate, feasible solutions to complex environmental challenges.

Dhiveshni is registered as a Candidate Natural Scientist (#1472997/19) with the SACNASP.

Sonto Mkize (Project Officer):

Sonto Mkize is an Environmental Assessment Practitioner Intern for the EMS group at CSIR. Sonto holds a BSc and BSc Honours in Urban and Regional Planning from the University of the Witwatersrand, and a MSc in Sustainable Urban Planning and Design from KTH Royal Institute of Technology in Sweden. She has assisted in compiling Basic Assessment and Scoping and Environmental Impact Assessment reports for wind and solar energy facilities in various provinces. Her key interests primarily lie in maximising the opportunities presented by advancements in technological innovations to build inclusive smart cities and to enable a just energy transition using renewable resources.

1.8. Need and Desirability

It is an important requirement in the EIA Process to review the need and desirability of the proposed project. Guidelines on Need and Desirability were published by the Department of Environmental Affairs (DEA) [now operating as the DFFE] in 2017⁷. These guidelines list specific questions to determine need and desirability of proposed developments. This checklist is a useful tool in addressing specific questions relating to the need and desirability of a project and assists in explaining that need and desirability at the provincial and local context. Need and desirability answer the question of whether the activity is being proposed at the right time and in the right place.

Table 1.3 includes a list of questions based on the DEA's Guideline to determine the need and desirability of the proposed project. This table is informed by the outcomes of the Scoping and EIA Process, including the Specialist Assessments. Note that the Specialist Assessments are included in Appendix G of this EIA Report, and where relevant, the findings of these studies have been integrated into Table 1.3.

⁷ DEA (2017), Guideline on Need and Desirability, Department of Environmental Affairs (DEA), Pretoria, South Africa. ISBN: 978-0-9802694-4-4.

Table 1.3: The Guideline on the Need and Desirability's list of questions to determine the "Need and Desirability" of a proposed project

NEED	
Question	Response
1. How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?	
1.1. How were the following ecological integrity considerations taken into account?: 1.1.1. Threatened Ecosystems, 1.1.2. Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure, 1.1.3. Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs"), 1.1.4. Conservation targets, 1.1.5. Ecological drivers of the ecosystem, 1.1.6. Environmental Management Framework, 1.1.7. Spatial Development Framework, and 1.1.8. Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).	The ecological sensitivities present within the study area will be assessed in detail in the Terrestrial Biodiversity and Plant and Animal Species, Aquatic Biodiversity, and Avifauna Impact Assessments during the EIA Phase. These assessments are included in Appendix G of this EIA Report. The specialists have identified aquatic, terrestrial and avifaunal sensitive areas within the study area that should be avoided by the proposed development, as well as any other ecologically sensitive areas and how to suitably develop within these areas so that the ecological integrity is maintained. The Terrestrial Biodiversity and Plant and Animal Species, Aquatic Biodiversity, and Avifauna Scoping Level Assessments are included in Appendix G.2, G.3 and G.4 of this EIA Report respectively. These Specialist Level Assessments have identified sensitivities within the study area that should be avoided, based on desktop assessments and field work. The Aquatic Biodiversity Assessment determined the following: ▪ The area is in the upper reaches of several tributaries of the Leeu River, a tributary of the Gamka River in the Gouritz River System. The upper Leeu River lies within a sub-catchment mapped as an Upstream Catchment. The only natural Freshwater Ecosystem Priority Area wetland within the study area are some seeps adjacent to the larger channel of the Leeu River downstream of the development site that has been lost due to past agricultural activities. There is also a depression wetland in the north of the larger site. These wetlands are also mapped in the National Wetland Map version 5. ▪ The watercourses are all mapped as aquatic Ecological Support Areas (ESAs). Within the terrestrial Critical Biodiversity Areas (CBAs), the watercourses have also been mapped as aquatic CBAs. These comprise the upper Leeu River upstream of Doringboomsfontein Dam, the Leeu River where the seep wetlands occur near

NEED	
Question	Response
	Modderdrift, the Frieslandkloof River within the kloof, in its upper reaches in the southern extent of the larger site, as well as the depression wetland in the northern extent of the larger site. ▪ The Leeu River is more impacted by surrounding land use activities and is in a moderately modified ecological condition. ▪ The Leeu River in the study area is deemed to be of high ecological importance and sensitivity. This is due to the importance of the larger river in providing a diversity of habitats and being an important refuge for biota as well as corridors for the movement of water within the landscape. ▪ The smaller tributaries are of moderate ecological importance and sensitivity and tend to be more sensitive to flow and water quality changes. ▪ The wetland features within the study area are considered of moderate ecological importance and sensitivity, providing habitat and ecological corridors for the movement of biota. ▪ Based on the present ecological condition and the ecological sensitivity and importance, aquatic sensitivity and recommended buffers have been mapped to protect these ecosystems. The recommended buffer area between the aquatic features and the project components to ensure these aquatic ecosystems are not impacted by the proposed activities is at least 35 m for the smaller drainage features and 50m from the larger rivers. The Terrestrial Biodiversity and Plant and Animal Species Assessment determined the following: ▪ The project site falls within the Western Upper Karoo and Upper Karoo Hardeveld vegetation types as well as some Southern Karoo Riviere along the major drainage lines of the site. ▪ In terms of fauna, there are several listed mammals which occur in the area and which would potentially be impacted by the development. This includes the Riverine Rabbit, Black-footed Cat, Brown Hyena, Grey Rhebok and Mountain Reedbuck.

NEED	
Question	Response
	- There is no habitat within the project site for the Karoo Dwarf Tortoise with the result that impacts on this species as a result of the proposed project are not considered significant. - In terms of the Riverine Rabbit, there is no habitat within the development footprint of either project, but there would be some risk of increased disturbance and vehicle-related mortality along the access route to the site. - The Mountain Reedbuck and Grey Rhebuck have not yet been observed on the site. - The DBF Solar project falls entirely within a National Protected Areas Expansion Strategy (NPAES) Focus Area intended for the future expansion of the adjacent Karoo National Park and would result in up to 207 ha of habitat loss within the NPAES Focus Area. The proximity of the site to the Karoo National Park and the delineation of the southern section of the site as a NPAES Focus Area was raised as a concern by the specialist. It is recommended that the applicant engage with SANParks on this issue and the possibility of finding options for mitigating the potential negative impact of the development on the future expansion potential of the park as well as the likely concerns regarding the impact of the development on the existing park. The Avifauna Assessment noted the following: - The PAOI is located right on the northern boundary of the Karoo National Park Important Bird Area (IBA) (Marnewick et al. 2015). The IBA itself follows the boundary of the Karoo National Park. The dominant topographical feature is the Nuweveld escarpment which, with peaks of over 1900m a.s.l., towers over plains averaging 900m a.s.l. Riverbeds, which are dry for most of the year, descend sharply from the escarpment to meander across the flat plains in the far west and east of the park (Marnewick et al. 2015). The variation in altitude yields a wide diversity of micro-habitats, resulting in a distinct contrast between the harsher vegetation of the upper plateau, where grassland intruded by shrubland elements is dominant, and the lower plain, where dwarf scrub dominates and thornveld occurs in the moister valleys and watercourses. - The study area is not located within any Protected Areas, but is located within a National Protected Areas Expansion Strategy (NPAES) focus area.

NEED	
Question	Response
	▪ A total of 107 species could potentially occur within the Broader Area where the proposed Project is located (Appendix E). Of these, 38 are classified as priority species for solar developments. All 38 priority species were recorded during the on-site monitoring so far and all have a medium to high probability of occurring regularly in the Project Area of Impact (PAOI). Eight (8) Red Data species were recorded during the on-site surveys, namely Blue Crane, Ground Woodpecker, Karoo Korhaan, Kori Bustard, Ludwig's Bustard, Martial Eagle, Secretarybird, and Verreaux's Eagle. Based on the desktop analysis and the site surveys/monitoring undertaken, the following buffers are recommended: ○ <u>All infrastructure exclusion zone:</u> Verreaux's Eagle nest: A 1 km all infrastructure exclusion zone is recommended to prevent the displacement of breeding Verreaux's Eagles during the construction phase due to disturbance. In addition, the 1 km buffer area will reduce the risk of injury to the juvenile bird due to collision with the solar panels, when it starts flying and practicing its hunting technique around the nest. ○ <u>Solar panel exclusion zones (other infrastructure allowed):</u> Waterpoints: Drainage lines, dams, and waterpoints: Surface water in this semi-arid habitat is crucially important for priority avifauna and many non-priority species. The PAOI and the immediate surrounding area contain several non-perennial rivers and drainage lines which are sources of surface water. It is preferable to leave some open space where possible with no solar panels, for birds to access and leave the surface water areas unhindered. Surface water is also important area for raptors to hunt birds which congregate around water troughs, and they should have enough space for fast aerial pursuit. This will also benefit Blue Cranes which prefer to breed close to water bodies. The buffer zones as recommended by the Freshwater Specialist should be followed. In addition, water troughs (if any) located within the PV footprint should be relocated outside the project area to ensure the continued availability of this water source to avifauna. ○ <u>High sensitivity zones:</u> The entire PAOI is a high sensitivity zone due to the confirmed presence of several Species of Conservation Concern (SCCs) namely Blue Crane, Ground Woodpecker, Karoo Korhaan, Kori Bustard,

NEED	
Question	Response
	Ludwig's Bustard, Martial Eagle, Secretarybird, and Verreaux's Eagle which could utilise the whole PAOI for foraging. However, these species do not require specific avoidance measures at this stage because there is still adequate habitat available outside the PAOI. The combined sensitivity map is included in Chapter 3 and Chapter 7 of this Scoping Report.
1.2. How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	The ecological sensitivities present within the study area were assessed in detail in the Terrestrial Biodiversity and Plant and Animal Species, Aquatic Biodiversity, and Avifauna Impact Assessments during the EIA Phase. The specialists identified aquatic, terrestrial and avifaunal sensitive areas within the study area that must be avoided by the proposed development, as well as any other ecologically sensitive areas and how to suitably develop within these areas so that the ecological integrity is maintained. The Terrestrial Biodiversity and Plant and Animal Species, Aquatic Biodiversity, and Avifauna Assessments are included in Appendix G of this EIA Report respectively. These EIA Phase Assessments have identified sensitivities within the study area that should be avoided, based on desktop assessments and field surveys. Refer to the response to Question 1.1 regarding the sensitivities identified in the Terrestrial Biodiversity and Plant and Animal Species, Aquatic Biodiversity, and Avifauna Specialists Assessments The feature and sensitivity map for the study area, the combined layout and sensitivity map are included in Chapter 6 of this EIA Report. The sensitivities identified by the various specialists , as highlighted above, have been taken into consideration and avoided where possible to identify the Buildable Area / development footprint. The Terrestrial Biodiversity and Plant and Animal Species Assessment has identified various potential impacts , which are discussed below:

NEED	
Question	Response
	▪ Construction, Operational and Decommissioning Phases: ○ Impacts on vegetation and listed or protected plant species; ○ Direct Faunal Impacts; ○ Impact on the Karoo Dwarf Tortoise; ○ Erosion risk; ○ Impacts on CBAs/ESAs and broad-scale ecological processes; and ○ Impact on NPAES Focus Area. Various mitigation measures have been identified to reduce the significance of or manage the impact. These measures are documented in the Specialist Assessment, and include, for example: Impacts on CBAs: • The development footprint within the CBAs should be minimized as far as possible. • Should access roads, internal cables and overhead lines traverse drainage lines and riparian areas mapped as CBAs these should be micro-sited by a suitably qualified ecological and aquatic specialist before construction in that area starts to ensure any potential impacts are minimised. • Minimise the development footprint as far as possible, which includes locating temporary-use areas such as construction camps and lay-down areas in low sensitivity or previously disturbed areas. The current layout depicts that the substations, camps and lay-down areas are in low sensitivity areas, and this is therefore acceptable. • Avoid impact to restricted and specialised habitats such as pans, wetlands and rock pavements. The final development footprint to be authorised should be checked for such sensitive features in the field, such that there is a high degree of confidence that the final layout avoids such features so that significant changes to turbines or roads are not required at the preconstruction phase.

NEED	
Question	Response
	Impact on NPAES Focus Areas • Reduce the development footprint within the NPAES Focus Area as much as possible. • Engage with SANParks to discuss potential mitigation and avoidance measures that can be implemented to reduce negative effects on the existing Park and reduce impacts on the future use value of the DBF project area. Measures to avoid, remedy, mitigate and manage identified impacts are included in the Environmental Management Programme (EMPr) that are included as Appendix H of this EIA Report. In summary, the potential impact on red listed mammal species, NPAES Focus Area and CBAs have been identified as potential impacts in the Terrestrial Biodiversity and Plant and Animal Species Assessment. In addition, avoidance mechanisms have been adopted, whereby the highly sensitive ecological features have been avoided in the Scoping phase development footprint. In addition, mitigation measures have been provided to minimise and remedy the potential impacts. All the potential impacts have been assessed in the EIA Phase.
1.3. How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Various Specialists Assessments have been compiled and are included in this EIA Report. These assessments have identified sensitivities within the study area that should be avoided, based on desktop assessments and field work. This has informed the identification of the Buildable Areas / development footprint. In addition, the assessments have identified various potential negative impacts that the proposed project may result in, such as degradation to the biophysical environment and potential pollution. The associated mitigation measures have also been identified. Refer to the detailed specialist assessments in Appendix G of this report Measures to avoid, remedy, mitigate or manage biophysical impacts are included in the EMPr (Appendix H of this EIA Report).

NEED	
Question	Response
1.4. What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether; what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	Waste will mostly be generated during the construction and decommissioning phases of the proposed project. Approximately 2 000 - 5 000 kg of solid waste is estimated to be generated per month during the construction phase and operational phase, respectively for the proposed project. The following waste materials are expected during the construction phase: ▪ Packaging material, such as the cardboard, plastic and wooden packaging and off-cuts; ▪ Hazardous waste from empty tins, oils, soil containing oil and diesel (in the event of spills), and chemicals; ▪ Building rubble, discarded bricks, wood and concrete; ▪ Domestic waste generated by personnel; and ▪ Vegetation waste generated from the clearing of vegetation. During the operational phase, the facility will produce minor amounts of general waste (as a result of the offices or maintenance). Waste generated on site will be disposed of at a licenced landfill site. Refer to Chapter 2 (Project Description) of the EIA Report for a detailed description of the waste to be generated by the proposed project. Measures to avoid, remedy, reduce, mitigate or manage waste are included in the EMPr (Appendix H of this EIA Report).
1.5. How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	A Heritage Impact Assessment (HIA) was undertaken during the EIA Phase to assess potential archaeological and cultural impacts resulting from the proposed project. A Heritage Impact Assessment (Archaeology and Cultural Heritage) was commissioned and is included as Appendix G.6 in this EIA Report. . This HIA has identified the following high-level impacts at this stage: ▪ Construction Phase:

NEED	
Question	Response
	○ Potential impacts on archaeology. ○ Potential impacts on the cultural landscape. ▪ Operational Phase: ○ Potential impacts on the cultural landscape. ▪ Decommissioning Phase: ○ Potential impacts on the cultural landscape. ▪ Cumulative Impacts: ○ Construction and Decommissioning Phases: ▪ Potential impacts on archaeology. ○ Operational Phase: ▪ Potential impacts on the cultural landscape. Overall, with the recommended mitigation measures being implemented, the potential impacts have been rated with a low significance. The HIA was submitted to Heritage Western Cape for comment during the EIA Phase 30-day public participation period. In terms of Palaeontology, a Palaeontology Site Sensitivity Verification Report has been completed and included in Appendix G.7 of this EIA Report. The Screening Tool indicates that the proposed development has a Very High Palaeontological Sensitivity. Based on a site visit undertaken by the specialist this provisional assessment is contested here due to the fact that no fossils were recovered in the ten-day palaeontological site investigation. It is concluded that the study area generally has a low palaeontological sensitivity. If Palaeontological Heritage is uncovered during surface clearing and excavations, the Chance find Protocol (attached to the Palaeontological Impact Assessment) should be implemented immediately. These recommendations are incorporated into the EMPr (Appendix H of this EIA Report) which must be implemented during the construction phase of the development. Refer to Appendix G.7 for additional information. Heritage Western Cape is required to provide comment on the proposed project.
1.6. How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use	Measures to avoid, remedy, mitigate or manage impacts on non-renewable natural resources have been included in the EMPr and is included as Appendix H of this EIA

NEED	
Question	Response
of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Report. However, the proposed project is focused on the use of renewable natural resources (i.e., a Solar PV Facility).
1.7. How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts? 1.7.1. Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life) 1.7.2. Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources of the proposed development alternative?) 1.7.3. Do the proposed location, type and scale of development promote a reduced dependency on resources?	South Africa has heavily relied on coal as a source of electricity for decades. Due to the nature of coal as a non-renewable resource that causes major environmental degradation, there is a need to identify alternative resources that could promote sustainable energy as well as cleaner energy production mechanisms. The proposed project aims to harness the solar resources available in the area for the generation of electricity. This project is seen as a source of 'clean energy' and reduces the dependence on non-renewable sources. The proposed project is intended to form part of the REIPPPP, and therefore aims to contribute to the energy mix of South Africa, in line with the IRP. The need for renewable energy is clear, with South Africa becoming an integral part of the global transition towards renewable sources of electricity generation. The proposed project is a sustainable option for the area and the footprint will, as far as possible, avoid areas of very high environmental sensitivity. Where impacts cannot be avoided, the footprint will be placed to minimise, mitigate or manage potential impacts to the receiving environment. In addition, various Specialist Assessments have been compiled and are included in Appendix G of this EIA Report. These Assessments have identified various potential negative impacts that the proposed project may result in. The associated high-level mitigation measures have also been identified.
1.8. How were a risk-averse and cautious approach applied in terms of ecological impacts?	The precautionary approach has been adopted for this study, i.e., assuming the maximum development scenario will occur and then identifying ways to mitigate or manage these impacts. In addition, the specialist assessments that have been compiled during the EIA

NEED	
Question	Response
1.8.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)? 1.8.2. What is the level of risk associated with the limits of current knowledge? 1.8.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	Phase have provided detailed feedback on any uncertainties, assumptions, and risks associated with limits of current knowledge.
1.9. How will the ecological impacts resulting from this development impact on people's environmental right in terms following: 1.9.1. Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts? 1.9.2. Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	A detailed Socio-Economic Impact Assessment is included in this EIA Report that considers the impact of the proposed project from a socio-economic perspective. The Socio-Economic Impact Assessment is included in this EIA Report that considers the impact of the proposed project from a socio-economic perspective. The Socio-Economic Assessment (Appendix G.8 of this EIA Report) has identified the following impacts:: ▪ Construction Phase: ○ Potential positive impacts: ▪ Capital investment (CapEx) contributing to the national, regional and local economy; ▪ Generation of employment, income and skills; ▪ Social disruption and change in social dynamics; and ▪ Reduced quality of life and increased risks due to construction near residences. ▪ Operational Phase: ▪ Operational investment (OpEx) contributing to the national, regional and local economy; ▪ Generation of employment, income and skills; ▪ Increased community prosperity through contributions and income from the SEF; and ▪ Increased power generation reducing the probability of load shedding. ▪ Decommissioning Phase:

NEED	
Question	Response
	▪ Social Reduced employment and funding.
1.10. Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	Linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area have been considered as part of the relevant specialist assessments during the EIA Phase.
1.11. Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives / targets / considerations of the area?	The impacts on ecological integrity objectives of the area are considered as part of the Terrestrial Biodiversity and Plant and Animal Species, Aquatic Biodiversity, and Avifauna Impact Assessments.. Refer to the responses provided to Questions 1.1 to 1.10 regarding the sensitivities identified in these Specialists Assessments, as well as the potential high-level impacts identified on terrestrial biodiversity.
1.12. Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	Chapter 5 of this EIA Report includes a full description of alternatives assessed during the EIA Phase. The no-go alternative and technology alternatives (relating to the BESS) were assessed during the EIA Phase. Note that the specialist assessed Lithium-Ion, Sodium-Ion and Redox Flow BESS technologies and all three are deemed acceptable (see Appendix G.10). The Lithium-Ion and Sodium-Ion BESS technologies are currently the preferred options of the Project Applicant. Both options have been assessed to be acceptable from an environmental sensitivity and health and safety perspective, and are therefore recommended for authorisation (see Chapter 7) provided that only one technology is selected for construction. With regards to technology options, these include options relating to the solar PV system or mounting structure, however these were not weighed against each other in order to identify the preferred alternative in the EIA Phase. Instead, the specialists assessed various mounting systems and if acceptable, all will be put forward for approval in the EA (should it be granted) – see Chapter 7. The approach followed to identify the buildable areas was to use environmental and social constraints to avoid sensitive features, thus applying the mitigation hierarchy. This approach replaces the need to rank alternative sites and locations, as it leads to the selection of the least environmentally sensitive development footprint.

NEED	
Question	Response
1.13. Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	Refer to Chapter 6 of this EIA Report where the potential cumulative impacts are discussed, as well as each Specialist Assessment included in Appendix G. Chapter 6 of this EIA Report contains a list of all other renewable energy projects within a 30 km radius that are being considered in the cumulative impact assessment. The cumulative impacts were assessed during the EIA Phase.
2.1. What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?	
2.1.1. The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area.	The proposed project is entirely located within the Beaufort West Local Municipality (BWLM) and Central Karoo District Municipality (CKDM). The vision of the BWLM Integrated Development Plan (IDP) (2017-2022) is to be the economic gateway in the Central Karoo, where people are developed and live in harmony together. Further unpacking of the vision indicates the provision of directives regarding the growth of the economy and ensuring financial sustainability among other areas in which development is required. The five priority areas of the IDP are: 1. Service to the people – seeking to improve and maintain basic service delivery through infrastructure development; 2. Sustainable economic growth by leveraging competitive advantages of the region (The IDP identifies low economic growth as one of the main reasons for the lack of new labour entrants into the economy); 3. A well-run administration that is efficient, effective and has the right skills mix; 4. Ensure financial sustainability; and 5. Be a transparent organisation. The Central Karoo region is attractive for renewable energy projects due to the significant solar and wind energy resources. Various renewable energy projects have been approved

NEED	
Question	Response
	in the CKDM area, but most have yet to be implemented. The CKDM Strategic Development Framework (SDF) has identified considerable opportunities for expanding renewable energy projects specifically related to solar and wind power generation in the CKDM, which encourages IPPs to locate in the region and to create downstream business- and employment opportunities (CKDM, 2019⁸). According to the Western Cape Provincial SDF (WCG, 2014⁹), renewable energy generation is also deemed one of the most promising economic sectors in the Central Karoo region that will add significant value to the regional Gross Domestic Product (GDP), while having the potential to change the composition and character of towns throughout the municipal district (CKDM, 2017¹⁰). Furthermore, the proposed project is also located within the Central Strategic Transmission Corridor that was gazetted in February 2018. This facilitates large scale transmission and distribution EGI, which would be needed to support the proposed project. Therefore, the proposed project is in line with the planning for the area. The proposed project will create job opportunities and economic spin offs during the construction and operational phases (if an EA is granted by the DFFE). Approximately 300 to 400 employment opportunities will be created during the construction phase, and approximately 40 to 50 during the operational phase of the proposed project. It should, however, be noted that employment during the construction phase will be temporary, whilst the employment opportunities during the operational phase will be long-term.

⁸ Central Karoo District Municipality. (2019). Central Karoo District Municipality Spatial Development Framework.

Central Karoo District Municipality. (2017). Central Karoo District Municipality Integrated Development Plan 2017-2022.

⁹ Western Cape Government. (2014) The Western Cape Provincial Spatial Development Framework. Retrieved from <https://cer.org.za/wp-content/uploads/2015/07/Western-Cape-Provincial-SDF-2014.pdf>

¹⁰ Central Karoo District Municipality. (2017). Central Karoo District Municipality Integrated Development Plan 2017-2022.

NEED	
Question	Response
	Therefore, the proposed project would help to address the need for increased electricity supply to the national grid while also providing advanced skills transfer and training to the local communities and creating contractual and permanent employment in the area. These factors are linked to the REIPPPP.
2.1.2. Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.)	This is not applicable as the proposed project is located within a rural area and the site is zoned for agricultural use.
2.1.3. Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.)	The land within the study area is currently being used for Low Density grazing. The farm is located in a sheep farming agricultural region. Grazing is the dominant agricultural land use on the site and surrounds. An Agricultural Compliance Statement has been included in Appendix G.1 of this EIA Report. It notes that grazing capacity of the site is low at 28 to 30 hectares per large stock unit. Infrastructure such as homesteads, livestock pens, windpumps, waterpoints, gravel farm roads and fences are located on the affected properties. Furthermore, existing overhead powerlines run through the study area. An HIA was undertaken during the EIA Phase to assess potential archaeological and cultural impacts resulting from the proposed project. A Heritage Assessment (Archaeology and Cultural Heritage) was commissioned and is included in Appendix G.6 and the HIA findings are discussed in Chapters 3, 6 and 7 of this EIA Report.. Should the proposed project proceed, it is not expected that the agricultural activities present on site will be significantly threatened. The Compliance Statement Appendix G.1) considers the impact of the proposed project in terms of the land capability and agricultural potential. The Statement notes that the site has low agricultural potential predominantly because of climate constraints, but also because of soil constraints. As a result of the constraints, the site is unsuitable for crop production, and agricultural production is limited to low-capacity grazing. The land impacted by the development footprint is verified in this assessment as being of low to medium agricultural sensitivity.

NEED	
Question	Response
	As noted, an EMPr (Appendix H of this EIA Report) was compiled for the proposed project to ensure that all potential negative impacts identified are suitably managed and mitigated, and potential positive impacts are enhanced. The impact on the sense of place is difficult to predict and would potentially be ambiguous. This is due to the subjective nature of perceptions regarding the relative attraction or disturbance of the solar facilities in a rural landscape. The visual impact and considerations were further assessed as part of the Visual Impact Assessment during the EIA Phase. A Visual Impact Assessment (VIA) was commissioned and is included as Appendix G.5 of this EIA Report. The VIA notes that there are a very limited number of sensitive visual receptors within the viewshed of the proposed PV facility, namely two (2) homesteads and one secondary road. This study area is a known as a tourist destination owing to the presence of the Karoo National Park, a midway stop between Gauteng and Cape Town, as well as the small historic town of Beaufort West. The VIA concludes that while the DBF South SEF falls within the Karoo National Park viewshed protection zone, it is not considered to be a fatal flaw or an area of high sensitivity. This is as a result of the location of the proposed facility on the plateau (higher lying ground), and subsequently the visual barrier created by the Nuweveldberge that visually screens the Karoo National Park from the proposed facility. The sensitivity map is included in Chapter 6 of this EIA Report. The sensitivities identified by the various specialists during the EIA Phase have been taken into consideration and avoided in order to identify the development footprint.
2.1.4. Municipal Economic Development Strategy ("LED Strategy").	The LED Strategy was considered, and potential alignment was discussed in this EIA Report. However, it should be noted that one of the thrusts in the National LED Strategy is focused on renewable energy development and enhancing efficiency in the energy sector.

NEED	
Question	Response
2.2. Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area? 2.2.1. Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	This is addressed in the Socio-Economic Impact Assessment that is included in this EIA Report. The assessment considers the impact of the proposed project from a socio-economic perspective. As noted in the Socio-Economic Assessment (Appendix G.8 of this EIA Report), the REIPPPP has contributed significantly towards meeting South Africa's Greenhouse Gas emission targets and, at the same time, supporting energy security, economic stability, and environmental sustainability. The establishment of renewable energy facilities, such as the proposed project, therefore, not only address the environmental issues associated with climate change and consumption of scarce water resources, but also creates significant socio-economic opportunities and benefits, specifically for historically disadvantaged, rural communities. A socio-economic assessment is included in Appendix G.8 and discussed in Chapter 3 of this EIA Report. Refer to the response provided to Question 1.9 for a description of the impacts identified.
2.3. How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	These needs and interests of the relevant communities are addressed in the Socio-Economic Impact Assessment, included in this EIA Report. Issues raised by Interested and Affected Parties (I&APs) to this effect are also addressed in the relevant Comments and Responses Report of the EIA Report.
2.4. Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long term? Will the impact be socially and economically sustainable in the short- and long-term?	This is addressed in the Socio-Economic Impact Assessment, included in this EIA Report. The assessment considers the impact of the proposed project from a socio-economic perspective. Inputs have been provided by the Socio-Economic specialist and have been included in Chapter (?) of this EIA Report. Refer to the response provided to Question 1.9 for a description of the impacts identified.
2.5. In terms of location, describe how the placement of the proposed development will:	
2.5.1. result in the creation of residential and employment opportunities in close proximity to or integrated with each other	Local employment opportunities will be provided as far as possible. Approximately 300 to 400 employment opportunities will be created during the construction phase, and approximately 40 to 50 during the operational phase of the proposed project. It should,

NEED	
Question	Response
	however, be noted that employment during the construction phase will be temporary, whilst the employment opportunities during the operational phase will be long-term.
2.5.2. reduce the need for transport of people and goods	This is not applicable as the proposed project is located within a remote rural area and the site is zoned for agricultural use. This project is a renewable energy project proposal. Nevertheless, traffic related impacts of the proposed project have been addressed in the TIA which is included in the EIA Report. These issues are further addressed in the TIA in Appendix G.9 of this EIA Report..
2.5.3. result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport)	This is not applicable as the proposed project is located within a remote rural area and the site is zoned for agricultural use. This project is a renewable energy project proposal. Refer to the response provided to Question 2.5.2.
2.5.4. compliment other uses in the area	As noted above, the land within the study area is currently being used for Low Density grazing. The Agricultural Compliance Statement (Appendix G.1) notes the following: ▪ The site has low agricultural potential predominantly because of climate constraints, but also because of soil constraints. As a result of the constraints, the site is unsuitable for crop production, and agricultural production is limited to low-capacity grazing. The land impacted by the development footprint is verified in this assessment as being of low to medium agricultural sensitivity. ▪ The amount of agricultural land used by the proposed project is well within the allowable development limits prescribed by the Agricultural Protocol of GN 320. ▪ The proposed project offers positive impact on agriculture by way of improved financial security for farming operations, as well as security benefits against stock theft and other crime. ▪ The proposed development will also have the wider societal benefits of generating additional income and employment in the local economy. Based on the above the specialist concluded that from an agricultural impact point of view, it is recommended that the development be approved.
2.5.5. be in line with the planning for the area	The Central Karoo District Municipality Strategic Development Framework (SDF) has identified considerable opportunities for expanding renewable energy projects specifically related to solar and wind power generation in the Central Karoo District Municipality, which

NEED	
Question	Response
	encourages IPPs to locate in the region and to create downstream business- and employment opportunities (CKDM, 2019). According to the Western Cape Provincial SDF (WCG, 2014), renewable energy generation is also deemed one of the most promising economic sectors in the Central Karoo region that will add significant value to the regional Gross Domestic Product (GDP), while having the potential to change the composition and character of towns throughout the municipal district (CKDM, 2017). Furthermore, the proposed project is also located within the Central Strategic Transmission Corridor that was gazetted in February 2018. This facilitates large scale transmission and distribution EGI, which would be needed to support the proposed project. Therefore, the proposed project is in line with the planning for the area.
2.5.6. for urban related development, make use of the underutilised land available with the urban edge	This is not applicable as the proposed project is located within a remote rural area and the site is zoned for agricultural use.
2.5.7. optimise the use of existing resources and infrastructure	GEED consulted with Eskom to formulate connection options for the GEED Renewable Energy Cluster projects. Following the inputs and recommendations from Eskom, two power evacuation options were proposed. These options take into consideration the status of the RedCap Nuweveld EGI power lines, as well as the lack of clarity surrounding Eskom's future plans for the area. Through consultation with Eskom, the Project Developer has determined that one of two 400 kV grid connection opportunities exist which includes: - Option 1: Power evacuated via 400 kV OHPL from the proposed GEED Collector Substation (400 kV) to the proposed Nuweveld Main Transmission Substation (MTS) - Option 2: Power evacuated from GEED Collector Substation via 400 kV Loop-in Loop-out (LILO) extension of Eskom proposed 400 kV OHPL between proposed Nuweveld MTS and the existing Droërvier MTS.

NEED	
Question	Response
	A separate environmental assessment process will be undertaken for the proposed development of the 400 kV power lines, 400 kV GEED Collector Substation and associated EGI.
2.5.8. opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement)	The proposed project is a renewable energy project and not related to bulk infrastructure expansion.
2.5.9. discourage "urban sprawl" and contribute to compaction/densification	This is addressed in the Socio-Economic Impact Assessment, included in this EIA Report.
2.5.10. contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs	This is not applicable as the proposed project is located within a remote rural area and the site is zoned for agricultural use.
2.5.11. encourage environmentally sustainable land development practices and processes	The development of a renewable energy facility is a sustainable land development practice provided it is constructed and operated in an environmentally conscious manner.
2.5.12. take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.)	Refer to Chapter 5 of this EIA Report for a description of the process undertaken to identify the study area as the preferred site for the solar PV facility.
2.5.13. the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential)	This is addressed within the Socio-Economic Impact Assessment, included in this EIA Report.
2.5.14. impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area	An HIA was undertaken during the EIA Phase to assess potential archaeological and cultural impacts resulting from the proposed project. A Heritage Assessment (Archaeology and Cultural Heritage) was commissioned and is included in Appendix G.6 of this EIA Report. As requested by Heritage Western Cape in their comment on the NID submitted during the Scoping phase, the HIA (Appendix G.6) integrates the findings of the Palaeontological and Visual Impact Assessment (Appendix G.7 and G.5, respectively). Refer to the response to Question 1.5 for detailed feedback on the high-level impacts identified on Archaeology and Cultural Heritage, as well as feedback on the palaeontology. The visual impact and considerations, including sense of place, were assessed as part of the Visual Impact Assessment undertaken during EIA Phase. A Visual Impact Assessment

NEED	
Question	Response
	was commissioned and is included in Appendix G.5 of this EIA Report. Refer to the response provided to Question 2.1.3 for additional feedback on the potential visual impacts.
2.5.15. in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	Chapter 6 of this EIA Report includes a list of other renewable energy projects within a 30 km radius that have received EA or are currently going through an Environmental Assessment process.
2.6. How were a risk-averse and cautious approach applied in terms of socio-economic impacts?	
2.6.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	The precautionary approach has been adopted for this study, i.e., assuming the maximum development scenario will occur and then identifying ways to mitigate or manage these impacts. In addition, the specialist assessments compiled during the EIA Phase provide detailed feedback on any uncertainties, assumptions, and risks associated with limits of current knowledge. The Socio-Economic Specialist Assessment included in Appendix G.8 of this EIA Report provides input on the assumptions and limitations.
2.6.2. What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	
2.6.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	
2.7. How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	
2.7.1. Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	A Socio-Economic Impact Assessment, included in this EIA Report that considers the impact of the proposed project from a socio-economic perspective. A socio-economic profile is included in Chapter 3 of this EIA Report.. Specialist inputs have been provided by the Socio-Economic specialist and have been included in Appendix G.8 of the EIA Report. Refer to the response provided to Question 1.9 for a description of the impacts identified in the Socio-Economic Assessment
2.7.2. Positive impacts. What measures were taken to enhance positive impacts?	
2.8. Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	In addition, measures to avoid, remedy, mitigate or manage negative socio-economic impacts and enhance positive socio-economic impacts are included in the EMPr (Appendix H of this EIA Report).
2.9. What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	Linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area, as well as how the potential socio-economic impacts will

NEED	
Question	Response
2.10. What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	result in ecological impacts considered as part of the relevant specialist assessments during the EIA Phase. With regard to the best practicable environmental option, Chapter 5 of this EIA Report includes a full description of alternatives that was assessed during the EIA Phase. The no-go alternative, and technology alternatives (relating to the BESS) were assessed during the EIA Phase. Refer to the response provided to Question 1.12 above for additional information on the alternatives to be considered.
2.11. What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	
2.12. What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	
2.13. What measures were taken to:	
2.13.1. ensure the participation of all interested and affected parties	The supporting documentation of the Public Participation Process (PPP) that was undertaken during the Scoping Phase is included as Appendix F of this EIA Report, and the PPP undertaken during the EIA Phase is described in Chapter 4, with supporting documentation in Appendix E. The PPP will comply with the 2014 NEMA EIA Regulations (as amended). Various methods are being employed to notify potential I&APs of the proposed project, namely, through newspaper advertisements, site notices boards, notification letters and communication via email, as well as text messages, and telephonic discussions where possible..
2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation	
2.13.3. ensure participation by vulnerable and disadvantaged persons	
2.13.4. promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means	The EIA Process aims to take cognisance of all interests, needs, and values espoused by all I&APs. Opportunity for public participation will be provided to all I&APs throughout the Scoping and EIA Process in terms of the 2014 NEMA EIA Regulations (as amended).
2.13.5. ensure openness and transparency, and access to information in terms of the process	The supporting documentation of the PPP undertaken during the Scoping Phase is included in Appendix E of this EIA Report, and the PPP undertaken during the EIA Phase

NEED	
Question	Response
	is described in Chapter 4, as well as supporting documentation in Appendix E. Refer to the responses provided to Questions 2.13.1 – 2.13.3 above.
2.13.6. ensure that the interests, needs and values of all interested and affected parties were taken into account and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge	The EIA process will take cognisance of relevant interests, needs and values adopted by I&APs.
2.13.7. ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein was promoted	Public participation of all I&APs will be promoted and opportunities for engagement will be provided during the EIA process.
2.14. Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	This is addressed in the Socio-Economic Impact Assessment, included in the EIA Report. Refer to the responses provided to Questions 1.9, 2.2 and 2.3.
2.15. What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	An EMPr was developed during the EIA Phase to address environmental, health and safety concerns (Appendix H of this EIA Report). An Environmental Control Officer (ECO) will be appointed to monitor compliance with the EMPr and EA (should such authorisation be granted) during the construction and operational phases.
2.16. Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1. the number of temporary versus permanent jobs that will be created	This is addressed in the Socio-Economic Impact Assessment that is included in the EIA Report. Refer to the response provided to Question 1.9 for a description of the impacts identified from a socio-economic perspective, and also the responses to Questions 2.1.1 and 2.5.1 for feedback on potential employment opportunities.
2.16.2. whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area)	
2.16.3. the distance from where labourers will have to travel	
2.16.4. the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits)	
2.16.5. the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	

NEED	
Question	Response
2.17. What measures were taken to ensure:	
2.17.1. that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment	Various government departments have been listed as I&APs and were given the opportunity to comment on the Draft Scoping Report, extending 4 March 2023 to 3 April 2023, and were given the opportunity to comment on the Draft EIA Report during the 30-day public participation period extending from 11 August 2023 to 11 September 2023. Comments submitted during the Scoping and EIA phase public participation periods were incorporated into the EIA Report, where relevant, and are included in the Public Participation and Comments and Responses Report as Appendix E of this EIA Report.
2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	
2.18. What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	The proposed project will adhere to the principles of environmental management in NEMA. Measures taken to ensure adherence to the principles of NEMA will be determined during the EIA Phase. In addition, the outcomes of this Scoping and EIA Process and the associated conditions of the EA (should it be received) will serve to address this question.
2.19. Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	The proposed mitigation measures included in the EMPr were informed by the specialist assessments that were undertaken. This includes a detailed assessment of the environment as well as the impacts associated with the proposed project. Detailed specialist assessments have all concluded that the project can proceed. Therefore, the mitigation measures are deemed to be realistic and practical. The EMPr is included in Appendix H of this EIA Report.
2.20. What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	The EMPr for the proposed project will form part of the contractual agreement and must be adhered to by the contractors, construction workers and the Project Applicant. The EMPr includes measures to ensure that the costs to potentially remedy pollution, environmental degradation and consequent adverse health effects will be paid for by those responsible for the relevant environmental impacts. The EMPr includes measures to ensure that the costs to potentially prevent, control or minimise further pollution, environmental damage or adverse health effects will be paid for by those responsible for the relevant environmental impacts. Roles and responsibilities for the implementation of management actions, and monitoring thereof, are included in the EMPr (Appendix H of this EIA Report).
2.21. Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different	Agriculture on site is influenced by climatic variables and limitations. Renewable energy development is a suitable land use option for the site. The proposed project would be

NEED	
Question	Response
elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	more robust in terms of economic viability and profitability while also being largely uninfluenced by climate change variables. The proposed project would also provide the farm owners with additional income by way of lease agreements and will also contribute to local socio-economic upliftment through job creation. Chapter 5 of this EIA Report includes a full description of alternatives that were assessed during the EIA Phase. The no-go alternative, and technology alternatives (relating to the BESS) was assessed during the EIA Phase. Refer to the response provided to Question 1.12 above for additional information on the alternatives to be considered.
2.22. Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope, and nature of the project in relation to its location and other planned developments in the area?	The potential cumulative impacts resulting from the proposed project have been assessed as part of the EIA phase.. Refer to Chapter 6 of this EIA Report where the potential cumulative impacts are discussed for this project, where relevant, as well as the Socio-Economic Specialist Assessment included in Appendix G.8. The Socio-Economic Specialist Assessment identified the following cumulative impacts at this stage: ▪ Stimulation of economic and employment growth; and ▪ Increased community prosperity through contributions and income from IPPs. Chapter 6 of this EIA Report contains a list of all other renewable energy projects within a 30 km radius that are being considered in the cumulative impact assessment. The cumulative impacts were assessed during the EIA Phase (see Chapter 6 of the EIA Report).

1.9. Objectives for this EIA Report

This EIA Report was preceded by a comprehensive Scoping Process. During the Scoping Phase, the Scoping Report was made available to Interested and Affected Parties (I&APs) and stakeholders for a 30-day comment period extending from 4 March 2023 to 3 April 2023. Comments submitted in response to the Draft Scoping Report were captured in a Comments and Responses Report. The Final Scoping Report was submitted to the DFFE on 17 April 2023 for consideration (i.e. acceptance or refusal) in line with Regulation 21 (1) of GN R326. The DFFE accepted the Final Scoping Report and Plan of Study for EIA on 1 June 2023. Refer to Appendix I of this EIA Report for a copy of this acceptance letter. This acceptance marked the end of the Scoping Phase after which the S&EIA Process moved into the impact assessment and reporting phase.

For the purpose of completeness and continuity, the documentation associated with the Public Participation Process undertaken in the Scoping Phase, and comments received from I&APs during the Scoping Phase, are included in Appendix E Part 1 of this EIA Report. The Comments and Responses Report for the comments received during the review of the Draft Scoping Report are included in Appendix E Part 2 of this EIA Report. For background on the Scoping Process, the reader is referred to the Final Scoping Report (CSIR, 2023).

The EIA Phase of this S&EIA Process is shaped by the findings of the Scoping Phase. The 2014 NEMA EIA Regulations (as amended) stipulates that the EIA Process must be undertaken in line with the approved Plan of Study for the EIA¹¹, and that it must include a description of the potential environmental impacts, mitigation, and closure outcomes, as well as the residual risks of the proposed activity. In broad terms, the objectives of the EIA Process in terms of the 2014 NEMA EIA Regulations (as amended) are to:

- determine the policy and legislative context within which the activity is located and note how the proposed activity complies with and responds to the policy and legislative context;
- describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the accepted scoping report;
- identify the location of the development footprint within the approved site as contemplated in the accepted scoping report based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- determine the nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and the degree to which these impacts (a) can be reversed; (b) may cause irreplaceable loss of resources, and (c) can be avoided, managed or mitigated;
- identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted scoping report based on the lowest level of environmental sensitivity identified during the assessment;

¹¹ The Plan of Study for the EIA was detailed in Chapter 7 of the Final Scoping Report, which was accepted by the DFFE in March 2023.

- identify, assess, and rank the impacts the activity will impose on the development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity;
- identify suitable measures to avoid, manage or mitigate identified impacts; and
- identify residual risks that need to be managed and monitored.

In terms of legal requirements, a crucial objective of the EIA Report is to satisfy the requirements of Appendix 3 of the 2014 NEMA EIA Regulations (as amended). This section regulates and prescribes the content of the EIA Report and specifies the type of supporting information that must accompany the submission of the EIA Report to the Competent Authority. An overview of where the requirements of Appendix 3 of the 2014 NEMA EIA Regulations (as amended) are addressed in this EIA Report is presented in Table 1.4 below.

As required in Regulation 23 (4) of the 2014 NEMA EIA Regulations (as amended), the EMPr that is required as part of the EIA Process is provided in Appendix I and Appendix J of this EIA Report. The EMPr for the Solar PV and associated infrastructure (Appendix I of the EIA Report) has been structured to comply with the requirements outlined in Appendix 4 of the 2014 NEMA EIA Regulations (as amended). The EMPr for the on-site substation complex (Appendix K of the EIA Report) complies with the Generic EMPr for substations published in GN 435 in March 2019.

Furthermore, this process is designed to satisfy the requirements of Regulations 41, 42, 43 and 44 of the 2014 NEMA EIA Regulations (as amended) relating to the PPP and, specifically, the registration of and submissions from potential and registered Interested and/or Affected Parties (I&APs).

Furthermore, this process has been designed to satisfy the requirements of Regulations 41, 42, 43 and 44 of the 2014 NEMA EIA Regulations (as amended) relating to the PPP and, specifically, the registration of and submissions from I&APs.

The Draft EIA Report was made available to registered I&APs, Organs of State and key relevant stakeholders for a 30-day comment period. All comments received during the 30-day comment period on the Draft EIA Report have been incorporated into the Comments and Responses Report and addressed, as applicable and where relevant, and are included as Appendix E Part 4 in this Final EIA Report that is being submitted to the DFFE for decision-making (i.e. approval or refusal) in line with Regulation 24 of GN R326.

Table 1.4: Compliance with Appendix 3 of the 2014 NEMA EIA Regulations (as amended)

Section of the EIA Regulations	<u>Requirements for an Environmental Impact Assessment Report in terms of Appendix 3 of the 2014 NEMA EIA Regulations (GN R982, as amended in GN R326)</u>	Chapter / Appendix
Appendix 3 - (3) (1) (a)	Details of - i. the EAP who prepared the report; and ii. the expertise of the EAP, including a curriculum vitae;	Chapter 1, Appendix A and Appendix B
Appendix 3 - (3) (1) (b)	The location of the activity, including - i. the 21-digit Surveyor General code of each cadastral land parcel; ii. where available, the physical address and farm name; iii. where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Chapter 1 and Chapter 2

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Section of the EIA Regulations	Requirements for an Environmental Impact Assessment Report in terms of Appendix 3 of the 2014 NEMA EIA Regulations (GN R982, as amended in GN R326)	Chapter / Appendix
Appendix 3 - (3) (1) (c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or if it is - i. a linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or ii. on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Chapter 1, Chapter 2, Chapter 3, Chapter 5, Appendix C
Appendix 3 - (3) (1) (d)	A description of the scope of the proposed activity, including – i. all listed and specified activities triggered; ii. a description of the activities to be undertaken, including associated structures and infrastructure;	Chapter 2 and Chapter 4
Appendix 3 - (3) (1) (e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	Chapter 4
Appendix 3 - (3) (1) (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Chapter 1
Appendix 3 - (3) (1) (g)	A full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including - i. details of all the alternatives considered;	Chapter 5, Chapter 6, and Chapter 7
	ii. details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Chapter 4, Appendix D, Appendix E, Appendix F
	iii. a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	This is included in Appendix E of the EIA Report
	iv. the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 3, Chapter 5, Chapter 6 and Appendix G
	v. the impacts and risks which have informed the identification of each alternative, including nature, significance, consequence, extent, duration, and probability of such identified impacts, including the degree to which these impacts – (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Chapter 5, Chapter 6 and Appendix G
	vi. the methodology used in identifying and ranking the nature, significance, consequences, extent, duration, and probability of potential environmental impacts and risks associated with the alternatives;	Chapter 6 and Appendix G
	vii. positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 5, Chapter 6 and Appendix G
	viii. the possible mitigation measures that could be applied and level of residual risk;	Chapter 6 and Appendix G
	ix. the outcome of the site selection matrix;	Chapter 5
	x. if no alternatives, including alternative locations for the activity, were investigated, the motivation for not considering such; and	Chapter 5

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Section of the EIA Regulations	Requirements for an Environmental Impact Assessment Report in terms of Appendix 3 of the 2014 NEMA EIA Regulations (GN R982, as amended in GN R326)	Chapter / Appendix
	xi. a concluding statement indicating the preferred alternatives, including the preferred location of the activity;	Chapter 5
Appendix 3 - (3) (1) (h)	A plan of study for undertaking the environmental impact assessment process to be undertaken, including - i. a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; ii. a description of the aspects to be assessed as part of the environmental impact assessment process; iii. aspects to be assessed by specialists; iv. a description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists; v. a description of the proposed method of assessing duration and significance; vi. an indication of the stages at which the competent authority will be consulted; vii. particulars of the public participation process that will be conducted during the environmental impact assessment process; and viii. a description of the tasks that will be undertaken as part of the environmental impact assessment process; ix. identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	Chapter 4
Appendix 3 - (3) (1) (i)	An undertaking under oath or affirmation by the EAP in relation to - i. the correctness of the information provided in the report; ii. the inclusion of comments and inputs from stakeholders and interested and affected parties; and iii. any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	Appendix B
Appendix 3 - (3) (1) (j)	An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	Appendix B
Appendix 3 - (3) (1) (k)	Where applicable, any specific information required by the competent authority.	Not Applicable
Appendix 3 - (3) (1) (l)	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A
Appendix 3 - (3) (1)	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a scoping report, the requirements as indicated in such notice will apply.	Not applicable in terms of the actual EIA Report, but various gazetted assessment and reporting protocols have been complied with for the specialist assessments. Refer to Chapter 4 and Appendix G of this EIA Report.

Scoping and Environmental Impact Assessment for the
proposed development of the Genesis DBF South Solar
Energy Facility and associated infrastructure near
Beaufort West in the Western Cape



FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER 2: Project Description



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2. PROJECT DESCRIPTION

This chapter provides an overview of the conceptual project design and technology for the proposed Genesis DBF South Solar Energy Facility (SEF) and associated infrastructure, as provided by the Project Developer, Genesis Eco-Energy Developments (Pty) Ltd (hereafter “GEED”).

The purpose of this chapter is to present sufficient project information on the proposed project to inform the Scoping and Environmental Impact Assessment (EIA) Process in terms of design parameters applicable to the project.

As noted in Chapter 1 of this Environmental Impact Assessment (EIA) Report, GEED is proposing to develop three clusters of WEF and SEFs, namely the Northern, Middle and Southern Cluster near Beaufort West in the Western Cape. This Scoping and EIA process focusses on the **Genesis DBF South SEF** and associated infrastructure) (hereafter referred to as the “DBF South SEF” or “proposed project”).

2.1 Definition of Project Study Area

The **study area or preferred site** for the proposed DBF South SEF is the **full extent** of the **affected farm properties** on which the SEF is proposed to be constructed. These farm properties are listed in Table 2.1. The full extent of these properties has been assessed by the specialists to identify environmental sensitivities and no-go areas.

Table 2.1: Farm Properties forming the study area

FARM PORTION	SG CODE	STUDY AREA	FOOTPRINT	
			SEF	OHPL
Doornboomfontyn Farm RE/89	C00900000000008900000	X	X	X
Hartebeeste Vleis Berg Farm RE/213	C009000000000021300000	X		
Doornboomfontyn Farm 1/89	C00900000000008900001	X		X

At the commencement of this Scoping and EIA Process, the **Original Scoping Phase PV Assessment Area** totalled 1 135 ha within the study area / preferred site. The preferred site or **total study area** for proposed DBF South SEF is approximately **1 135 hectares (ha)**. The preferred site serves as the study area for this Scoping and EIA Process. Therefore, the terms “site” and “study area” are used synonymously in this report. Following the identification of sensitivities by the specialists during the Scoping Phase, the Project Developer took such sensitivities, and other considerations, into account and formulated an approximately 500 ha Revised Scoping Development Area which was considered in the EIA phase. Informed by the EIA-level specialist assessments and the proposed specialist mitigation measures, the final PV design and PV footprint that is proposed for EA has been reduced to 207 ha (see Chapter 7). The development footprint is where the actual development will be located, i.e., the footprint containing the PV solar arrays. The buildable areas are the full extent to be approved for development, and the development footprint detailed in the layouts is based on the current proposal.

In summary, the full extent of the study area has been assessed by the specialists and mapped accordingly in the Specialist Assessments to identify environmental sensitivities and no-go areas. This approach uses environmental and social constraints to avoid sensitive features, thus applying the mitigation hierarchy, and it leads to the selection of the least environmentally sensitive development footprint.

2.2 Project Locality and Co-ordinates

Appendix 3 of the 2014 National Environmental Management Act, 1998 (Act 107 of 1998, as amended) (NEMA) EIA Regulations (as amended) states that a EIA Report must provide 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; or the coordinates of the boundary of the property or properties if the aforementioned is not available. Appendix 2 of the 2014 NEMA EIA Regulations (as amended) also states that a EIA Report must include a plan which locates the proposed activity or activities applied for at an appropriate scale.

In line with the above, refer to Chapter 1 for a locality map of the proposed DBF South SEF and associated infrastructure. Refer to Appendix C of this EIA Report for additional maps.

The Scoping Report and Specialists reports (see Appendix G) assessed a larger scoping phase PV area which extended on to Hartebeeste Vleis Berg Farm 213. However, following environmental sensitivity inputs from the specialists assessments, the revised EIA phase layout has been reduced and therefore only affects the farm portions

- Doornboomfontyn Farm RE/89
- Doornboomfontyn Farm 1/89

Table 2.1 above, specifies the corresponding 21-digit Surveyor General code for each affected farm portion. The properties to be affected by the development of the proposed project will be leased from the property owners by the Project Applicant for the life span of the proposed project.

In addition, some intersections may need to be widened to accommodate truck access to the site.

The approximate co-ordinates of the boundary points of the project site are provided in Appendix C. A map corresponding to the co-ordinate points is provided in Figure 2.1. The co-ordinates of the proposed 132 kV power line (start, mid and end points) to connect to the GEED Collector substation are also provided in Appendix C.2 with a corresponding map in Figure 2.2.

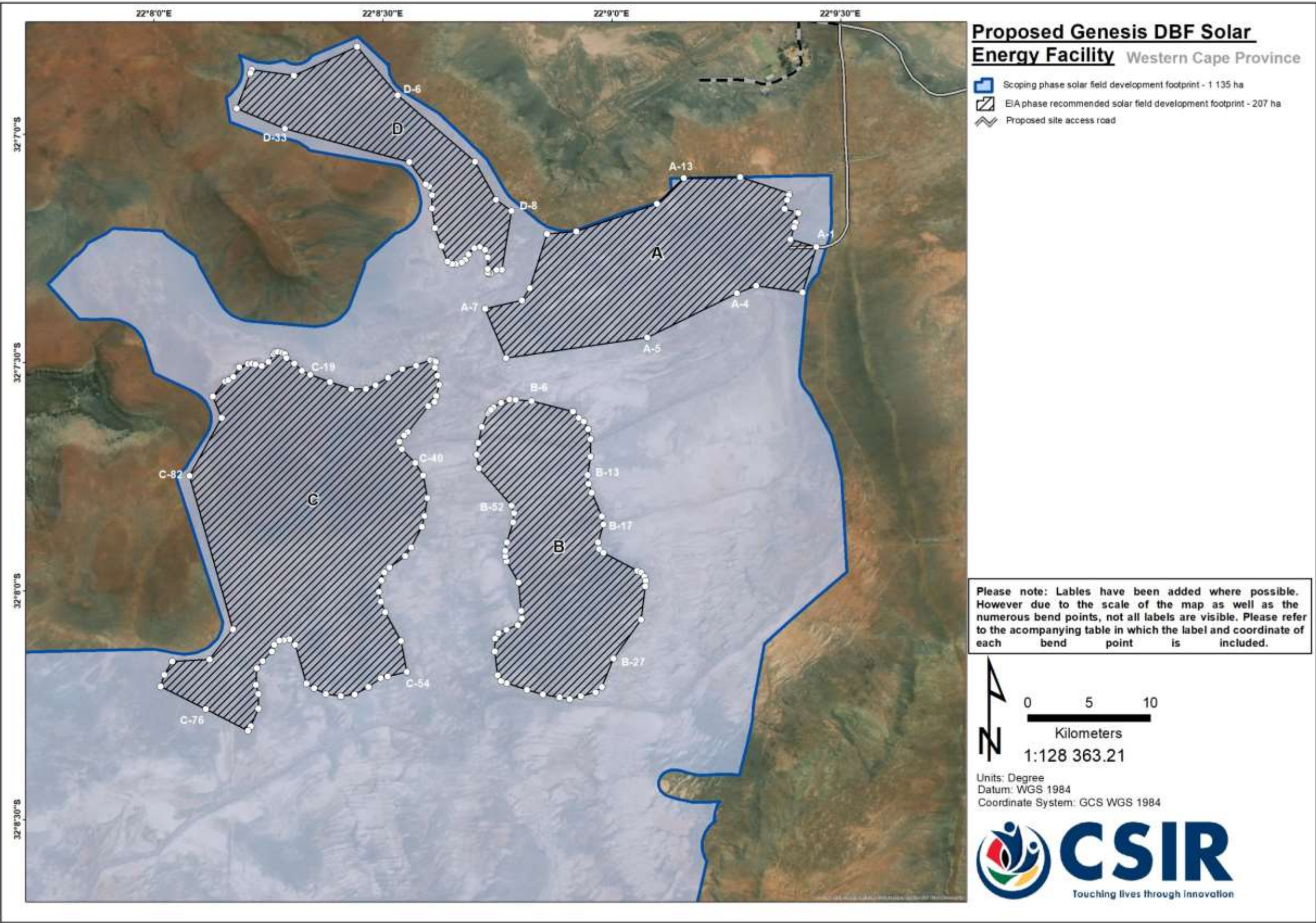


Figure 2.1: Coordinates of the boundary points of the EIA phase PV area footprint for the proposed project

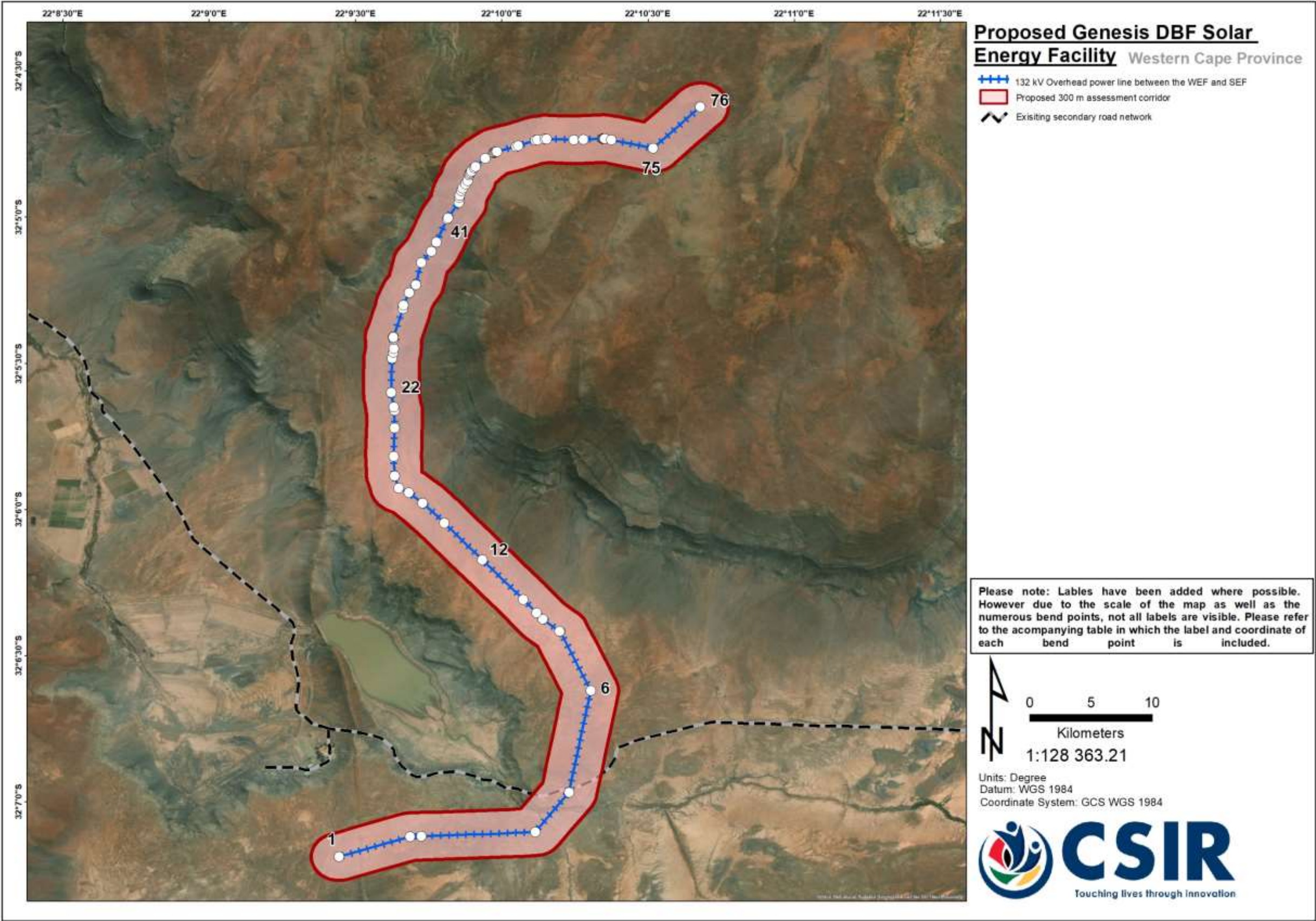


Figure 2.2: Coordinates of the power line routing

The co-ordinates of the estimated mid-points of the proposed project and on-site substation are detailed in Table 2.2 and Table 2.3 respectively. The co-ordinates of the start, middle, and end point of the 132 kV power line are indicated in Table 2.4.

Table 2.2: Co-ordinates of the Mid-Point of the proposed project

Project	Decimal Degrees		Degrees, Minutes, Seconds	
	Latitude (Y)	Longitude (X)	Latitude (S)	Longitude (E)
DBF South SEF	-32.13826131	22.13796922	32° 08' 17.74071281" S	22° 08' 16.68920946" E

Table 2.3: Co-ordinates of the Mid-Point of the on-site substation of the proposed project

Project	Decimal Degrees		Degrees, Minutes, Seconds	
	Latitude (Y)	Longitude (X)	Latitude (S)	Longitude (E)
DBF South SEF: On-site substation	-32.11974497	022.15732789	32° 07' 11.08189860" S	022° 09' 26.38040280" E

Table 2.4: Co-ordinates of the start, middle, and end point of the DBF South SEF EGI: 132 kV power line

Project	Decimal Degrees		Degrees, Minutes, Seconds	
	Latitude (Y)	Longitude (X)	Latitude (S)	Longitude (E)
132 kV Power line: Start	-32.11978543	022.15740504	32° 07' 11.22753360" S	022° 09' 26.65814400" E
132 kV Power line: Middle	-32.09019573	022.16048996	32° 05' 24.70461360" S	022° 09' 37.76384880" E
132 kV Power line: End	-32.07704114	022.17798146	32° 04' 37.34810040" S	022° 10' 40.73324880" E

2.3 Key components of the proposed project

The proposed project will consist of the key components listed below in Table 2.5. A summary of the key components of the proposed project and the technical information is described in this section.

Table 2.5: Description of the components of the proposed project

Component	Description
Solar Field	
Type of Technology	- Solar Photovoltaic (PV) Technology - Bifacial or Monofacial, or a combination of both
Generation Capacity (Maximum Installed)	400 MW
Total developable area that includes all associated infrastructure within the fenced off area of the PV facility	207 ha - Note: 1 135 ha constituted the draft Scoping project area of interest which was assessed by the EAP and specialists.

Component	Description
	Following input from specialist findings, and taking into consideration comments received during the draft scoping comment period, the project area of interest was revised to 500 ha. The final transformation footprint of the proposed PV development has been further reduced to 207 ha in the EIA phase taking into account environmental sensitivities, specialists mitigation measures and other considerations raised by I&APs.
PV Panel Structure	▪ <u>Possible tracking and mounting systems:</u> ○ Single Axis Tracking structures (aligned north-south); ○ Dual Axis Tracking (aligned east-west and north-south); ○ Fixed Tilt Mounting Structure; ○ Mono-facial Solar Modules; or ○ Bifacial Solar Modules. ▪ <u>Height:</u> Approximately 3.5 m (maximum)
132 kV Overhead Transmission Power Line (OHPL)	
Line capacity	▪ 132 kV
Approximate length	▪ 7.5 km
Pylon height	▪ 17.4m – 21m
Pylon type, span, working area and footprint	▪ <u>Type:</u> Monopole or steel lattice type pylons, or combination of both where required. ▪ <u>Span:</u> The pylons will have a span of 200 m to 350 m for monopole pylons and up to approximately 500 m for lattice structures. ▪ <u>Working area:</u> The working area required around a pylon position during the construction phase is approximately 30 m x 30 m. ▪ <u>Footprint:</u> The size of the final constructed pylon footprint depends on the type of structure used, which will typically range from approximately 0.5 m² to 8 m² for monopole pylons, and 36 m² to 64 m² for steel lattice pylons.
Tower type	▪ Self-supporting and Angle Strain towers
Registered servitude	▪ Up to 50 m wide (where multiple adjacent power lines occur, in line with the Eskom Distribution Guideline for OHPL. Note that the entire servitude will not be cleared of vegetation.
Assessment corridor	▪ Specialists assessed an approximately 300 m wide corridor (i.e., 150 m on either side of centreline) for all power lines to identify sensitivities and features that need to be avoided.
Building Infrastructure	
Auxiliary Buildings	▪ <u>Type:</u> These include, but are not limited to, Operation and Maintenance (O&M) building / centre, site office, workshop, staff lockers, bathrooms/ablutions, warehouses, guard houses, etc. ▪ <u>Cumulative Footprint:</u> Approximately up to 5000 m² ▪ <u>Height:</u> Up to 10 m
Inverter/Transformer Stations	Several transformers will be installed with the following specifications: ▪ <u>Height:</u> Approximately 3 m ▪ <u>Footprint:</u> Approximately 220 m² each
On-site Substation and Switching Substation	▪ <u>Footprint:</u> Approximately 1 ha ▪ <u>Height of the on-site substation complex:</u> Up to 10 m. However, the on-site substation will include switchgear portals up to 15 m and lightning masts up to 25 m in height. ▪ <u>Capacity of the on-site substation complex:</u> 132 kV

Component	Description
	▪ <u>Fence</u>: Galvanized palisade fencing to be used at the substations ▪ <u>Height</u>: Up to 2.5 m
Associated Infrastructure	
Battery Energy Storage System (BESS)	▪ <u>Preferred Technology</u>: Lithium-Ion or Sodium-Ion (Solid state) ▪ <u>Alternative Technology</u>: Redox Flow ▪ <u>Footprint</u>: Up to 2 ha ▪ <u>Height</u>: Up to 10 m ▪ <u>Capacity</u>: Up to 1 200 MWh
On-site medium voltage internal cables	▪ <u>Placement</u>: Underground (maybe above ground pending technical constraints) ▪ <u>Capacity</u>: 33 kV ▪ <u>Depth</u>: Maximum depth of 1.5 m
Access roads (including upgrading and widening of existing roads, where relevant)	▪ Existing roads will be used as far as practically achievable. The proposed project site can be accessed via the following roads: ○ Divisional Road 2312 (DR02312); ○ Trunk Road 5801 (TR05801); and ○ Trunk Road 7301 (TR07301). ▪ Refer to the Traffic Impact Assessment (Appendix G.9 of the Scoping Report) and Chapter 2 of the Scoping Report for additional information on the route options per project. ▪ Some of the existing intersections along the above roads may need to be widened to accommodate the turning movement of the trucks. Exact specifications of the widening will be confirmed during the detailed engineering design phase prior to construction.
Internal roads	▪ <u>Internal access roads</u>: Permanent roads will be up to 6 m wide and may require side drains on one or both sides. All roads may have underground cables running next to them. A 12 m wide road corridor may be temporary impacted during construction and rehabilitated to 6 m wide after construction. Temporary clearing of up to 50 m may be required in areas where cut and fill may be required as well for the construction of the bell mouth road junction, turning circles and temporary passing lanes. ▪ <u>Details</u>: New internal service roads will need to be established. These would either comprise farm roads (compacted dirt/gravel) or paved roads. ▪ <u>Width</u>: Approximately 4 – 6 m
Fencing around the PV Facility Perimeter	▪ <u>Type</u>: Could be palisade or mesh or fully electrified ▪ <u>Height</u>: Up to 3 m
Storm water channels	▪ Details to be confirmed once the Engineering, Procurement and Construction (EPC) contractor has been selected and the design is finalised. Where necessary, a detailed storm water management plan would need to be developed.
Work area during the construction phase (i.e. laydown area)	▪ Temporary Laydown: Up to 4.5 ha.
Water Requirements	▪ Approximately 90 000 m³ of water is estimated to be required per year for the construction phase. ▪ Approximately 30 000 m³ of water is estimated to be required per year for the operational phase. ▪ Water requirements during the decommissioning phase are unknown at this stage.

Component	Description
	▪ Potential sources: Local municipality, third-party water supplier, existing boreholes, newly drilled boreholes on site or a combination of existing and newly drilled boreholes on site. ▪ Water supplied to site from an external source will be trucked to the site. ▪ Water supplied from either a nearby bulk supply pipeline (to be confirmed) or on-site borehole will most likely be piped via a temporary HDPE pipe. Should these same sources be utilised during the operations phase then these pipes will most likely be buried.
Construction Period	▪ 24 to 30 months
Operational Period	▪ Once the commercial operation date is achieved, the proposed facility will generate electricity for 20 to 25 years.

A description of the key components of the proposed project is described below.

2.3.1 Solar PV Facilities – Solar Field

The Solar Field will consist of the solar arrays (panels) and building infrastructure.

The total developable area (project footprint) that includes PV array area (207 ha) and all associated infrastructure within the fenced off area of the DBF South SEF i.e., including the solar field, foundations, buildings and associated infrastructure but excluding access roads leading to the fenced off area, for the proposed project is approximately **230 ha**.

The smallest unit of a PV installation is a cell. A number of cells form a module, and several modules cumulatively form the arrays (Figure 2.3). An example of a Solar PV Facility is provided in Figure 2.4.

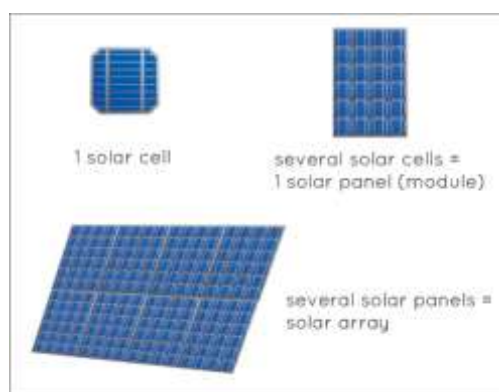


Figure 2.3: Components of the Proposed PV Installation

Modules are arranged into strings that form the solar field and are installed on racks which are made of aluminium or galvanised steel. Foundations will likely be drilled and concreted into the ground. The entire structure will have a maximum height of approximately 4 m (measured from the ground). This system may be fixed, or may track the movement of the sun, either by adopting

Single Axis Tracking (aligned north-south), Dual Axis Tracking (aligned east-west and north-south), Fixed Tilt Mounting Structures, Mono-facial Solar Modules, or Bifacial Solar Modules (preferred option). Bifacial panels can be up to 20 - 40 % more effective since it also utilises solar radiation reflected from the surfaces onto the rear side of the panels. The tracker design will be confirmed during the detailed engineering phase. All tracker design options will be considered in this Scoping and EIA Process.



Figure 2.4: Example of PV Technology (Department of Environment, Forestry and Fisheries (DEFF), 2019¹).

2.3.2 Infrastructure within the PV Facility

2.3.2.1 Inverters, Low Voltage Cables, and Medium Voltage Cables

There will be several inverter stations at the proposed DBF South SEF. The solar arrays are typically connected to each other in strings, which are in turn connected to inverters that convert Direct Current (DC) to Alternate Current (AC). Each inverter station is expected to extend approximately 3 m in height, with a footprint of approximately 0.02 ha.

The strings will be connected to the inverter stations by low voltage underground (internal) DC cables (to a maximum depth of 1.5 m) or cable trays. Power from the inverter stations will be collected in medium voltage transformers through underground (internal) AC cables or cable trays.

The inverter stations will in turn be connected to the proposed on-site substation complexes, via medium voltage (33 kV) internal underground cables. It is highly unlikely that above ground 33 kV power lines will be utilised due to the shading created to the SEF from the overhead lines. It is more likely that the 33 kV internal cables will be underground to a maximum depth of 1.5 m. However, in the isolated event of crossing a feature hindering underground cabling (e.g., a road, topographical or environmental constraint), the reticulation lines may better be suited to be above ground in certain sections. Therefore, both below and above ground routings need to be covered in this Application for EA.

¹ Department of Environment Forestry and Fisheries, 2019. Phase 2 Strategic Environmental Assessment for wind and solar PV energy in South Africa. CSIR Report Number: CSIR/SPLA/SECO/ER/2019/0085 Stellenbosch, Western Cape.

2.3.2.2 On-site Substation Complex

The proposed project will also include an on-site substation complex. The on-site substation complex will cover an approximate area of 3 ha, with a height of up to 10 m, and generally stepping up from 22 kV or 33 kV to 132 kV. The on-site substation complex is planned to include the following:

- On-site Independent Power Producer (IPP) or facility substation (1 ha); and
- Battery Energy Storage System (BESS) (2 ha).

The on-site IPP or facility substation will cover an area of approximately 1 ha within the on-site substation complex, and with a maximum height of 10 m. This will be maintained by the IPP, focusing on the high voltage infrastructure leading up to the Point of Connection. As noted above, this has been included in the current Application for EA (i.e., for the Solar PV Facility and associated infrastructure), as confirmed with the DFFE.

The BESS is described in the section below.

2.3.2.3 Battery Energy Storage System

The BESS will extend up to 2 ha within the on-site substation complex, with a height of up to 10 m, and a capacity of up to 400 MW / 1 200 MWh.

Battery storage offers a wide range of advantages to South Africa including electricity supply reliability and quality improvement. The main purpose of the BESS is to mitigate intermittency of solar PV energy by storing and dispatching of electricity when needed i.e., to contribute to the grid 24 hours/day, during peak demand at night or during power outages. In essence, this technology allows renewable energy to enter the completely independent power generation market.

The BESS technology type will either be Lithium-Ion, Lithium-Na or Redox Flow, with Lithium-Ion and Lithium-Na being the preferred types. All three of these technologies were assessed during the Scoping and EIA Phase, and a motivation is included in Chapter 7 of the EIA Report to authorise both Lithium-Ion and Lithium-Na technology types since both were found to be acceptable and preferred during the EIA Phase. Additional information on the BESS technologies that are being considered is provided below.

▪ Solid State Lithium-Ion Batteries or Sodium-Ion Batteries (preferred technology)

Lithium-Ion and Sodium-Ion batteries are solid state, sealed systems i.e., pre-assembled off site and then delivered to site for placement as per specifications of the supplier. This BESS system consists of multiple battery cells that are assembled together to form modules. A module may consist of several cells working in conjunction. Each cell contains a positive electrode, a negative electrode and an electrolyte.

It is proposed that the Lithium-Ion or Sodium-Ion BESS would be housed in containers, with associated operational, safety and control infrastructure. The BESS will be a sealed unit and will remain sealed during operations. Based on various discussions with the DFFE on previous occasions, it has been confirmed that Lithium-Ion and Sodium-Ion BESS are not classified as containers or structures for the development and related operation of facilities or infrastructure, for

the storage, or for the storage and handling, of a dangerous good. Hence, listed activities pertaining to this aspect in the 2014 NEMA EIA Regulations (as amended) do not apply. Figure 2.5 is an illustration of a 25 MW / 50 MWh Lithium-Ion battery located at the 60 MW Gannawarra Solar Farm in Australia.



Figure 2.5: Example of PV Technology with Lithium-Ion BESS in the foreground (ARENAWIRE, 2018²)

- **Redox Flow Batteries (RFB) (alternative technology)**

Flow batteries generally comprise of three major components; a cell stack, auxiliary parts and electrolyte storage. The active chemical species in a flow battery are stored mostly externally in above-ground storage tanks, which contain the positive and negative electrolytes separately. The energy is stored in two chemical components, which are dissolved in a liquid to form electrolytes during operation. The energy density of a RFB is thus dependent on the size of the storage tanks (Parsons, 2017³).

A schematic representation of a typical RFB is provided in Figure 2.6.

There are two types of RFB's i.e., a 'true' RFB and a hybrid RFB. In a 'true' RFB the electro-active materials used to store energy remain dissolved in solution. Therefore, the energy is determined by the volumes of electrolyte available. Examples of a 'true' RFB is a Vanadium RFB and iron-chromium systems. Hybrid RFBs deposit at least one chemical species as a solid during the charge cycle, therefore preventing the complete separation of power and energy characteristics (Parsons, 2017⁴).

² Arenawire (2018). Solar battery storage in Victoria charging up for summer. <https://arena.gov.au/blog/solar-battery-storage-in-victoria-charging-up-for-summer/> [online]. Accessed November 2021.

³ Parsons, 2017. US Trade and Development Agency. South Africa Energy Storage Technology and Market Assessment. Order Number: TDA-IE201511210. USTDA Activity Number: 2015-11032A. Parsons Job Number: 640368

Examples of electrolytes for RFBs include Hydrochloric Acid and Sulphuric Acid, which are considered as dangerous goods in terms of the 2014 NEMA EIA Regulations (as amended).

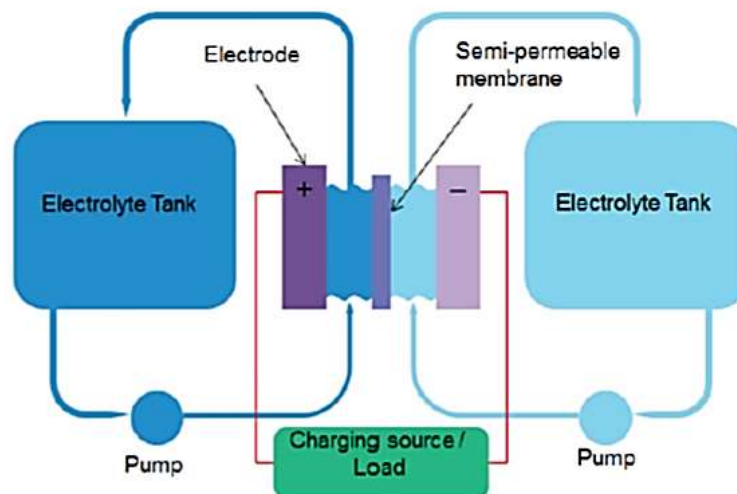


Figure 2.6: Schematic diagram of a typical Redox Flow Battery (Source: Parsons, 2017⁴)

Activity 14 of Listing Notice 1 is for “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”. This listed activity is applicable to the Redox Flow BESS technology type as some of the electrolytes could be stored separately in above ground storage tanks for use in the Redox Flow BESS during operations. Activity 14 of Listing Notice 1 has not been included in the current Application for EA as the preferred BESS technology selected by the applicant is the Solid State BESS (Lithium-Ion or Sodium-Ion).

However, it should be noted that the High-Level Safety, Health and Environment Risk Assessment for the Development of the BESS (Appendix G.10) found that both Solid State technology options and Redox Flow technology options are acceptable for the proposed SEF development. The report provides high level information on the safety, health and environmental risks of the BESS technologies being considered. According to ISHECON (2023⁴), the safety and health risks associated with RFBs⁵ will likely be lower than the lithium-ion battery type for both employees and members of the public outside the facility. Lithium-ion and Sodium-Ion batteries pose a higher fire and explosion risk and the possibility of generating noxious smoke under these circumstances. However, lithium battery systems are easier to install, i.e., pre-assembled containers as opposed to formal brick and mortar structures and will not require as many permanent staff as RFB utility scale operations. The environmental risks of surface aquatic features and groundwater contamination with the RFBs will likely be higher than for solid state batteries, due to the presence of liquids and potential spillages.

⁴ ISHECON (2023). Battery Energy Storage System High-Level Safety, Health and Environment Risk Assessment. Scoping Level Assessment for the proposed DBF South SEF and Beau Valley Solar Facility and associated infrastructure. Prepared for the Scoping and Environmental Impact Assessment (EIA) for the DBF South SEF Solar Facility and associated infrastructure. Appendix G.10 of the Scoping Report.

⁵ Vanadium is assumed for now; however alternative chemistry may be considered.

2.3.2.4 Internal Roads

Internal roads will also be constructed within the footprint of the SEF. The internal roads will comprise farm roads (compacted gravel/dirt) or paved roads and will extend approximately 6 m wide. A 12 m wide road corridor may be temporary impacted during construction and rehabilitated to 6 m wide after construction. Temporary clearing of up to 50 m may be required in areas where cut and fill may be required as well for the construction of the bell mouth road junction, turning circles and temporary passing lanes. The total internal road length is estimated at approximately 40 km post-construction. The total internal road length may vary slightly, depending on the final design.

2.3.2.5 Panel Maintenance and Cleaning Area

During the operational phase, the accumulation of dust on solar panels generally negatively influences the productivity of solar facilities. As such the panels require regular cleaning. It is proposed that panel cleaning will take place as part of a maintenance schedule, twice per year; however, this may be revised should the site and weather conditions warrant more frequent cleaning. Cleaning may also be required after events that generate significant dust, but not daily. A dedicated panel maintenance and cleaning area will be required on site during the operational phase. Water that emanates from the cleaning process will be free from harmful detergents or will comprise of approved biodegradable substances.

2.3.2.6 Storm water

It is proposed that the area where the solar panels will be installed will not be fully cleared of vegetation. It is planned for the vegetation to be trimmed and the panels will be installed on steel supporting structures above the height of the vegetation. The solar panels will not replace the vegetated area and thus storm water runoff is not expected to increase specifically due to the proposed PV panel placement.

Stormwater infrastructure, such as channels, will be constructed on site to ensure that stormwater run-off from site is appropriately managed. Water from these channels is not likely to contain any chemicals or hazardous substances and will be released into the surrounding environment based on the natural drainage contours.

Details of storm water management are to be confirmed once the Engineering, Procurement and Construction (EPC) contractor has been selected and the design is finalised. Where necessary, a detailed Storm Water Management Plan would need to be developed during the detailed design phase (post EA, should such an authorisation be granted) and to be implemented during all phases of the project. The plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion. The plan should also include the installation of appropriate design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures promotes the dissipation of storm water run-off. Recommendations for the management of storm water are included in the EMP, Appendix H of this EIA Report.

2.3.2.7 Auxiliary Building Infrastructure

The solar field will require the following auxiliary building infrastructure:

- O&M Building (includes Control Centre, Offices, Guard houses, Warehouses, Workshop, Canteen, Visitors Centre, Staff Lockers, etc.): 0.5 ha with a height of up to 10 m;
- Ablution facilities: approximately 0.4 ha;
- Inverter stations: 0.02 ha each; and
- On-site substation and switching station building: up to 1 ha.

A temporary laydown area with a maximum footprint of 4.5 ha will also be constructed.

The auxiliary buildings will have an estimated cumulative footprint of approximately 5 000 m², and a height up to 10 m.

A temporary laydown area with a maximum footprint of 4.5 ha will also be constructed.

2.3.2.8 Additional Infrastructure

The Project Applicant may establish a concrete batch plant on site of up to 1 ha (within the laydown area) for purposes of the construction phase. Only a limited amount of water (within the overall water usage estimates described in this chapter) will be utilised during construction for the batching of concrete. Details of the concrete batching plant will be confirmed during detailed design as the development progresses.

For various reasons such as security, public protection and lawful requirements, the proposed built infrastructure on site and the entire SEF will be secured via the installation of appropriate fencing. The SEF fencing type could be palisade or mesh or fully electrified, with an estimated height of up to 3 m.

Existing livestock fencing on the affected farm portions may be upgraded in places, where deemed insufficiently secure, whereas permanent fencing will be required around the O&M area and on-site substation complex. Access points will be managed and monitored by an appointed security service provider. The type and height of fencing to be installed will be confirmed during detailed design as the development progresses.

2.3.3 External Access Roads

A Traffic Impact Assessment was commissioned for the proposed project and is included in Appendix G.9 of this EIA Report. The following information has been obtained from the Traffic Impact Assessment (Athol Schwarz, 2023⁶).

The proposed project study area / preferred site can be accessed via various existing main roads and unnamed farm gravel roads. The road network adjacent to the proposed project and potential access routes are discussed below and illustrated in Figure 2.7.

⁶ Athol Schwarz (2023). Traffic Impact Assessment. Scoping Level Assessment for the proposed Genesis DBF South SEF and associated infrastructure. Prepared for the Scoping and Environmental Impact Assessment (EIA) for the Genesis DBF South SEF and associated infrastructure. Appendix G.9 of the Scoping Report.



Figure 2.7: Road network adjacent to the proposed project (Schwartz, 2023⁷)

2.3.3.1 Main Road

- **MR00588 (R356)**

The MR00588 is an Access Collector providing mobility between towns. The management and maintenance of this road fall under the jurisdiction of the Northern Cape Provincial Roads Department. The MR00588 starts at the R354 in Sutherland, passing through Fraserburg, before ending at the TR016 (R63) at Loxton.

The road consists of a gravel carriageway within a 30 m wide servitude, as shown in Figure 2.8. The condition of the road is good and allows for dual-directional traffic at speed.



Figure 2.8: MR00588

2.3.3.2 District Roads

The district roads in the area are level 4 roads and are classified as Resident Access Collector roads, providing accessibility to nearby towns and main roads. The management and maintenance of this road fall under the jurisdiction of the Provincial Roads Department, in which the roads are located. The minimum required level of service on these roads is a LOS C.

Most of these roads consist of a gravel carriageway, approximately 7 m wide, within a 20 m wide servitude. As a result of the width, road users have to reduce speed when passing oncoming vehicles. Although most of these roads are suitable for light vehicles, the use of these roads by heavy vehicles is not recommended.

The condition of these roads is not consistent and varies from very poor to satisfactory. However, several sections of these roads are very stony, which could result in mechanical damage to vehicles.

- **DR02312**

The DR02312 starts at the TR05801 (R381) and ends at the TR07301 (R353). The condition of this road is adequate, as shown in Figure 2.9. Road users need to slow down when passing oncoming vehicles.



Figure 2.9: DR02312

- **DR02313**

The DR02313 is a link road that starts and ends on the DR02312 and provides access to the DR02315 and the DR02319. The condition of this road is adequate, as shown in Figure 2.10. This road passes through numerous homesteads.



Figure 2.10: DR02313

- **DR02314**

The DR02314 starts at the MR00588 and intersects with the DR02315 before ending at the DR02312. The road's width is significantly less than the required 7 m, making passing other vehicles very difficult, as shown in Figure 2.11. Travelling at high speed on this road is not advisable.



Figure 2.11: DR02314

- **DR02315**

The DR02315 starts at the DR02313 and intersects with the DR02314 before ending at the TR05801 (R381). The section of the road between the DR02315 and TR05801 passes through a ravine, which requires a significant speed reduction. The road's width is significantly less than the

required 7 m, making passing other vehicles very difficult, as shown in Figure 2.12. Travelling at high speed on this road is not advisable.



Figure 2.12: DR02315

- **DR02317**

The DR02317 is 68 km long, starts at the TR05801, and intersects with the DR02311 (at 30.7 km) and DR02318 (at 40.5 km) before ending at the NR00108 (N1). Over the majority of the length, the road is undulating, as shown in Figure 2.13.



Figure 2.13: DR02317

At approximately 8 km from the TR05801, the DR02317 passes through an existing homestead, as shown in Figure 2.14.



Figure 2.14: DR02317 - 8 km from TR05801

Another farming community straddles the DR02317 at approximately 22 km from the TR05801, as shown in Figure 2.15.



Figure 2.15: DR02317 - 22 km from TR05801

- **DR02319**

The DR02319 starts at the MR00588 before ending at the DR02313. The condition of this road is adequate, as shown in Figure 2.16.



Figure 2.16: DR02319

2.3.3.3 Minor Roads

Minor roads in the area, have a functional classification of level 5, and are categorised as a Local Access road, providing direct access to properties. The management and maintenance of this road fall under the jurisdiction of the Provincial Roads Department, in which the roads are located. The minimum required level of service on these roads is a LOS C.

Most of these roads consist of a gravel carriageway, within a 20 m wide servitude.

- **OP08870**

The OP08870 (Modderpoort) is 3.41 km long, starting at the DR02312 before ending at the Northern Cape Boundary. The road is well utilised, as shown in Figure 2.17.



Figure 2.17: OP08870

- **OP08871**

The OP08871 (Klipbanksfontein) is 16.84 km long, starting at the DR02312 before ending at the OP08872. The road is well utilised, as shown in Figure 2.18.



Figure 2.18: OP08871

2.3.3.4 Site Access

The envisaged access to the proposed development would be from the DR02312 and across the adjacent properties. The final selection of the access points to this development will be subject to the outcome of the EIA process. However, given the topography of the area, there are not many limitations provide on this section of the road. The geometric design limitations need to be implemented when selecting and design the final access point.

It should be noted that the access point, from the DR02312, is the same access point that will be used for all the developments in the southern cluster and majority of the developments in the middle cluster.

2.3.3.5 Transportation routes

2.3.3.5.1 Commuter Routes

The towns in this part of the country are few and far apart. There are several towns within a 200 km radius of the proposed development from which the workforce is to be drawn, for the proposed development, which include Beaufort West, Carnarvon, Fraserburg, Loxton, Leeu Gamka, Merweville, Nelspoort, Victoria West and Williston. The anticipated routes to the proposed development from the surrounding towns are indicated in magenta, in Figure 2.19.



Figure 2.19: Commuting Routes to the Proposed Development

The proportionality of the workforce from the surrounding towns is based on a 'working-age' population, modified by a 'weighting factor', calculated based on the distance travelled to the proposed development from the relevant town. The expected proportion of the workforce from the surrounding communities is depicted in Table 2.6.

Table 2.6: Distance to Surrounding Towns

Town	Population	Travel Distance	Proportion (%)
Beaufort West	21376	58 km	76%
Carnarvon	4107	156 km	5%
Fraserburg	1854	93 km	4%
Loxton	604	97 km	1%
Leeu Gamka	1679	180 km	2%
Merweville	960	185 km	1%
Nelspoort	1212	128 km	2%
Victoria West	4978	169 km	6%
Williston	1981	183 km	2%

Based on the information provided above, the proportion of the workforce from Leeu Gamka, Merweville, Nelspoort and Williston are low, and in reality, might not materialise. However, for the purpose of this report they have been included.

2.3.3.6 Freight Routes

2.3.3.6.1 Container Terminals

Transnet Port Terminals is a division of Transnet SOC Limited, South Africa's state-owned freight transport company, which owns and operates the terminal at several Ports in South Africa.

Operations are divided into the major market sectors: containers, bulk, breakbulk, and automotive, organised into three geographical regions – Eastern Cape, Western Cape, and Kwa-Zulu Natal.

The port of entry into South Africa for all import photovoltaic panels is limited to the container terminals at Durban, Ngqura, Gqeberha and Cape Town. The possible routes from these terminals to the proposed development is via Victoria West and Loxton, shown in Figure 2.20.

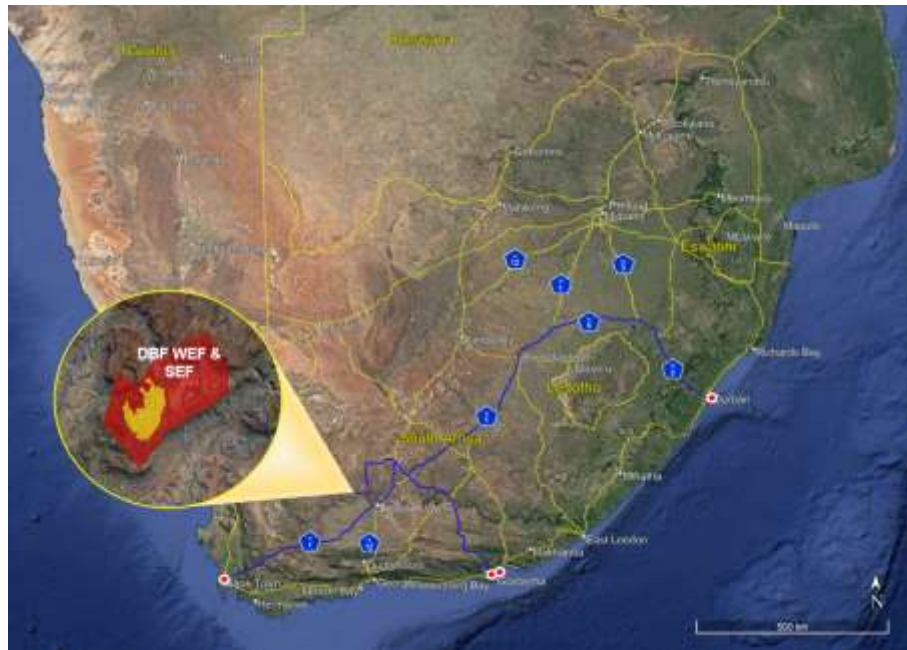


Figure 2.20: Freight Routes - Port Terminals

The potential transportation routes from the various Container Terminals in South Africa to the proposed development, are detailed in Table 2.7.

Table 2.7: Distance - Port Terminals

Container Terminals	Distance
Cape Town	775 km
Durban	1298 km
Gqeberha	623 km
Ngqura	614 km

Based on the information provided above, the closest container terminals to the proposed development are the Ports at Gqeberha and Ngqura, both of which are located in the Eastern Cape.

However, the preferred transportation route would ultimately be identified by the logistic company appointed to transport the components from the port of entry to the proposed development.

2.3.3.7 Commercial Centres

The most likely transportation routes for domestically supplied and manufactured components from the major commercial centres to the proposed development are either Cape Town or Johannesburg (or any supplier along these routes), as shown in Figure 2.21.



Figure 2.21: Freight Routes - Commercial Centres

The distances from the proposed developments to the major commercial centres in South Africa are shown in Table 2.8.

Table 2.8: Distance - Major Commercial Centres

Commercial Centres	Distance
Cape Town	775 km
Johannesburg (via N1)	1079 km
Johannesburg (via N12)	1044 km

Although the closest major commercial centre to the proposed development is located in the greater Cape Town area, many components will be fabricated in Johannesburg and transported to the proposed development.

2.3.4 Service Provision

The Project Developer consulted with the Beaufort West Local Municipality during the EIA Phase in order to confirm the supply of services (in terms of water usage, sewage removal, solid waste removal, and electricity requirements) for the proposed project. The municipality was also

consulted with as part of the 30-day public review period of the Draft Scoping Report to seek comment on the general proposed project. No feedback was obtained from the municipality. However, the municipality will still be communicated with in the EIA Phase. Should the local municipality not have adequate capacity available for the handling of waste, provision of water and sewage handling provisions; then the Project Applicant will make use of private contractors to ensure that these services are provided. An outline of the services that will be required are discussed below.

2.3.4.1 Water Usage

During the construction phase, approximately 90 000 m³/a (2.85 L/s) of water will be required per year for the Genesis Southern Cluster facilities. Water will mostly be used for human consumption and construction activities. This includes road construction; hardstand compaction; concrete foundations; cleaning equipment after concrete pours and dust suppression on roads. This is also classified as potable water and should be from a reputable source and conform to South African National Standards (SANS) quality standards. The decommissioning phase is also expected to result in similar water usage requirements; however, the exact specifications will be confirmed at the time and is not expected to significantly exceed the volume requirements of the construction phase.

During the operational phase, it is estimated that the panel washing process, and human consumption, staff ablution facilities as well as other operational phase activities will require approximately 30 000 m³/a (0.11 L/s) of water per year for an approximate 20 to 25-year operational lifespan. The water for panel washing does not need to meet the same quality standards as that required for potable water, however the water should be tested to ensure that it does not negatively impact on the mechanical equipment. Refer to the Geohydrology Assessment (Appendix G.11 of this Scoping Report) and Chapter 3 of this Scoping Report for additional information.

The EMPr provides recommendations for water conservation techniques during the construction, operational and decommissioning phases. The staff would also be encouraged to use water sparingly during all phases.

Water required for the construction, operational and decommissioning phases will either be sourced from the following sources (in order of priority and likelihood), either individually or as components of a water mix:

- The Beaufort West Local Municipality - specific arrangements will be agreed to with the local municipality in a Service Level Agreement (SLA). The water will be trucked in or made available for collection at the Local Municipal Water Treatment Plant via a metered standpipe. Should the water be trucked in, such impacts have been considered in the Traffic Impact Assessment.
- Investigation into a third-party water supplier which may include private services companies. This would be trucked in, and such impacts have been considered in the Traffic Impact Assessment.
- Methods for rainwater and stormwater recycling have been included in the EMPr (Appendix H) for implementation on site.

- **Existing boreholes on site** to source groundwater (if available and if suitable). A Geohydrology Assessment has been commissioned as part of this Scoping and EIA Process. The study an analysis of the hydrocensus chemistry results in terms of the SANS 241-1: 2015 and the Department of Water Affairs and Forestry (DWAF) (1998) Standards. Based on this, the groundwater quality in the study area is generally of good quality in terms of pH, total dissolved solids (TDS) and electrical conductivity (EC). It is possible that the groundwater can be used for potable and domestic purposes with only minor treatment however a full laboratory analysis will be required. With regards to the cleaning of panels, salts could be removed from the groundwater by thermal distillation (i.e. boiling since salt has a much higher boiling point than water) or by membrane separation (commonly reverse osmosis). Both of these techniques are possible but financial viability would have to be determined before commissioning as both techniques are costly on a large scale. Water pipelines may need to be constructed to transfer groundwater from existing boreholes or they may be transported by trucks from the boreholes to the site. Groundwater may also need to be stored on site in suitable containers or reservoir tanks during the construction and operational phases. Refer to Chapter 4 of this EIA Report for feedback on the authorisations required for this aspect in terms of the National Water Act (Act 36 of 1998, as amended).

The Geohydrology Assessment notes there are several existing boreholes that could potentially be utilised for groundwater abstraction to meet the required volumes for construction (pending detailed testing and relevant consent from landowners and DWS). An overview of the potential groundwater supply from existing boreholes is given in Table 7 of the said report. Note that all boreholes listed were derived from the NGA database and will need to be verified in the field. It is anticipated that the existing boreholes will require some upgrading to meet the water demands of the proposed project and that at least two (2) boreholes situated on two (2) different farm portions will be required to meet the demand of the solar farm.

The Geohydrology Assessment emphasises that the GA volume is capped at 40 000 m³/a per farm portion, hence the requisite minimum of two boreholes.

- **New boreholes that will be drilled on site** to source groundwater (if available and if suitable), which will be subject to complete geohydrological testing and an assessment, as well as a Water Use Licence Application process. This will be undertaken as a separate process, once more detailed information becomes available, outside of the current Application for EA for the proposed project and associated infrastructure. Refer to Chapter 4 of this EIA Report for feedback on the authorisations required for this aspect in terms of the National Water Act (Act 36 of 1998, as amended).

The groundwater specialist, GEOSS, sought to identify potential exploration target area or Areas of Interest (AOI) that can be targeted for groundwater development. The delineation of AOIs has been based on identified geologic structures that may potentially control groundwater flow, which in this area, consist mainly of dolerite dykes, contacts between different geological units, and potentially fractured units. The identification of dolerite dykes has been based on published geological maps of the area, interpretation of the available aerial imagery. GEOSS made use of available Google Earth imagery and ESRI Imagery (sourced from Cape Farm Mapper) of the area. The assessment notes there are four major dolerite dykes trending in a northwest-southeast orientation to the east and west of the Genesis DBF South SEF which are

still within the Genesis Eco-Energy Southern Cluster. The contact between the Beaufort Group and this dyke could be investigated in detailed during an exploration phase, if required.

- **Finally, the Groundwater assessment notes a third option to consider is to make use of a combination of existing boreholes and drilling new boreholes** for further groundwater development. This scenario will depend on the following:
 - Whether permission is granted by land/farm owner to make use of the existing boreholes on their properties.
 - The volumes that could sustainably be abstracted from the relevant boreholes, this would need to be proven by scientific yield testing according to relevant standards.
 - The volumes that are currently being used by the farmer while bearing in mind permissible abstraction in terms of the GA.
 - Successful borehole drilling, i.e. intersection of groundwater with a reasonable quality and sufficient sustainable yield, which could supplement any shortfall required on the proposed project.

Groundwater quality will be a further factor in determining which boreholes are considered most appropriate for supply.

2.3.4.2 Sewage or Liquid Effluent

The proposed project will require sewage services during the construction, operational and decommissioning phases. Low volumes of sewage or liquid effluent are estimated. Liquid effluent will be limited to the ablution facilities during the construction and operational phases. Portable sanitation facilities (i.e., chemical toilets) will be used during the construction phase, which will be regularly serviced and emptied by a suitable and registered contractor. Permanent ablution facilities may be installed during the operational phase, as indicated above. The effluent may be stored on site in waterproof conservancy sumps/tanks structures (conservancy tanks) and will be regularly emptied, typically with Honey-sucker trucks, and be transported and disposed of at a registered Municipal Sewerage Treatment Facility in the Beaufort West Local Municipality, or similar facility by a registered service provider.

2.3.4.3 Solid Waste Generation

The quantity of waste generated will depend on the construction phase, which is estimated to extend 24 to 30 months. The following waste materials are expected:

- Packaging material, such as the cardboard, plastic and wooden packaging and off-cuts;
- Hazardous waste from empty tins, oils, soil containing oil and diesel (in the event of spills), and chemicals;
- Building rubble, discarded bricks, wood and concrete;
- Domestic waste generated by personnel; and
- Vegetation waste generated from the clearing of vegetation.

Solid waste will be managed via the EMP during all project phases. The EMP is provided in this EIA Report, incorporates waste management principles. During the construction phase, general solid waste will be collected and temporarily stockpiled in skips in a designated area on site and thereafter removed, emptied into trucks, and disposed at a registered waste disposal facility on a regular or monthly basis by an approved waste disposal Contractor (i.e., a suitable Contractor) or the municipality. In addition, a skip will be placed on site and any damaged or broken PV panels

(i.e., those not returned to the supplier) will be stored in this skip. A specialist waste management company will be commissioned to manage and dispose of this waste. Any hazardous waste (such as contaminated soil as a result of spillages) will be temporarily stockpiled in a designated area on site (i.e., placed in leak-proof storage skips), and thereafter removed off site by a suitable service provider for safe disposal at a registered hazardous waste disposal facility.

Waste disposal slips and waybills will be obtained for the collection and disposal of the general and hazardous waste. These disposal slips (i.e., safe disposal certificates) will be kept on file for auditing purposes as proof of disposal. The waste disposal facility selected will be suitable and able to receive the specified waste stream (i.e., hazardous waste will only be disposed of at a registered/licenced waste disposal facility). The details of the disposal facility will be finalised during the contracting process, prior to the commencement of construction. Where possible, recycling and re-use of material will be encouraged.

During the operational phase after construction, the facility will produce minor amounts of general waste (as a result of the offices or maintenance).

2.3.4.4 Electricity Requirements

In terms of electricity supply, the developer may make use of generators on site during construction, and the operational electrical requirements would be nominal and would likely be supplied by the proposed facility.

2.4 Socio-Economic

It should be noted that the employment opportunity specifications provided in this report are estimates and is dependent on the final engineering design and the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) Request for Proposal provisions, or similar programme requirements, at that point in time.

2.4.1 Employment during Construction

During the construction phase, skilled, low skilled and semi-skilled temporary employment opportunities will be created. It is difficult to specify the actual number of employment opportunities that will be created at this stage; however, approximately 300-400 employment opportunities are expected to be created during the construction phase. The skill breakdown of employment opportunities is estimated as 55 % low skilled, 30% semi-skilled and 15 % skilled.

Employees will most likely be housed in local nearby towns and villages. The Socio-Economic Assessment will also consider this during the EIA Phase. Typically, the EPC contractor will be responsible for the provision of transport of construction personnel to and from site.

2.4.2 Employment during Operations

Approximately 40 to 50 full time employment opportunities will be created during the operational phase. The employment breakdown is estimated as 50 % low skilled, 40 % semi-skilled and 10 % skilled. The low and semi-skilled jobs will be linked to services such as panel cleaning, maintenance and security. The percentage of temporary workers that may be offered permanent employment once the construction phase is completed will be dependent on the investor

requirements, however, will meet the requirements of the REIPPPP (or similar process) at the time as well.

2.4.3 Socio-Economic Investment and Development

The Applicant will ultimately own the project, if successful, and will compile an Economic Development Plan which will be compliant with REIPPPP requirements (or similar process) and will inter alia set out to achieve the following:

- Create a local community trust or similar (as required by REIPPPP) which has an equity share in the project life to benefit historically disadvantaged communities;
- Initiate a skills development and training strategy to facilitate future employment from the local community;
- Give preference to local suppliers for the construction of the facility; and
- Support local community upliftment projects and entrepreneurship through socio-economic and enterprise development initiatives.

2.5 Overview of the Project Development Cycle

This section provides an outline of the main activities that are proposed during each phase of the proposed project, i.e., extending from the Planning and Design phase through to the Decommissioning phase. The operational life of the proposed DBF South SEF is expected to be approximately 20 to 25 years, which could be extended through regular maintenance and/or upgrades in technology.

The project can be divided into the following main phases:

- Detailed Planning and Design Phase;
- Construction Phase;
- Operational Phase; and
- Decommissioning Phase.

Each activity undertaken as part of the above phases may have environmental impacts and, where applicable, has therefore been assessed in the specialist studies for the EIA Phase (Appendix G of this EIA Report)..

2.5.1 Planning and Design Phase

During the EIA phase the project layout has been refined and informed by the findings of the specialist assessments. Mitigation measures for environmental sensitivities have been integrated into the EMPr (Appendix H) for implementation during the pre-construction detailed engineering design and planning phase.

2.5.2 Construction Phase

The construction phase will take place subsequent to the issuing of the EA (should such authorisation be granted) and if a successful bid in terms of the REIPPPP or a similar tender process is issued, and once a power purchase agreement (PPA) is signed with a suitable energy off-taker (either national government or private). As indicated above, the construction phase is expected to extend 24 to 30 months. The main activities that will form part of the construction phase are:

- Removal of vegetation for the proposed infrastructure, where necessary, within the approved development footprint to facilitate the construction and/or establishment of infrastructure. Note that vegetation is planned to be trimmed within the PV array area (and not removed completely);
- Excavations for infrastructure and associated infrastructure;
- Establishment of a laydown area for equipment;
- Stockpiling of topsoil and cleared vegetation, where necessary (except for the PV array);
- Creation of employment opportunities;
- Transportation of material and equipment to site, and personnel to and from site; and
- Construction of the solar field, and additional infrastructure.

All efforts will be made to ensure that construction work will be undertaken in compliance with local, provincial and national legislation, local and international best practice, as well as the EMPr that is included in Appendix H of the EIA Report. An independent Environmental Control Officer (ECO) will be appointed during the construction phase and will monitor compliance with the recommendations and conditions of the EMPr and EA (should it be granted), respectively.

2.5.3 Operational Phase

The following activities will occur during the operational phase:

- The generation of electricity from the proposed project; and
- Maintenance of the solar field and associated infrastructure.

The operational lifespan of the proposed project is expected to be approximately 20 to 25 years. During the life span of the proposed project, on-going maintenance will be required on a scheduled basis to ensure the continued optimal functioning of the infrastructure. In general, maintenance on the structures will involve visual inspection, and only equipment that fails will be replaced in a manner similar to that of construction activities. The EMPr included in Appendix H of the EIA Report includes the requirement for method statements to be compiled prior to the operational phase to describe the manner in which maintenance will be undertaken to ensure environmental impacts are minimised.

2.5.4 Decommissioning Phase

At the end of the operational phase, the PV facility may be decommissioned, or may be repowered i.e., redesigned and refitted to operate for a longer period. The main aim of decommissioning is to return the land to its original, pre-construction condition. Should the unlikely need for decommissioning arise i.e., if the facility becomes outdated or the land needs to be used for other purposes, the decommissioning procedures will be undertaken in line with an approved EMP and relevant legislation at the time, and the site will be rehabilitated and returned to its pre-construction state.

Scoping and Environmental Impact Assessment for the
proposed development of the Genesis DBF South Solar
Energy Facility and associated infrastructure near
Beaufort West in the Western Cape



FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER 3: Description of the Affected Environment



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3. DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter of the EIA Report provides an overview of the affected environment for the proposed DBF South Solar Farm (hereafter referred to as the “DBF South SEF” or the “proposed project”) and the surrounding area.

The receiving environment is understood to include biophysical, socio-economic, and heritage (cultural landscape) aspects, which could be affected by the proposed project or which in turn might impact on the proposed project.

This information is provided to identify the potential issues and impacts of the proposed project on the environment and vice versa. The information presented within this chapter has been sourced from *inter alia*:

- EIA-level inputs from the specialists that form part of the project team;
- Feedback from the National Department of Forestry, Fisheries and the Environment (DFFE) National Web-based Environmental Screening Tool (hereafter referred to as the Screening Tool), where applicable;
- Review of *inter alia* information sources available on the South African National Biodiversity Institute (SANBI) Biodiversity Geographical Information System (BGIS), Agricultural Geo-Referenced Information System (AGIS), Endangered Wildlife Trust (EWT) Threatened Species No-Go Map;
- Western Cape Provincial Strategic Plan 2019-2024;
- Western Cape Provincial Spatial Development Framework (SDF), 2014;
- Central Karoo District Municipality (CKDM) Integrated Development Plan (IDP), 2020;
- CKDM SDF, 2019;
- Beaufort West Local Municipality (BWLM) IDP 2022-2027; and
- BWLM SDF, 2022;
- Karoo National Park Management Plan, 2017-2027.

It is important to note that this chapter intends to provide a broad overview of the affected environment. Detailed descriptions of the preferred project footprint within the preferred site (i.e. the study area) that are focused on significant environmental aspects of the proposed project are provided in the relevant specialist assessments contained in Appendix G of this EIA Report.

3.1 Background, Study Area, and Buildable Areas

As indicated in Chapter 1 of this EIA Report, the proposed project forms part of a cluster of 9 Renewable Energy Facilities (REFs) (i.e. 2 x Solar PV and 7 x Wind) and associated infrastructure that comprises the GEED Renewable Energy Cluster near Beaufort West. The study areas and affected farm portions for all 9 REFs and the 400 kV EGI are indicated in Table 3.1 and are located north-west of Beaufort West in the Western Cape Province. The total extent of the study area for the DBF South SEF and WEF projects are approximately 6 931 hectares (ha), excluding the 132 kV power line corridor that extends onto Portion 1 of Doornboomfontyn Farm Nr. 89.

Table 3.1: Farm portions and SG codes for the Study Area

Project	Farm Portion	SG Code	Site Area (ha)
NORTHERN CLUSTER			
Eland WEF, 132 kV EGI and associated infrastructure	Remaining extent of Elands Fontein Farm Nr. 24	C00900000000002400000	2 229
Windy Plains WEF, 132 kV EGI and associated infrastructure	Remaining extent of Drooge Onrust Farm Nr. 22	C00900000000002200000	2 961
MIDDLE CLUSTER			
Aloe WEF, 132 kV EGI and associated infrastructure	Matjesfontein Farm Nr. 412	C00900000000041200000	22 936
Elegia WEF, 132 kV EGI and associated infrastructure			
Gazania WEF, 132 kV EGI and associated infrastructure			
SOUTHERN CLUSTER			
Beau Valley WEF, 132 kV EGI and associated infrastructure	Portion 1 of Doornboomfontyn Farm Nr. 89	C00900000000008900001	2 597
Beau Valley SEF, 132 kV EGI and associated infrastructure			
DBF South WEF, 132 kV EGI and associated infrastructure	Remaining extent of Doornboomfontyn Farm Nr. 89	C00900000000008900000	5 758
DBF South SEF, 132 kV EGI and associated infrastructure			
SUPPORTING 400 kV EGI (Affected farm portions to be confirmed)			
400 kV Overhead Transmission Power Line and a 132/400 kV Collector Substation and associated infrastructure	Quagga Fontein Farm Nr. 82	C00900000000008200000	12 522
	Farm Nr. 42	C00900000000004200000	3 403
	Leeuw Kloof Farm Nr. 43	C00900000000004300000	4 835
	Portion 4 of Duiker Kranse Farm Nr. 45	C00900000000004500004	3 858
	Spits Kop Farm Nr.81	C00900000000008100000	5 622

At the commencement of this Scoping and EIA Process, the **Original Scoping Phase PV Assessment Area** totalled 1 135 ha within the study area / preferred site. The preferred site or **total study area** for proposed DBF South SEF is approximately **1 135 hectares (ha)**. The preferred site serves as the study area for this Scoping and EIA Process. Therefore, the terms “site” and “study area” are used synonymously in this report. Following the identification of sensitivities by the specialists during the Scoping Phase, the Project Developer took such sensitivities, and other considerations, into account and formulated an approximately 500 ha Revised Scoping Development Area which was considered in the EIA phase. The EIA-level Specialist Assessments included in Appendix G of this EIA Report therefore assessed the Revised Scoping Development Area within the Original Scoping Phase PV Assessment Area, in other words the total study area. Informed by the EIA-level specialist assessments and the proposed specialist mitigation measures, the final PV design and PV footprint that is proposed for EA has been reduced to 207 ha (see Chapter 7). A map of the reduced proposed footprint to be considered for EA by the DFFE is included in Chapter 7 of this EIA Report.

The development footprint is where the actual development will be located, i.e., the footprint containing the PV solar arrays. The buildable areas are the full extent to be approved for development, and the development footprint detailed in the layouts is based on the current proposal. In summary, the full extent of the study area has been assessed by the specialists and mapped accordingly in the Specialist Assessments to identify environmental sensitivities and no-go areas. This approach uses environmental and social constraints to avoid sensitive features, thus applying the mitigation hierarchy, and it leads to the selection of the least environmentally sensitive development footprint.

The proposed project is located within the BWLM and CKDM. Figure 3.1 below provides a locality map of the study area.

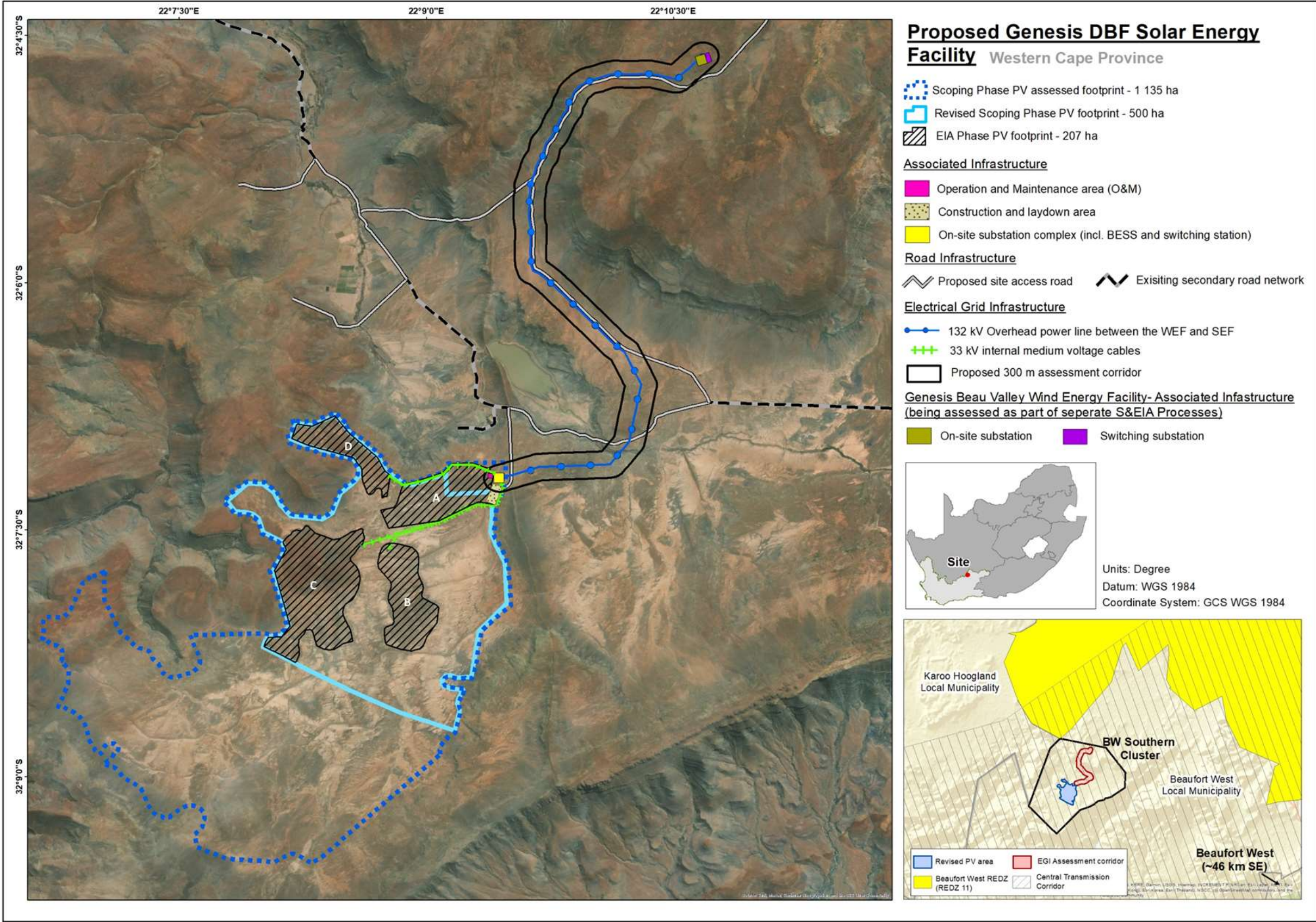


Figure 3.1: Locality map for the proposed project situated north-west of Beaufort West in the Western Cape province.

3.2 Biophysical Environment

The description of the receiving biophysical environment discussed hereafter is informed by inputs provided by the specialists as indicated in Table 3.2.

Table 3.2: Specialist inputs and respective appendices.

NAME	ORGANISATION	ROLE/STUDY UNDERTAKEN
Specialists		
Johann Lanz (<i>Pr.Sci.Nat.</i>)	Private	Agriculture and Soils Compliance Statement
Simon Todd (<i>Pr.Sci.Nat.</i>)	3Foxes Biodiversity Solutions	Terrestrial Biodiversity, Terrestrial Plant Species, and Terrestrial Animal Species
Toni Belcher (<i>Pr.Sci.Nat.</i>)	Private	Aquatic Biodiversity Impact Assessment
Chris van Rooyen ¹ Albert Froneman (<i>Pr.Sci.Nat.</i>)	Chris van Rooyen Consulting, AfriAvian Environmental (Pty) Ltd	Avifauna Impact Assessment
Lourens Du Plessis	LOGIS	Visual Impact Assessment
John Gribble	ACO Associates	Heritage Impact Assessment (Archaeology and Cultural Landscape)
Elize Butler	BANZAI Environmental	Palaeontology Site Sensitivity Verification Report
Sue Reuther Christopher Dalglish	SRK Consulting	Socio-Economic Impact Assessment
Athol Schwartz (<i>Pr. Tech.</i>)	Private	Traffic Impact Assessment
Debbie Mitchell (<i>Pr Eng</i>)	Ishecon cc	Battery Storage High Level Safety, Health and Environment Risk Assessment
Louis Jonk (<i>Pr.Sci.Nat.</i>)	GEOSS South Africa (PTY) Ltd	Geohydrology Assessment
Louis Jonk (<i>Pr.Sci.Nat.</i>) Shane Teek (<i>Pr.Sci.Nat.</i>)	GEOSS South Africa (PTY) Ltd	Desktop Geotechnical Assessment
Helen Antonopoulos Paul Lochner (Reg. EAP (2019/745))	CSIR	Civil Aviation Site Sensitivity Verification
	CSIR	Defence Site Sensitivity Verification

¹ Please note that the Avifauna Impact Assessment was authored by Chris van Rooyen before his passing in June 2023. Mr van Rooyen worked under the supervision and in association with Albert Froneman. Following Mr van Rooyen's passing, Albert Froneman has assumed lead authorship as the avifaunal specialist and will continue to provide specialist input on the proposed project under AfriAvian Environmental (Pty) Ltd.

3.2.1 Climate

3.2.1.1 General Context

According to the Köppen-Geiger climate classification method the majority of the study area is classified “BWk”, which is indicative of a cold arid climate (Figure 3.2). The region is characterised with a long term (1950 – 2000) mean annual rainfall of 195 mm with the bulk of rainfall generally received in the summer and early autumn months (i.e., between December to April) (Figure 3.3). Figure 3.4 shows the average annual rainfall within the region for the period 2010 to 2022. Average maximum temperatures range from 13°C in June to 29°C in January. Figure 3.5 shows the average monthly maximum and minimum temperature within the region. The highest average temperatures occur from December to February (Figure 3.5). As shown in Figure 3.6, the area is characterised by relatively consistent sunny days throughout the year, with the lowest quantity of sun hours generally experienced in June. The area is characteristic of gusty winds prevailing for most of the year, with the average gust falling within the 20 kmph to 30 kmph range, for the period 2010 to 2022 (Figure 3.7).

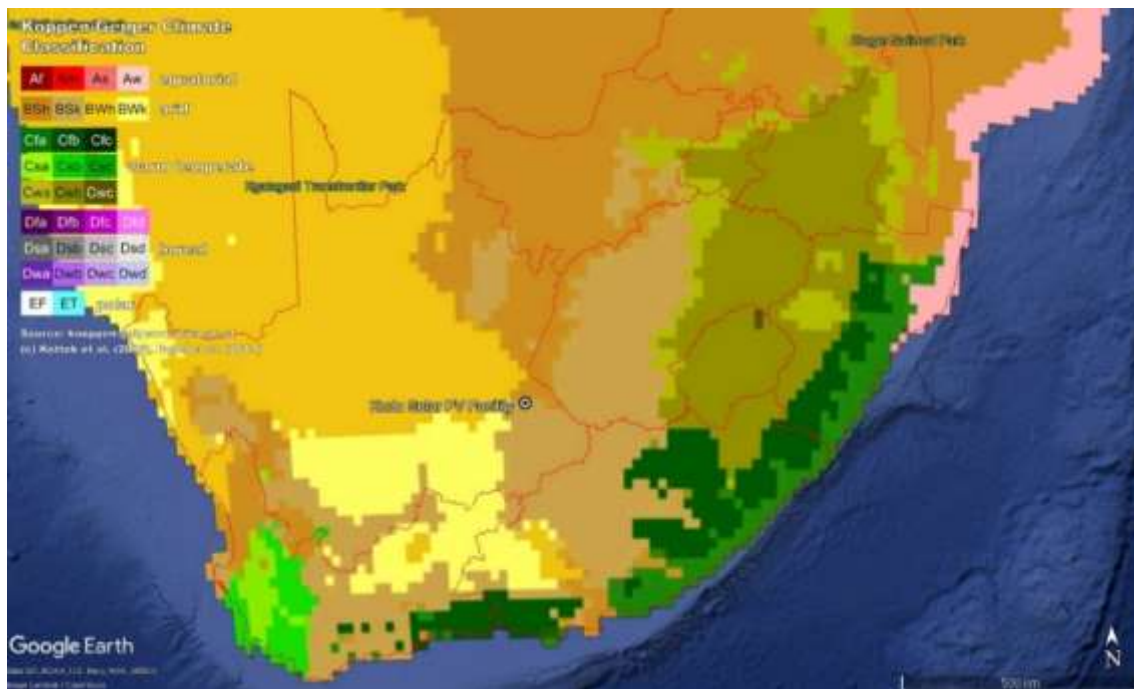


Figure 3.2: Köppen-Geiger Climate Classification of South Africa, including the study area (Source: Köppen-Geiger Climate Classification²)

² Kottek, M., J. Grieser, C. Beck, B. Rudolf, and F. Rubel, 2006: World Map of the Köppen-Geiger climate classification updated. Meteorol. Z., 15, 259-263. DOI: 10.1127/0941-2948/2006/0130. Available at: <http://koeppen-geiger.vu-wien.ac.at/present.htm> [online]. Accessed: November 2022.

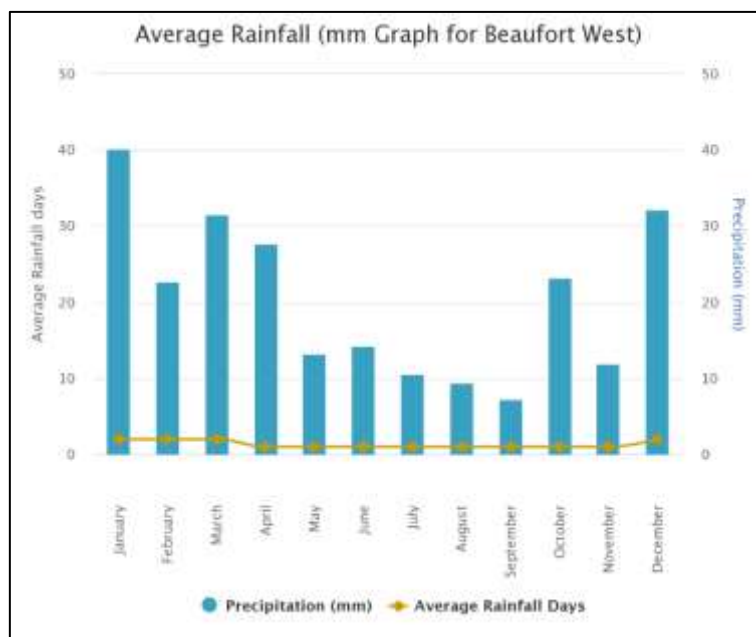


Figure 3.3: The average monthly distribution of rainfall within the Beaufort West area, including the study area (Source: World Weather Online, 2023³)

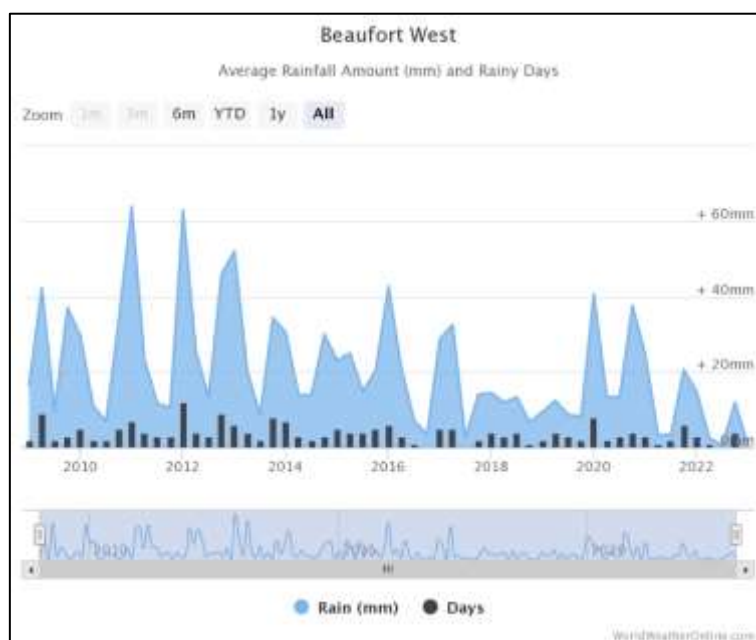


Figure 3.4: The average annual rainfall within the Beaufort West area, including the study area for the period 2010 – 2022 (Source: World Weather Online, 2023⁴)

³ World Weather Online. 2023. Beaufort West Annual Weather Averages. Available at: <https://www.worldweatheronline.com/beaufort-west-weather-averages/western-cape/za.aspx> [online]. Accessed: 19 February 2023.

⁴ World Weather Online. 2023. Beaufort West Annual Weather Averages. Available at: <https://www.worldweatheronline.com/beaufort-west-weather-averages/western-cape/za.aspx> [online]. Accessed: 19 February 2023.

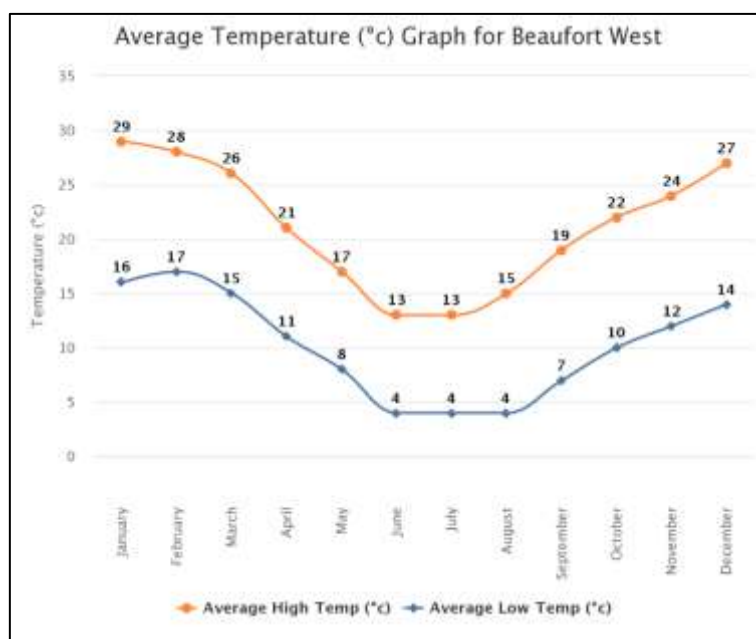


Figure 3.5: The average monthly maximum and minimum temperature for the Beaufort West area, including the study area (Source: World Weather Online, 2023⁵)

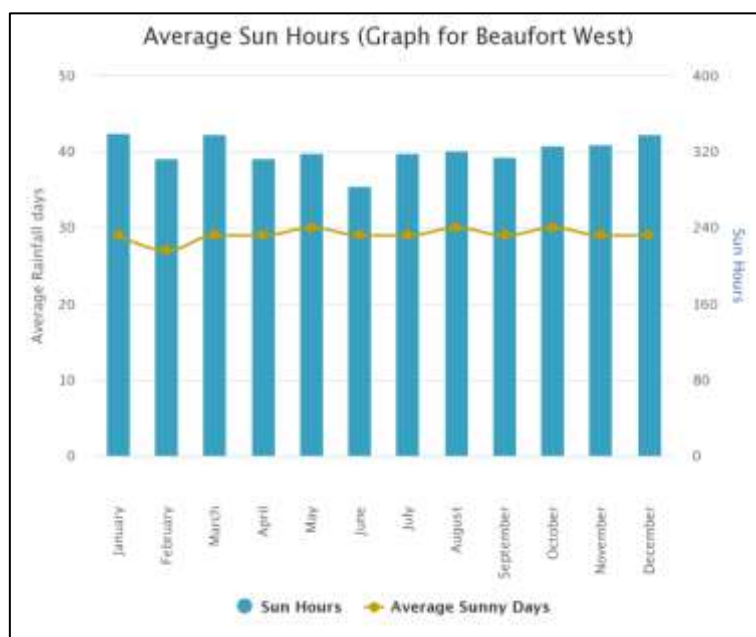


Figure 3.6: The average sun hours and sunny days per month for the Beaufort West area, including the study area for the period 2010 – 2022 (Source: World Weather Online, 2023⁶)

⁵ World Weather Online. 2023. Beaufort West Annual Weather Averages. Available at: <https://www.worldweatheronline.com/beaufort-west-weather-averages/western-cape/za.aspx> [online]. Accessed: 19 February 2023.

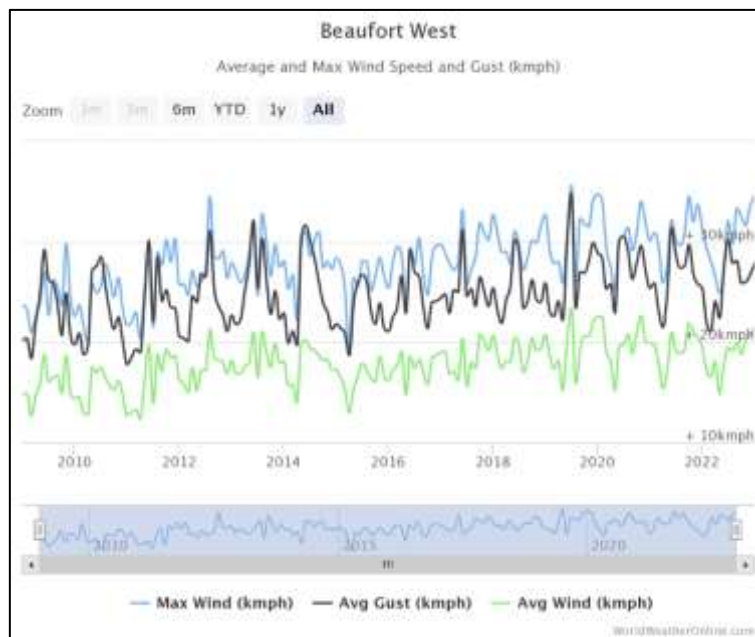


Figure 3.7: The average and maximum annual wind speeds and gusts for the Beaufort West area, including the study area for the period 2010 – 2022 (Source: World Weather Online, 2023⁷)

3.2.2 Topography and Landscape

Regionally, the site for the proposed DBF South SEF is located approximately 70 km south of Loxton and 46 km northwest of Beaufort West within the Beaufort West Local Municipality and the Central Karoo District Municipality in the Western Cape Province. The border to the Northern Cape Province lies approximately 1 km to the west.

The proposed site lies on the plateau, north of the Great Escarpment (Figure 3.8). The Great Escarpment, a major topographical feature in Africa extends from Limpopo, past Lesotho (known as the Drakensberg), down into the Western Cape before it extends northwards into Namibia and Angola. The Nuweveldberge, on which the proposed PV sites lie, forms the central and most arid component to the southern Great Escarpment which straddles the Northern and Western Cape.

Elevation ranges from approximately 750 m above sea level (a.s.l.) to the south of the proposed site, below the escarpment, to approximately 1 950 m a.s.l. on the tops of the mountains to the east. The proposed development site itself is located at an average elevation of 1 750 m a.s.l., comprising a wide flat area surrounded by hills and drained by small watercourses (Figure 3.8 and Figure 3.9). The overall terrain morphological description of the southern portion of the study area is steep slopes of koppies, butts, mesas, while the northern portion is a more dissected landscape

⁶ World Weather Online. 2023. Beaufort West Annual Weather Averages. Available at: <https://www.worldweatheronline.com/beaufort-west-weather-averages/western-cape/za.aspx> [online]. Accessed: 19 February 2023.

⁷ World Weather Online. 2023. Beaufort West Annual Weather Averages. Available at: <https://www.worldweatheronline.com/beaufort-west-weather-averages/western-cape/za.aspx> [online]. Accessed: 19 February 2023.

associated with the tributaries of the upper catchment of the Leeu River. Several pans occur within the area.

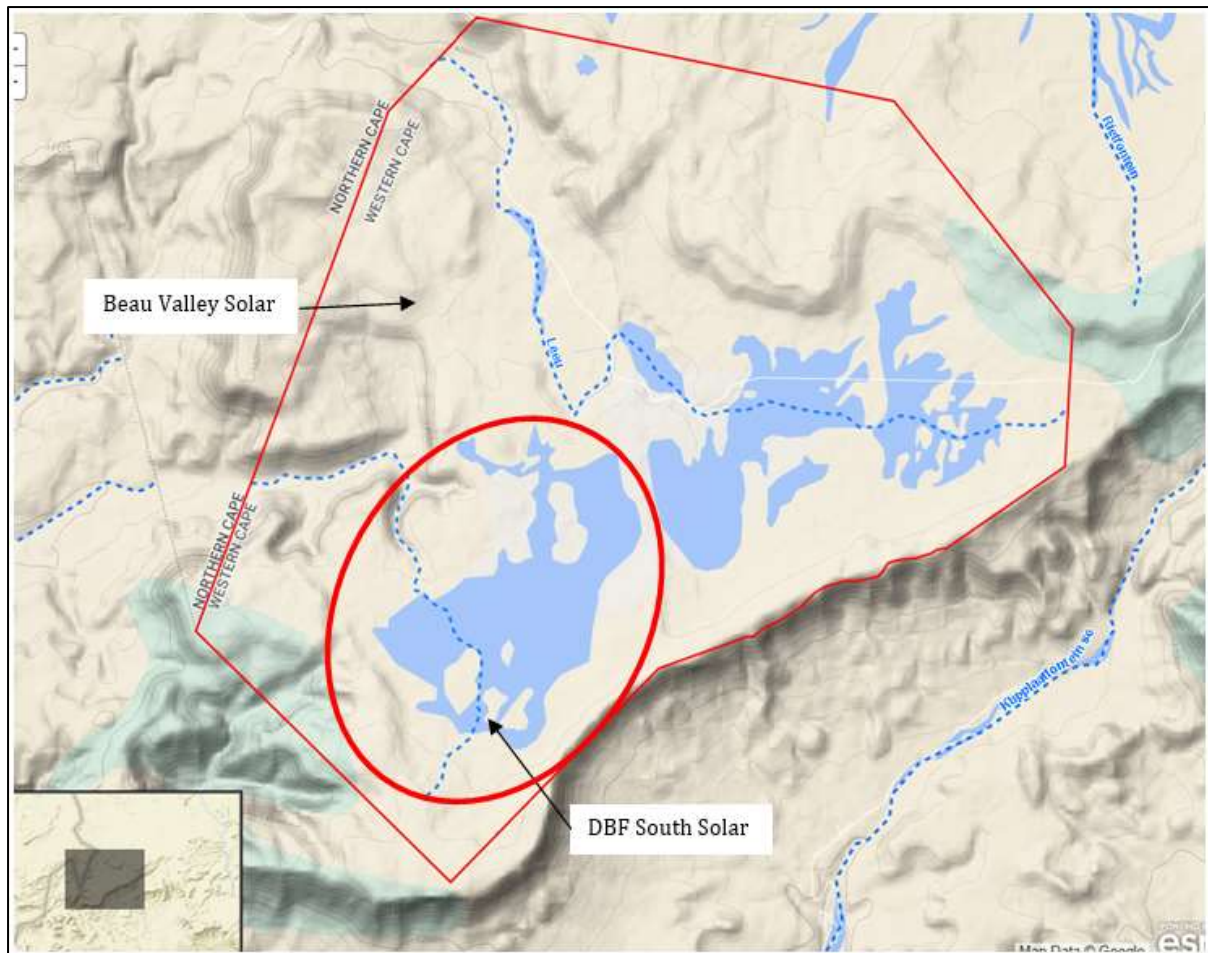


Figure 3.8: Relief map for the area, showing the topography and main watercourses and the location of the projects (CapeFarmMapper, 2023). The red oval shows the focus area for the proposed project.



Figure 3.9: Typical view over the study area indicating the low relief, dolerite koppies, bossieveld vegetation with drainage sediments in places (Source: E Butler, 2023; Appendix G.7).



Figure 3.10: View westwards across the wide alluvial plateau where the DBF South SEF is proposed. The project footprint extends to roughly the base of the hills in the distance (Source: J Gribble, 2023, Appendix G.6)

3.2.3 Geology and Soils

The information described below is based on EIA-level inputs provided by the Terrestrial Biodiversity, Palaeontology, Geohydrology and Geotechnical Specialists, which are included in Appendix G.2, G.7, G.11 and G.12 of this EIA Report, respectively.

The main geology of the study area is listed in Table 3.3, and an extract from the 1:250 000 geology map 3222 Beaufort West (Council for Geoscience, Pretoria) overlain by the study area is shown in Figure 3.11.

Table 3.3: Geological formations within the study area listed in order of relative age

Symbol	Formation	Group	Lithology
	Quaternary Deposit		Alluvium
Jd	Jurassic Intrusion		Dolerite
Pte	Teekloof	Beaufort	Brownish-red and greenish-grey mudstone, subordinate siltstone and sandstone

As mapped in Figure 3.11, the site is mostly underlain by flat lying mudstones and sandstones of the Permian-aged Teekloof Formation of the Beaufort Group, which have been intruded by Jurassic-aged horizontal dolerite lopoliths and subvertical dolerite dykes. These rocks are in-turn overlain by quaternary-aged partially calcretised alluvium deposits. Shallow, gravelly colluvial and eluvial deposits are dominated by hornfels, sandstone, and dolerite rubble that overlies most hillslopes and plateaus. The site shows very little evidence of regional scale folding or faulting, with structures mostly limited to vertical jointing within the dolerites. Downwasted weathered gravels and soils are shown in the photographs in Figure 3.9.

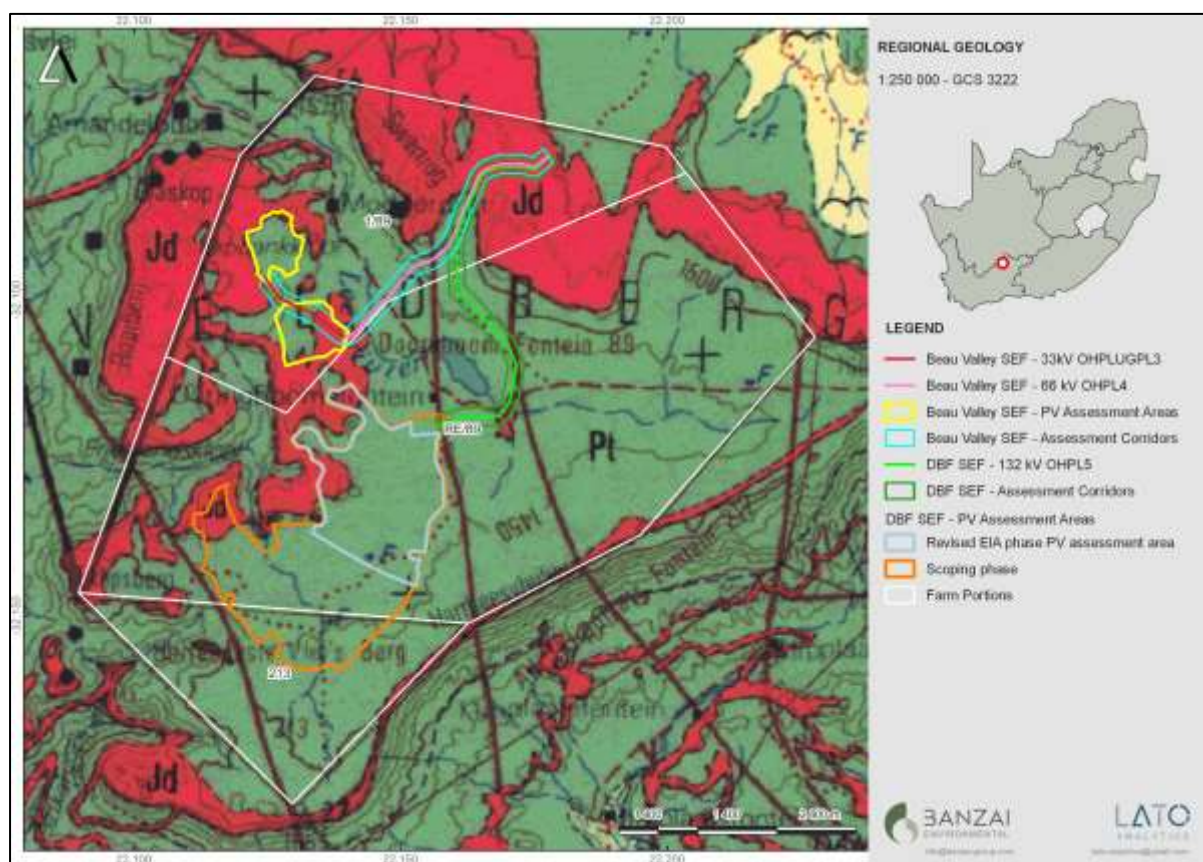


Figure 3.11: Geological setting for the proposed project and associated infrastructure (Source: Council for Geoscience, 1997, Map: 1:250 000 scale; Beaufort West 3222 in E Butler, 2023, Appendix G.7).).

3.2.4 Agriculture and Land Capability

The information described below is based on the Agriculture Compliance Statement included in Appendix G.1 of this EIA Report.

3.2.4.1 General Context

Agricultural sensitivity is a direct function of the capability of the land for agricultural production. All arable land that can support viable crop production, is classified as high (or very high) sensitivity. This is because there is a scarcity of arable production land in South Africa and its conservation for agricultural use is therefore a priority. Land which cannot support viable crop production is much less of a priority to conserve for agricultural use and is rated as medium or low agricultural sensitivity.

The Screening Tool classifies agricultural sensitivity according to only two independent criteria – the land capability rating and whether the land is used for cropland or not. All cropland is classified as at least high sensitivity, based on the logic that if it is under crop production, it is indeed suitable for it, irrespective of its land capability rating. The Screening Tool sensitivity categories in terms of land capability are based upon the Department of Agriculture's updated and refined, country-wide land capability mapping, released in 2016. The data is generated by GIS modelling.

Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rain fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land, based on its soil, climate and terrain. The higher land capability values (≥ 8 to 15) are likely to be suitable as arable land for crop production, while lower values are only likely to be suitable as non-arable grazing land.

In 2017, the then Department of Agriculture, Forestry and Fisheries (DAFF) released updated and refined land capability mapping across the whole of South Africa. This has greatly improved the accuracy of the land capability rating for any particular piece of land anywhere in the country. The new land capability mapping divides land capability into 15 different categories with 1 being the lowest and 15 being the highest. Values of 1 to 5 translate to a low agricultural sensitivity and values of 6 to 8 translate to a medium agricultural sensitivity. Values of below 8 are generally not suitable for production of cultivated crops. This land capability data is used by the Screening Tool.

3.2.4.2 Screening Tool Descriptions and Site Sensitivity Verification

A map of the study area and proposed development footprint in relation to the Agricultural Sensitivity provided by the Screening Tool is shown in Figure 3.12. The Screening Tool classifies the proposed footprint as low to medium agricultural sensitivity. As per the Agricultural Compliance Statement (Appendix G.1), the classified land capability of the site is predominantly 4 to 8 (i.e. low to medium land capability). The small-scale differences in the modelled land capability across the project area are not very accurate or significant at this scale and are largely a function of terrain and of how the data is generated by modelling, than actual meaningful differences in agricultural potential on the ground.

The low to medium agricultural sensitivity of the site, as identified by the screening tool, is verified by the Site Sensitivity Verification (SSV) in the Agricultural Compliance Statement (Appendix G.1 of the EIA Report). The motivation for confirming the sensitivity is predominantly that the climate data (low rainfall of approximately 220 mm per annum and high evaporation of approximately 1300 mm per annum) (Schulze, 2009) proves the area to be arid, and therefore of limited land capability. Moisture availability is totally insufficient for crop production without irrigation. In addition, the land type data shows the dominant soils to be shallow soils on underlying rock. A low to medium agricultural sensitivity is entirely appropriate for this land, which is totally unsuitable for crop production.

The required level of agricultural assessment is therefore confirmed as an Agricultural Compliance Statement. Based on the above and various factors, the impact of the proposed project on the agricultural production capability of the site is assessed as being acceptable. Therefore, from an agricultural impact point of view, it has been recommended that the proposed project be approved.

Therefore, there are no areas that specifically need to be avoided by the proposed project from an agricultural perspective. Furthermore, the Agriculture specialist has confirmed that the exact nature and layout of the different infrastructure within the proposed site has no bearing on the significance of agricultural impacts because it is the total footprint size (and its agricultural production potential) that determines the impact significance. Any alternative layout within the footprint is considered acceptable. Furthermore, in this agricultural environment with uniformly low production potential, the location of the proposed project within the studied landscape will also make absolutely no

material difference to the significance of the agricultural impacts. The Agricultural assessment further verified that the agricultural impact of the proposed associated power lines for the DBF South SEF are entirely insignificant in this environment because agriculture is not excluded from the land underneath a power line. The power line corridor is not therefore considered to be part of the agricultural footprint, in keeping with NEMA's agricultural protocol.

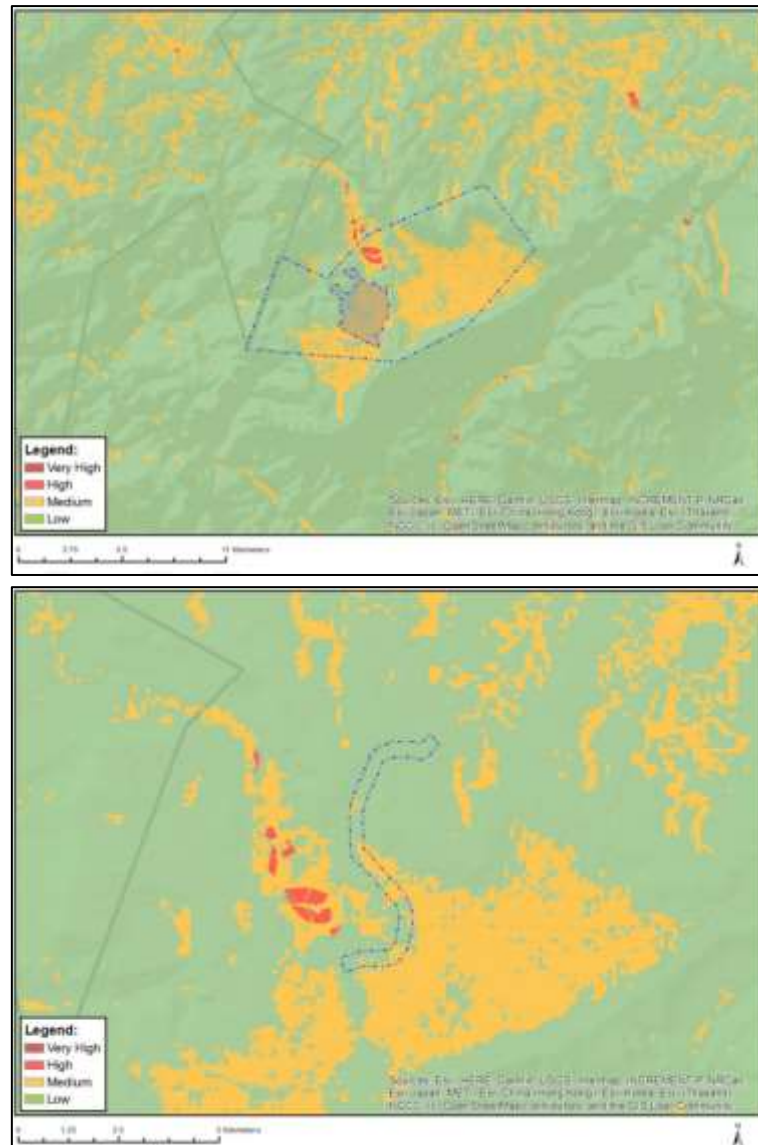


Figure 3.12: The Agricultural Sensitivity of the DBF South SEF (top) and associated 132 kV power line corridor (bottom) based on the Screening Tool (Source: Screening Tool, 2023)

3.2.5 Geohydrology

The information described below is based on EIA-level inputs provided by the Geohydrology Specialist, which are included in Appendix G.11 of this EIA Report.

3.2.5.1 Regional and Site-Specific Geohydrological Context

▪ Hydrogeology:

The DBF South SEF is shown to be underlain by two main aquifers according to the Department of Water Affairs and Forestry's (DWAf) 1:500 000 hydrological map, see Figure 3.13. The larger aquifer is classified by the DWAf as a fractured aquifer, while the smaller, more localized aquifer is classified as an intergranular and fractured aquifer. An intergranular aquifer is one where groundwater flows in spaces between grains or weathered rock, while a fractured aquifer is one where water flows in joints, fissures, cracks and fractures within the rock. The larger fractured aquifer is estimated to have a yield potential of 0.5 to 2 L/s, while the smaller intergranular and fractured aquifer is estimated to have a yield potential of 0.1 to 0.5 L/s. According to regional hydrogeological mapping (DWAf, 2002), the electrical conductivity (EC) of the groundwater in the area generally ranges between 70 and 300 mS/m, which is considered "moderate" in terms of drinking water standards. The quality improves towards the north, with electrical conductivity of 0 to 70 mS/m, which is considered "good" for drinking water (Figure 3.14).

Both these classifications are based on regional datasets, and therefore, only provide an indication of the possible/likely conditions. Groundwater in the area is generally considered as being of marginal quality and boreholes have a low yield.

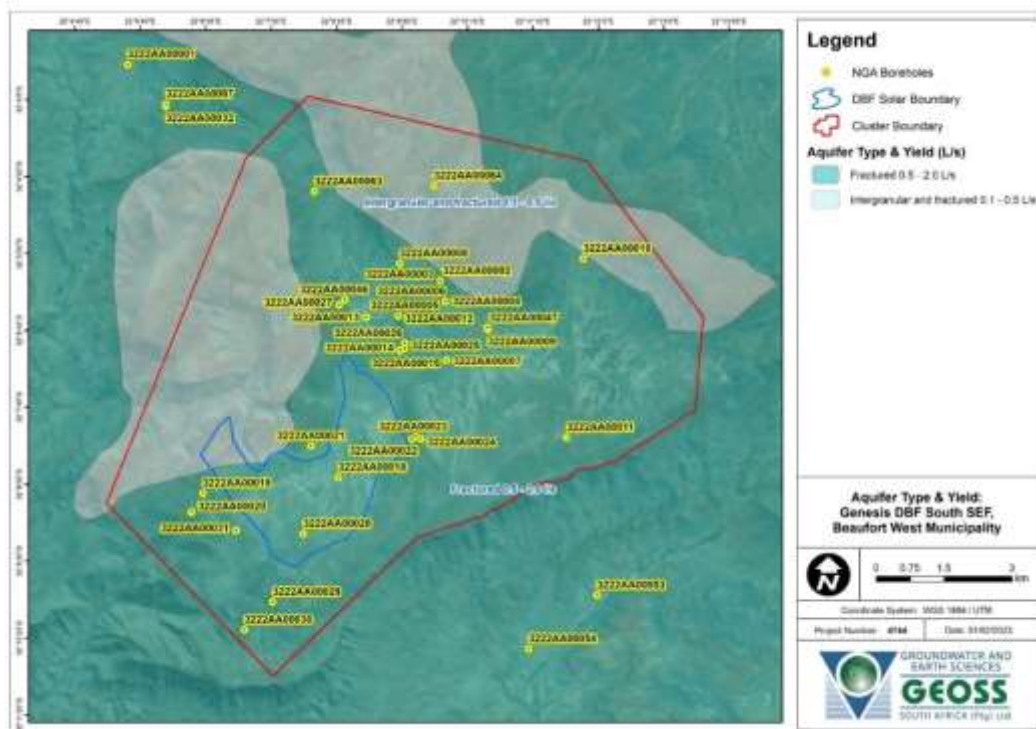


Figure 3.13: Regional aquifer yield and borehole yields (L/s) (Source: DWAf, 2002 and NGA database, in GEOSS, 2023, Appendix G.11)

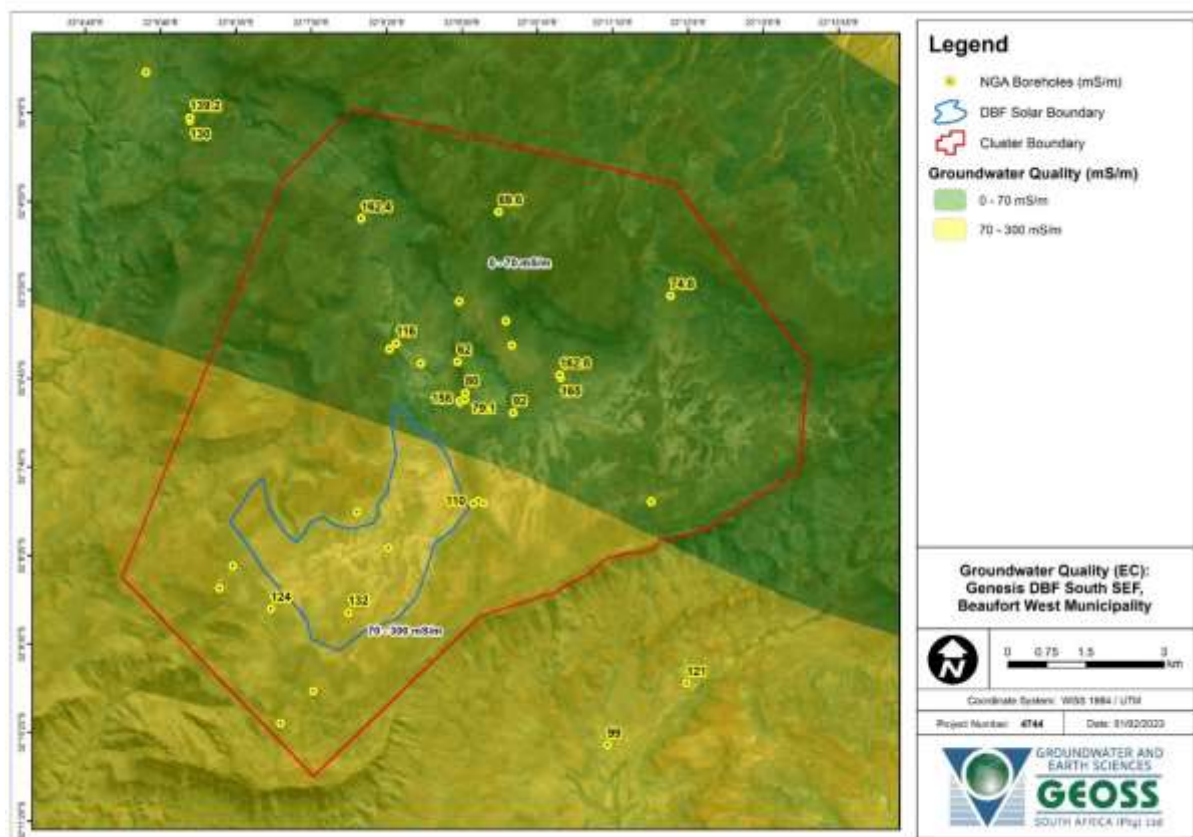


Figure 3.14: Regional groundwater quality (mS/m) and boreholder groundwater quality (EC in Ms/m) (Source: DWAf , 2002 in GEOSS, 2023, Appendix G.11)

▪ **Aquifer Vulnerability:**

Mapping of groundwater vulnerability was undertaken at the national scale on a 1 km by 1 km cell (pixel) size basis by Conrad and Munch (2007) (in GEOSS, 2023⁸). This national scale map indicates the relative vulnerability of groundwater resources throughout the country and provides project planners a clear idea of what level of groundwater protection is required. The proposed project study area has a Low/Medium to Low groundwater vulnerability. The “Low / Medium” rating is associated with, amongst other factors, the depth to the water table, the geology/soil type(s) in the area, the amount of recharge and the topography in this region.

⁸ Conrad J. and Munch Z., (2007). Groundwater recharge and vulnerability mapping – a national scale approach; GWD Conference Bloemfontein, 8 – 10 October 2007 pp 46 – 56. Cited in GEOSS (2023), Appendix G.11 of the EIA Report.

▪ **Site Specific and Existing Groundwater Information**

○ **National Groundwater Archive (NGA) Database**

The NGA database provides data on borehole positions, groundwater chemistry and yield, where available. The NGA indicated there 39 boreholes exist within a 4 km radius of the GEED Southern Cluster boundaries (Figure 3.13). The mean EC measured for these boreholes was 115.38 mS/m, and ranged between 62 – 165 mS/m, which falls within the ideal to moderate (0 – 300 mS/m) classification according to DWAF (2002). The depths of the boreholes in the region are shown to range between 1.70 m to 213.00 m, with a mean depth of 54.93 m. Water levels for the boreholes show a maximum depth of 81 m, and a minimum depth of 1.7 m with the mean water level at 20.38 m. Finally, blow yield values for several boreholes were recorded and showed a maximum yield of 11.30 L/S, and minimum of 0.14 L/S, and a mean of 3.46 L/s.

○ **Historical Hydrocensus**

Discussions with landowners during the historical hydrocensus indicated that most boreholes in the study area are used for watering of livestock. The 2023 site survey, by the Geohydrology specialist, showed that the majority of boreholes were equipped with windpumps and a small amount equipped with solar powered submersible pumps. Due to the geological homogeneity across the region it is expected that the hydrological features should remain relatively constant (CGS, 1989;1991; Johnson et al., 2006).

A detailed groundwater quality assessment was performed at a site 10 km east of the GEED Beaufort West Cluster (GEOSS, 2023) and the results are discussed briefly hereunder as a means to approximate the groundwater quality that can be expected at the DBF South SEF. Samples taken during this historical study were classified according to the SANS241-1: 2015 standards for domestic water and the classification for groundwater quality provided by DWAF (1998), as common points of reference.

South African National Standards (SANS) 241-1:2015: Drinking water standards. These standards have the following limits and associated risks for domestic water:

- Health risks: parameters falling outside these limits may cause acute or chronic health problems in individuals.
- Aesthetic risks: parameters falling outside these limits indicate that water is visually, aromatically or palatably unacceptable.
- Operational risks: parameters falling outside these limits may indicate that operational procedures to ensure water quality standards are met may have failed.

Table 3.4: Classification table for the groundwater quality results as per DWAF (1998)

Blue	(Class 0)	Ideal water quality - suitable for lifetime use.
Green	(Class I)	Good water quality - suitable for use, rare instances of negative effects.
Yellow	(Class II)	Marginal water quality - conditionally acceptable. Negative effects may occur.
Red	(Class III)	Poor water quality - unsuitable for use without treatment. Chronic effects may occur.
Purple	(Class IV)	Dangerous water quality - totally unsuitable for use. Acute effects may occur.

The analysis showed that groundwater qualities to the north of the GEED Renewable Energy Cluster to be good, in terms of dissolved mineral concentrations (GEOSS, 2021; 2023) and are generally classified as Class 0 following the DWA (1998) Drinking Water Assessment Guide. Exceptions to this is Turbidity (NTU) and Hardness (CaCO_3), with water samples classified as Class I to Class II in terms of the DWA (1998) Drinking Water Assessment Guide. Following the specific limits for water according to SANS241-1: 2015 (Table 4), nearly all mineral concentrations were classified as Acceptable. Notable exceptions to this were one instance of lead and arsenic concentrations exceeding the Chronic Health limit, two instances of Iron concentrations exceeding the Aesthetic limit, and one instance of manganese concentration exceeding the Aesthetic limit. Both Colour and Turbidity are generally classified as Acceptable, with several instances of samples exceeding the Aesthetic and Operational limits. No negative effect or impacts on human or animal health upon consumption was expected based on the undertaken laboratory analysis results.

- **Water use**

It is understood that the water will primarily be used across the SEF in the construction of roads, hardstand compaction, concrete foundations, cleaning of equipment, and dust suppression on roads. Water consumption during the operational phase will be mostly limited to staff ablutions and cleaning of solar panels. With regards to the cleaning of panels it is understood that very clean water is required to clean the panels to prevent salt deposition on the panels. The EC for the groundwater is considered to be good to marginal. Although this water quality is relatively good it will not be suitable for panel washing as it will result in salts precipitating on the panels. The salts could be removed from the groundwater by thermal distillation (i.e. boiling since salt has a much higher boiling point than water) or by membrane separation (commonly reverse osmosis). Both techniques are possible but financial viability would have to be determined before commissioning as both techniques are costly on a large scale.

In terms of using groundwater for construction purposes and mixing of concrete the SANS 51008:2006 (Mixing water for concrete document) is referred to. Both the composition of the water and the application of the concrete needs to be considered. Potable water is considered to be suitable for concrete batching with no testing required. However, groundwater is considered to potentially be suitable for concrete batching however it requires testing as some groundwater can be very saline which is not considered to be suitable. Furthermore, the SANS 51008 Standard does specify maximum limits for chlorides, sulphates, alkalinity, phosphates, nitrates, lead and zinc. Most of these parameters are currently unknown and therefore it is unclear if the groundwater is suitable for construction and concrete batching.

The volumes of water required for the development should be readily available and could be sourced from groundwater in the region. It is anticipated that the underlying aquifers will be able to deliver the requisite cumulative demands during the construction ($360\,000\text{ m}^3/\text{a}$) and operational ($30\,000\text{ m}^3/\text{a}$) phases, for all of the energy facilities in the GEED Southern Cluster.

There are multiple sources and scenarios that could potentially supply the required peak requirement (during the construction phase) of $90\,000\text{ m}^3/\text{a}$ for the proposed DBF South SEF. This could potentially be achieved through utilising existing boreholes only which are close to existing and planned infrastructure (pending relevant consent and authorisations). The use of existing boreholes will depend on several factors such as scientifically proven sustainable yields of the

boreholes, existing use and authorisation of the landowner, as well as whether the landowner would engage in an agreement to make use of his boreholes. It is anticipated that the bulk of the requisite 90 000 m³/a could be sourced from existing boreholes. However, this would depend on cost and logistics and supply available from each borehole.

An additional option would be to drill new boreholes. This can be achieved by conducting a geological and geophysical study to confirm lineaments (dykes) visible on aerial imagery followed by drilling and scientific yield and quality testing. The region shows promise for further groundwater development; however, this will need to be confirmed by groundwater exploration, drilling and testing.

The third and final scenario entails a combination of the above-mentioned options, i.e., making use of existing borehole and drilling of new boreholes. It must be stressed that the General Authorisation (GA) limit of 40 000 m³/a applies to each farm portion larger than 889 hectares and this should be adhered to. All conditions of groundwater use in terms of the GA will be applicable and important to consider.

Refer to Chapter 4 of this EIA Report, as well as Appendix G.11 (Geohydrology Assessment) for the legal considerations for a GA and a Water Use Licence Application (WULA) in terms of the National Water Act (Act No. 36 of 1998). The GA and/or WULA will be dealt with as a separate process in line with the relevant regulations and legislative requirements at the time.

3.2.5.2 Screening Tool Descriptions and Site Sensitivity Verification

There are no dedicated Geohydrology or Groundwater themes on the Screening Tool as of February 2023, therefore the environmental sensitivity of the proposed project area as identified by the Screening Tool is not applicable. Furthermore, there is no dedicated assessment protocol prescribed for Geohydrology or Groundwater. Therefore, the specialist assessment has been undertaken in compliance with Appendix 6 of the 2014 National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) EIA Regulations (as amended), as stipulated in Part A of the Assessment Protocols published in Government Notice (GN) 320 in March 2022.

3.2.6 Aquatic Biodiversity

The information described below is based on EIA-level inputs provided by the Aquatic Biodiversity Specialist, which are included in Appendix G.3 of this EIA Report. The EIA-level inputs was informed by a combination of desktop assessments of existing freshwater ecosystem information for the study area and surrounding catchments, as well as by a more detailed assessment of the freshwater features within the study area. The study area was visited in December 2022 and in January 2023, both following recent rainfall events, to verify the aquatic features occurring on the site. During the field visits, the characterisation and integrity assessments of the freshwater features were undertaken. Mapping of the freshwater features was undertaken using a GPS Tracker and mapped in PlanetGIS and Google Earth Professional.

3.2.6.1 Regional and Site-Specific Aquatic Context

The majority of the study area is located in the Gouritz Water Management Area (WMA) which is managed by the Breede Gouritz Catchment Management Agency. The proposed DBF South SEF study area is located in the upper reaches of several tributaries of the Leeu River Quaternary Catchment (J22G), in the upper Gouritz River System. The tributaries drain westwards to join the Leeu River, which then drains southwards to its confluence with the Gamka River at Leeu Gamka. The Gamka River joins the Olifants River to form the Gouritz River.

Table 3.5: Key water resources information for the proposed project development area

Descriptor	Name / details	Notes
Water Management Area (WMA)	Breede Gouritz WMA	
Catchment Area	Tributaries of the Leeu River	Upper portion of the Gouritz Catchment
Quaternary Catchment	Leeu River (J22G)	
Present Ecological state	B (largely natural)	DWS (2012) for the Leeu River
Ecological Importance (EI) and Ecological Sensitivity (ES)	High EI and Very high ES	
Type of water resources	Ephemeral streams and depression wetlands	
Recommended Ecological Condition (REC)	Remain in current condition	

The Leeu River is a larger watercourse that tends to contain water for longer periods. The rivers are in a slightly modified ecological condition, with the main impacts being the Doornboomfontein Dam, livestock grazing and trampling and farm roads that cross the watercourses. The largest of the Leeu River tributaries within the site is the Frieslandkloof Stream which drains into the river from the south, confluenting with the larger river to the west of the study area. Associated with both the Leeu and Frieslandkloof Rivers are wider valley floor wash areas that contain a mosaic of depression wetlands.

The larger Leeu River corridor and the Frieslandkloof Stream are mapped in places as aquatic Critical Biodiversity Areas (CBAs), with the smaller tributaries mapped as aquatic Ecological Support Areas (ESAs). The only mapped natural Freshwater Ecosystem Priority Area Wetlands and National Wetland Map (version 5) areas are seep wetlands adjacent to the Leeu River near Modderdrift that have been lost to past agricultural activities and a depression wetland (pan) near Swartrug in the north of the site. The aquatic CBA is on the upper Frieslandkloof Stream lies within the proposed DBF South Solar Facility. The access roads to the facility largely avoid crossing within the aquatic CBAs, crossing the Leeu River immediately downstream of the channel, where it enters the Doornboomfontein Dam and at an existing road crossing.

The aquatic features that have been mapped as being of conservation concern are shown in Figure 3.15.

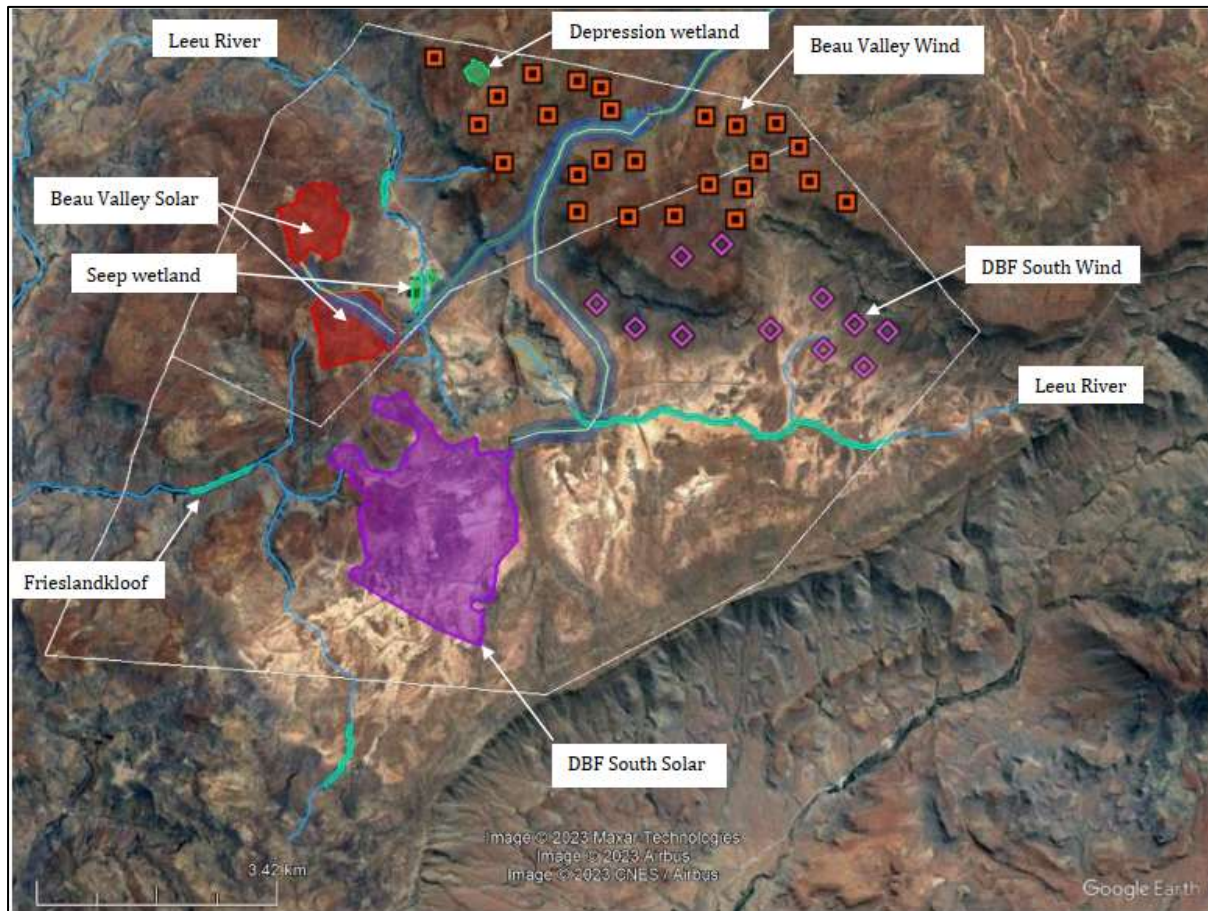


Figure 3.15: Google Earth image with the mapped aquatic features of conservation (light green polygons) shown within the larger Beaufort West Southern Cluster (Source: T Belcher, 2023, Appendix G.3)

Table 3.6 summarises the aquatic ecological condition, ecological importance and sensitivity and recommended ecological category, as well as the sensitivity and associated buffers for the aquatic features, based on the field assessment by the Aquatic Specialist.

Table 3.6: Summary of the ecological condition, importance and sensitivity of aquatic features, together with recommended buffers (Source: T Belcher, 2023, Appendix G.3)

Aquatic feature	Present Ecological Status (PES)	Ecological Importance and Sensitivity (EIS)	Recommended Ecological Category (REC)	Sensitivity	Recommended buffer
Leeu River	C	High	B/C	High	50 m
Small tributaries	A/B	Moderate	A/B	Medium	35 m
Depression wetlands and wider wash areas	B/C	Moderate	B/C	Medium	-

The Leeu River in the study area is deemed to be of high ecological importance and sensitivity. This is due to the importance of the larger river in providing a diversity of habitats and being an important refuge for biota as well as corridors for the movement of water within the landscape. The smaller tributaries are of moderate ecological importance and sensitivity and tend to be more sensitive to flow and water quality changes.

Considering the moderately modified to largely natural ecological condition of the aquatic ecosystems within the study area and their moderate to high ecological importance and ecological sensitivities, the recommended ecological condition (REC) of these features would be that they remain in their current condition or be improved where possible. These rivers should not be allowed to degrade further. The proposed PV Facilities are mostly located outside of the aquatic features and are unlikely to result in any significant degradation of aquatic ecosystem integrity if the recommended mitigation measures are implemented.

Aquatic Habitat and Species of Concern

Vegetation along the larger watercourses comprises *Vachellia karroo* thickets fringed by tall *Salsola aphylla*-dominated shrubland and comprising of *Stipagrostis namaquensis* grass within the sandy drainage lines. Most of the vegetation associated with the aquatic features within the valley floors in the study area is still largely natural and comprises a mix of low trees and shrubs such as *Vachellia karroo*, *Lycium* spp., *Asclepias fruticosa* and *Asparagus capensis* within the riparian zones. Patches of common *Phragmites australis* reeds, grasses such as *Stipagrostis ciliata* and *Aristida congesta* with *Juncus* rushes within the instream habitat. There is a low density of invasive alien plants such as *Opuntia* spp. occurring in the more disturbed aquatic habitats.

The watercourses in the study area are non-perennial. As a result, there are no records of indigenous fishes occurring in the Leeu River System. The amphibian diversity within the study area is also likely to be relatively low. No species of conservation concern are thus known to occur in the study area from an aquatic perspective. The amphibian species likely to be present are quite widespread and of low conservation concern. These include the Karoo Dainty Frog *Cacosternum karooicum* (Data Deficient), Poynton's River Frog *Amietia poyntoni*, the Cape Sand Frog, *Tomopterna delalandii*, Pygmy Toad *Poyntonophrynus vertebralis* and the Karoo Toad, *Vandijkophrynus garipeensis*. The latter two amphibian species are listed as "Least Concern".

A faunal species potentially in the area associated with watercourses the Riverine Rabbit, which is listed as Critically Endangered. The habitat preference of Riverine Rabbit is alluvial seasonal watercourses, browsing on *Pteronia erythrochaetha*, *Kochia pubescens*, *Salsola glabrescens* and

Mesembryanthemaceae. They are unable to survive in heavily overgrazed or agriculturally transformed habitats as is the case with the proposed development footprint. This finding by the Aquatic specialist is supported by the Terrestrial Biodiversity specialist (see Appendix G.2 and Section 3.2.7.3 of the EIA Report).

Strategic Water Source Areas

Strategic Water Source Areas (SWSAs) are defined as “areas of land that either: (a) supply a disproportionate (i.e., relatively large) quantity of mean annual surface water runoff in relation to their size and so are considered nationally important; or (b) have high groundwater recharge and where the groundwater forms a nationally important resource; or (c) areas that meet both criteria (a) and (b)” (Le Maitre *et al.*, 2018:1 in Department of Environment, Forestry and Fisheries (DEFF) [now operating as the DFFE], 2019: Page 60⁹). The proposed project study area is located approximately 33 km to the north-west of the Nuweveld surface water SWSA. The proposed project study area is located approximately 21 km to the north-west of the Beaufort West groundwater SWSA. The proposed project will not impact on the Nuweveld surface water SWSA and the Beaufort West groundwater SWSA.

⁹ Department of Environment, Forestry and Fisheries (DEFF), 2019. Strategic Environmental Assessment for the Development of a Phased Gas Pipeline Network in South Africa. CSIR Report Number: CSIR/SPLA/EMS/ER/2019/0077/B. ISBN Number: ISBN 978-0-7988-5649-2. Stellenbosch and Durban.

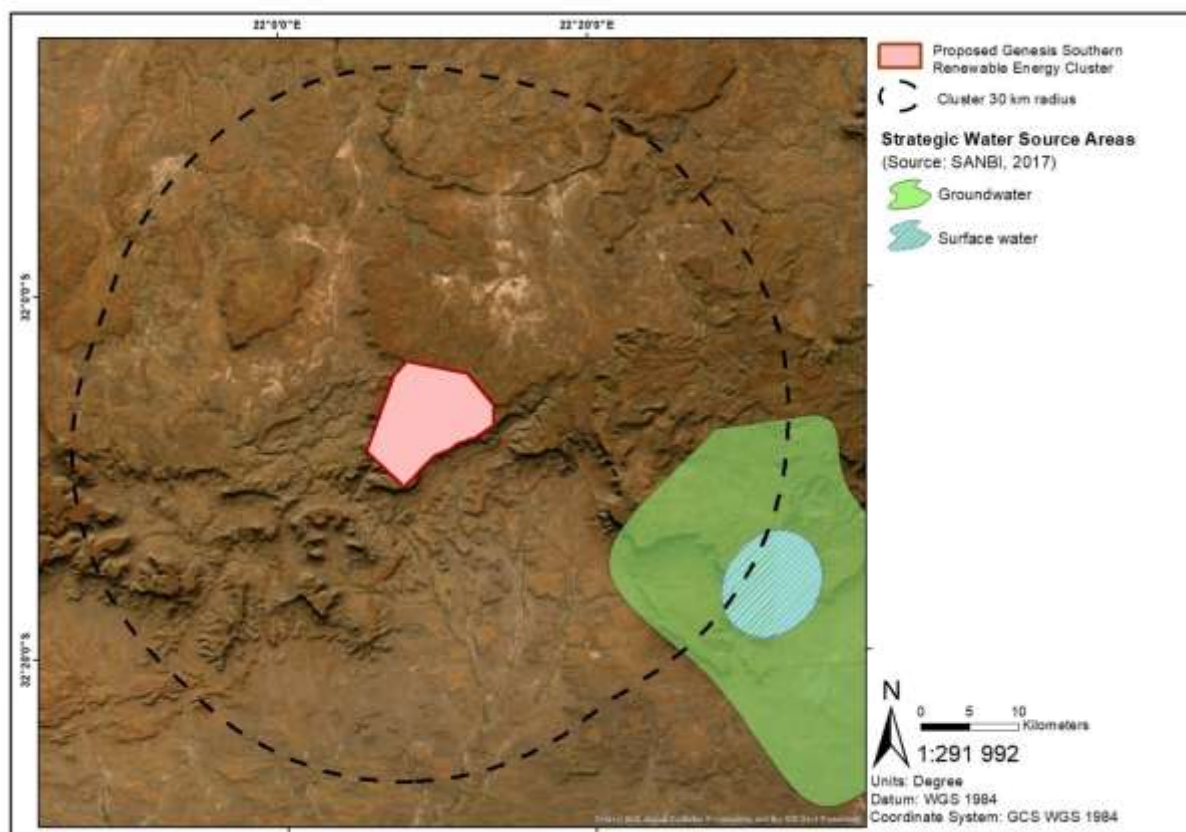


Figure 3.16: Strategic Water Source Areas within 30 km of the GEED Southern Renewable Energy Cluster.

3.2.6.2 Screening Tool Descriptions and Site Sensitivity Verification

Figure 3.17 below presents the information from the Screening Tool for the Aquatic Biodiversity Combined Sensitivity as it relates to the study area and the proposed development footprint. Evident from this data is that most of the wider study area is indicated to be of low sensitivity, with only the main channels of the larger rivers and some wetland areas within the wider site being mapped as being of very high sensitivity. The very high sensitivity is linked to aquatic CBAs that are associated with larger rivers that contain instream wetland habitat. These larger river channels will need to be crossed by the proposed access roads to the DBF South SEF. The findings of the Aquatic Biodiversity and Species Assessment (Appendix G.3) largely agree with the screening tool mapping.

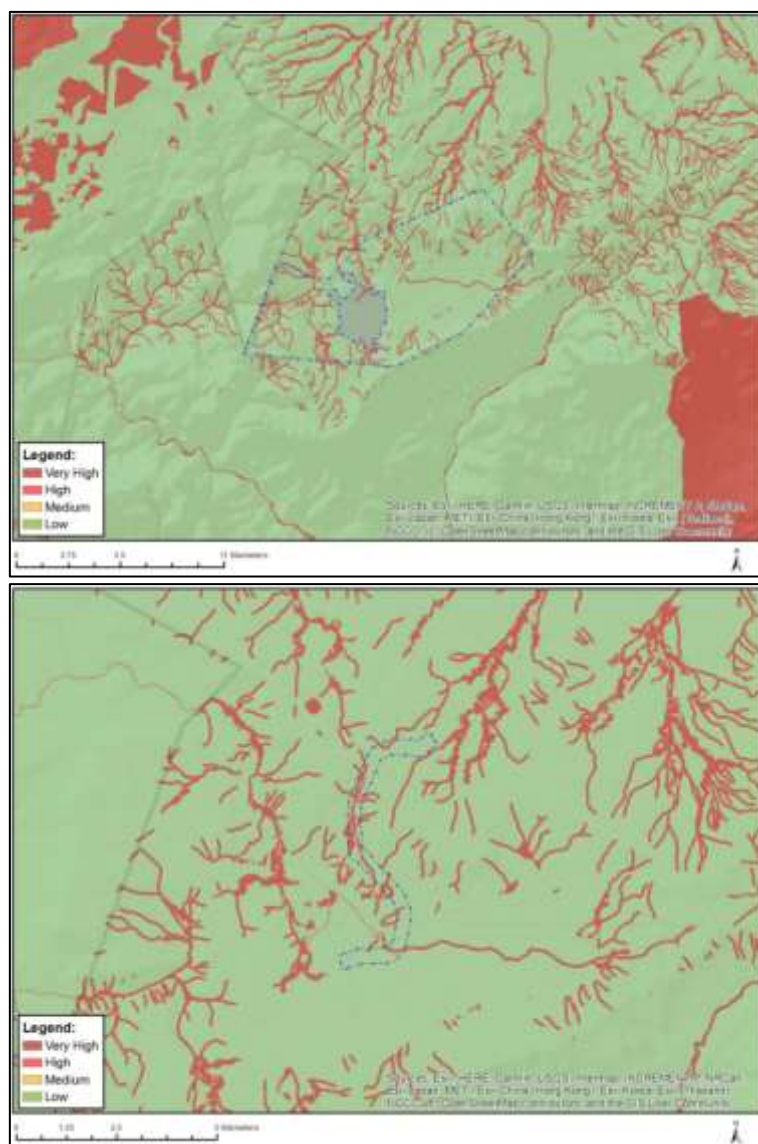


Figure 3.17: Aquatic Biodiversity Combined Sensitivity of the proposed development site for the DBF South SEF (top) and associated 132 kV power line corridor (bottom) based on the Screening Tool (Source: DFFE Screening Tool, 2023).

Prior to commencing with the Aquatic Biodiversity Specialist Assessment in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Notice 320, dated 20 March 2020), a site sensitivity verification was undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

The details of the site sensitivity verification are noted below:

Date of Site survey	17 December 2022 and 23 January 2023
Specialist Name	Toni Belcher
Professional Registration Number	400040/10
Specialist Affiliation / Company	Private

The proposed DBF South SEF Project was assessed in terms of its aquatic biodiversity sensitivity by means of a desktop analysis using available aquatic ecosystem mapping, aerial imagery and a site survey was undertaken on 17 December 2022 and 23 January 2023. A literature survey was also undertaken to determine any aquatic biodiversity sensitivities that may occur in the surrounding area.

Based on the PES, EI&ES and REC findings detailed in Table 3.6, aquatic sensitivity and recommended buffers have been mapped to protect these ecosystems. The recommended buffer area between the aquatic features and the project components is 35 m from the centre of the smaller streams or along the delineated edge of the wetlands and 50 m from the larger Leeu River. The mapped aquatic features and recommended buffers are shown in Figure 3.18.

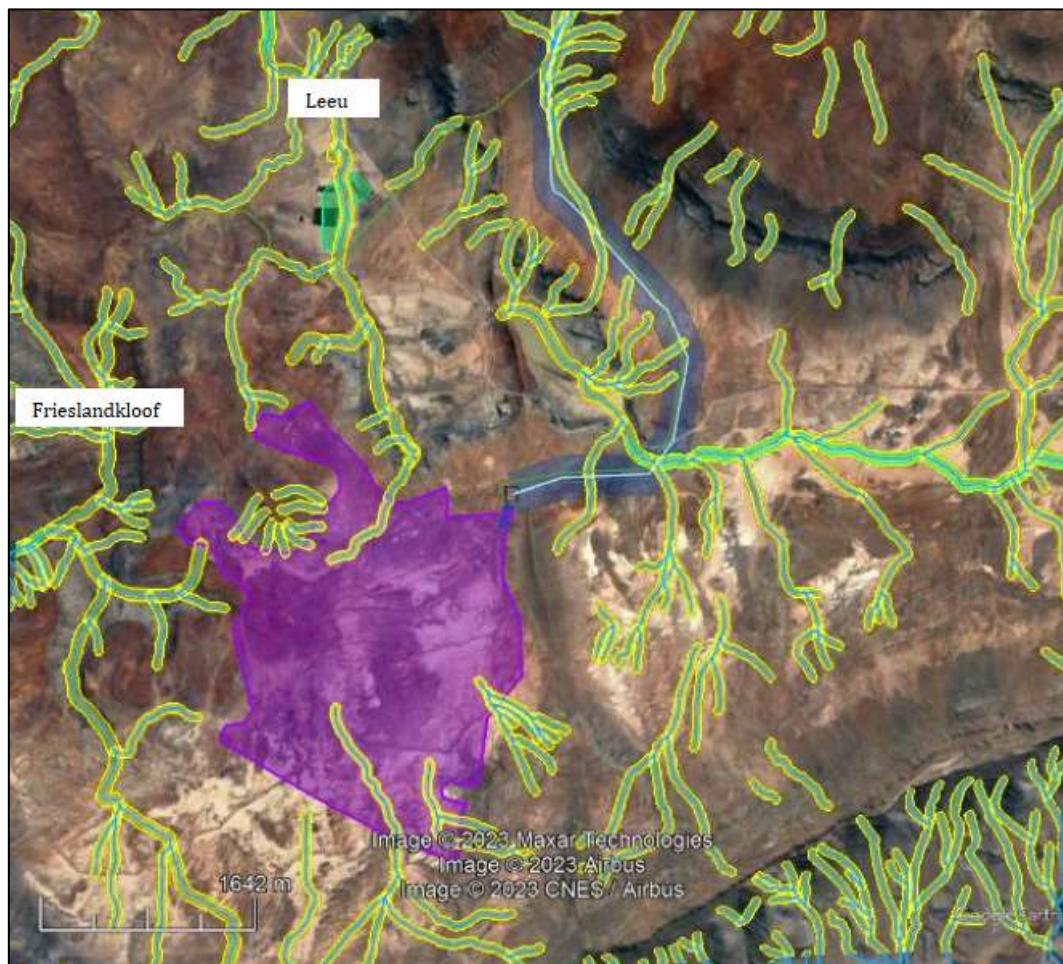


Figure 3.18: Google Earth image of the proposed renewable energy development and the associated aquatic ecosystem constraints (recommended buffers as the yellow areas; the access roads pink lines, the grid connection the pale blue line and PV footprints the red polygons). The aquatic features mapped as FEPA wetlands or aquatic CBAs are indicated by the green polygons) (Source: T Belcher, 2023, Appendix G.3).

With regards to the proposed layout, there are some minor watercourses as well as the wide wash area with its mosaic of depression wetlands that occur within the proposed solar facility. These

watercourses, as well as the wetlands, are deemed of moderate sensitivity that should largely be avoided with only some limited infrastructure development. The proposed access roads will require careful consideration where they are new roads to be established down steep slopes that are drained by watercourses, as these will pose an erosion risk and a higher risk of impacting the adjacent watercourses. Where widening along existing roads and the watercourse crossings can be adequately mitigated, the aquatic ecosystems would not be a constraint to the required upgrade to the existing roads.

In terms of aquatic ecosystem sensitivity, the larger Leeu and Frieslandkloof Rivers should be treated as high-sensitivity, no-go areas, while the smaller tributaries are of medium sensitivity as well as the recommended buffers for all the watercourses. The wider valley floor depressions and wider wash areas are areas that should largely be avoided in the proposed development as medium sensitivity areas. The buffer areas are areas of protection recommended as a development setback for the Solar Facilities that are intended to reduce the edge effect and direct impacts on the integrity and functionality of the aquatic ecosystems.

Figure 3.19 indicates the aquatic sensitivity layers and their associated recommended buffers for the proposed project. The no-go areas (red lines) are areas of high aquatic sensitivity that should be avoided for the PV facility. The existing access roads that intersect with the high sensitivity areas will be upgraded and is acceptable. The medium sensitivity (orange areas) should be avoided where possible or in the case of the new service tracks, adequately mitigated as stipulated in Chapter 6 and Appendix G.3 of this EIA Report. As discussed in Chapter 3.1, the PV footprint area recommended to be authorised in Chapter 7 will avoid the medium sensitivity aquatic features.

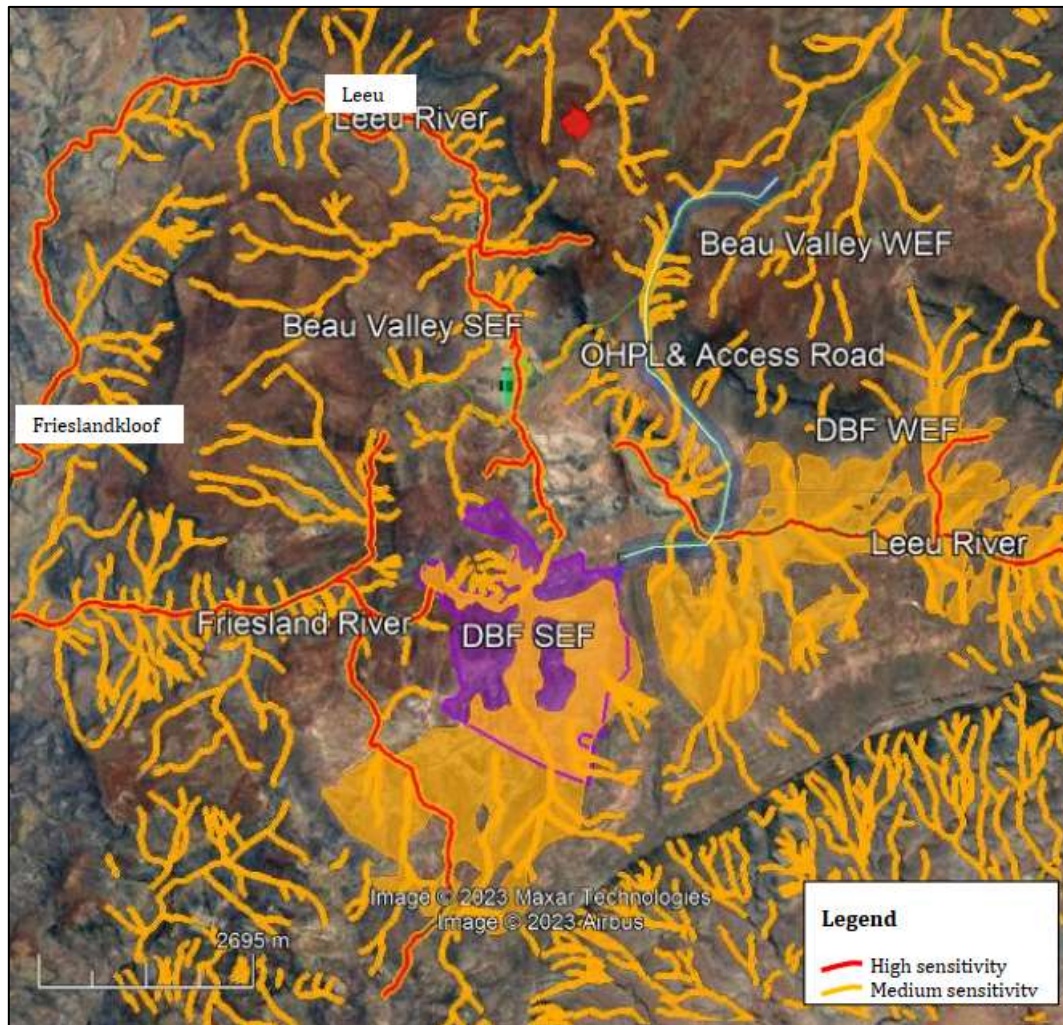


Figure 3.19: Google Earth image showing the aquatic ecosystem sensitivity mapping for the proposed project (Source: T Belcher, 2023, Appendix G.3).

3.2.7 Terrestrial Biodiversity

The information described below is based on EIA-level inputs provided by the Terrestrial Specialist, and which are included in Appendix G.2 of this EIA Report. Appendix G.2 includes the following associated reports:

- Terrestrial Biodiversity Assessment
- Flora (Plant Species) Compliance Statement
- Terrestrial Biodiversity Site Sensitivity Verification report
- Karoo Dwarf Tortoise Species Assessment

A literature review of existing reports, scientific studies, databases, reference works, guidelines, and legislation relevant to the study area was conducted to establish the baseline ecological and vegetative condition of the study area. The literature review aimed to identify the potential habitats and flora Species of Conservation Concern (SCC) present within the study area. The South African Biodiversity Information Facility (SABIF)/ SANBI Integrated Biodiversity Information System (SIBIS) database was used to access distribution records on southern African plants. The Red List of South African Plants website (SANBI, 2022)¹⁰ was also utilized to provide the most current account of the national status of flora. Relevant field guides and texts were also consulted for identification purposes in the field during the surveys.

An initial site visit took place on the 9th of September 2022, with a follow-up field assessment on the 9th of May 2023 and a final walk-through of the development footprint taking place on the 9th of June 2023. During the site visits, the different biodiversity features, habitat, and landscape units present at the site were identified and mapped in the field. Specific features visible on the satellite imagery of the site were also marked for field inspection and were verified and assessed during the site visit. During the final field assessment, a full walk-through-surveys of the development footprint was conducted and all plant and animal species observed were recorded. Active searches for reptiles and amphibians were also conducted within habitats likely to harbour or be important for such. The presence of sensitive habitats such as stands of large trees, pans or rocky outcrops were noted in the field where present and recorded on a GPS. Particular attention was paid to the integrity of habitats present as well as the broader ecological context in terms of connectivity and broad-scale ecological processes likely to be operating at the site.

In terms of the actual sampling approaches that were used, the vegetation of the site was characterised through walk-through surveys distributed across the site, in which plant species lists for the different habitats observed were compiled. Specific attention was paid to the presence of SCC as well as other species which are considered to be of ecological significance. In terms of fauna, active searches were conducted for mammals, reptiles and amphibians across the site, within habitats where such species are likely to be encountered.

3.2.7.1 Regional Vegetation

The national vegetation map (Mucina & Rutherford 2006 & SANBI 2018 update) for the study area is depicted below in Figure 3.20. The whole of DBF site is classified as falling within the Western Upper Karoo and Upper Karoo Hardeveld vegetation types. Although it has not been mapped by

¹⁰ SANBI (2022): <http://redlist.sanbi.org/>.

the VegMap, the major drainage features of the area, can be considered to represent the Southern Karoo Riviere vegetation type.

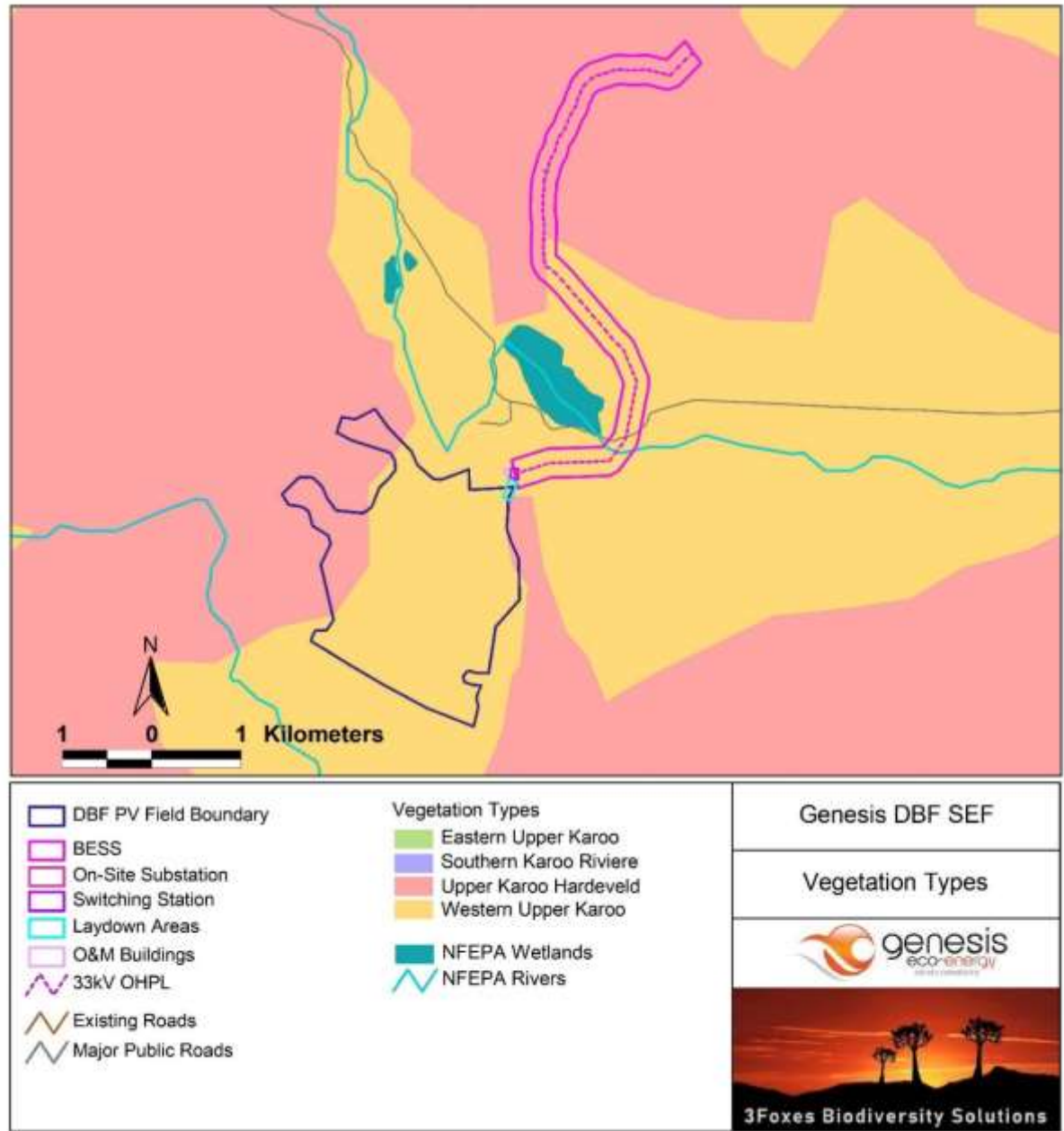


Figure 3.20: The national vegetation map (SANBI 2018 Update) for the proposed site and surrounding area (Source: S Todd, 2023, Appendix G.2).

According to national VegMap, the DBF Solar Facility falls largely within the Upper Karoo Hardeveld vegetation type, with some Western Upper Karoo present along the grid connection (Figure 3.20). The field assessment however indicates that the majority of the site should rather be considered to represent Western Upper Karoo, with some Upper Karoo Hardeveld around the margins of the PV areas and along the power line corridor.

The hills, outcrops and undulating slopes around the margins of the DBF South SEF PV area and along the power line corridor consist of Upper Karoo Hardeveld. This vegetation type usually consists of very rocky ground and is often associated with steep slopes, with the result that it is considered vulnerable to disturbance but is also an important habitat for fauna. It also contains a higher abundance of protected plant species than the adjacent areas of Western Upper Karoo. Consequently, it is generally considered higher ecological sensitivity than the surrounding areas. However, while the rocky hills are considered sensitive from an overall ecological perspective, they are considered low sensitivity for plant species as no plant SCC were observed within the site within these areas.



Figure 3.21: Example of rocky terrain representative of the Upper Karoo Hardeveld vegetation type and which occurs largely along the grid connection route and only marginally within the PV area (Source: S Todd, 2023, Appendix G.2).

Within the study area, the Western Upper Karoo vegetation type is associated with the lower-lying parts of the site, on open plains. Common and dominant shrub species include *Lycium cinereum*, *Tripteris sinuata*, *Chrysocoma ciliata*, *Eriocephalus ericoides* subsp. *ericoides*, *Helichrysum lucilioides*, *Pentzia globosa*, *Tetragonia arbuscula*, *Asparagus capensis* var. *capensis*, *Berkheya annectens*, *Eriocephalus decussatus*, *Felicia muricata*, *Hermannia cuneifolia*, *H. spinosa*, *Melolobium candicans*, *Pegolettia retrofracta*, *Pentzia incana*, *Pteronia adenocarpa*, *P. glauca*, *P. mucronata*, *P. sordida*, *Rosenia glandulosa*, *Selago albida* and *Zygophyllum microphyllum*. Succulent shrubs include *Ruschia intricata*, *Aridaria noctiflora* subsp. *straminea*, *Brownanthus ciliata* subsp. *ciliatus*, *Drosanthemum lique*, *Euphorbia rectirama*, *Galenia sarcophylla*, *Salsola calluna*, *S. glabrescens*, *S. rabieana*, *S. tuberculata*, *Sarcocaulon patersonii* and *Psilocaulon coriarium*. Grasses include *Aristida congesta*, *Enneapogon desvauxii*, *Stipagrostis ciliata*, *S. obtusa*, *Aristida adscensionis*, *A. diffusa*, *Eragrostis obtusa*, *Fingerhuthia africana*, *Tragus berteronianus* and *T. koelerioides*. However, no plant SCC were observed within the site within these areas.



Figure 3.22: View over the DBF Solar Facility PV area, showing the open plains habitat considered to represent the Western Upper Karoo vegetation type. Note the homogenous nature of the vegetation (Source: S Todd, 2023, Appendix G.2).

About 12% of the Southern Karoo Riviere vegetation type has been transformed as a result of intensive agriculture and the construction of dams. Although it is classified as Least Threatened, it is associated with rivers and drainage lines and, as such, represents areas that are considered ecologically significant. Within the study site, the Leeu Rivier lies along the grid connection route and while these areas are often of high significance due to their association with the Riverine Rabbit, the habitat within the affected area is not considered suitable for the Riverine Rabbit. Typical and dominant species observed at the site include *Searsia lancea*, *Cenchrus ciliaris*, *Melanthus comosus*, *Sporobolus ioclados*, *Pentzia globosa*, *Salsola aphylla*, *Tribulus terrestris*, *Felicia muricata*, *Atriplex vestita*, *Roepera retrofractum*, *Cynodon dactylon*, *Chrysocoma ciliata*, *Stipagostis namaquensis*, *Lycium pumilum*, *Lycium cinereum*, *Artemisia africana*, *Tripteris spinescens*, *Exomis microphylla* and *Derris denudata*. These areas are considered important for ecological processes and the provision of ecosystem services and as such are considered to represent sensitive habitats.

3.2.7.2 Biodiversity Conservation Planning

Critically Endangered and Threatened Ecosystems

Based on EIA-level input, there appears to be no Critically Endangered or Threatened Ecosystems present within the proposed project site. The Upper Karoo Hardeveld vegetation types is considered to be vulnerable to disturbance. The Upper Karoo Hardeveld vegetation type is associated with 11 734 km² of the steep slopes of koppies, buttes mesas and parts of the Great Escarpment covered with large boulders and stones. The vegetation type occurs as discrete areas associated with slopes and ridges from Middelpoos in the west and Strydenburg, Richmond and Nieu-Bethesda in the east, as well as most south-facing slopes and crests of the Great Escarpment between

Teekloofpas and eastwards to Graaff-Reinet. The field assessment however indicates that the majority of the site should rather be considered to represent Western Upper Karoo, with some Upper Karoo Hardeveld around the margins of the PV areas and along the power line corridor. However, while the rocky hills are considered sensitive from an overall ecological perspective, they are considered low sensitivity for plant species as no plant SCC were observed within the site.

Critical Biodiversity Areas and Ecological Support Areas

Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), 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. Biodiversity priority areas are described as follows:

- CBAs are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses. For CBAs the impact on biodiversity of a change in land-use that results in a change from the desired ecological state is most significant locally at the point of impact through the direct loss of a biodiversity feature (e.g., loss of populations or habitat). All FEPA prioritized wetlands and rivers have a minimum category of CBA1, while all FEPA prioritised wetland clusters have a minimum category of CBA2.
- ESAs are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of CBAs and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resource use in these areas may be lower than that recommended for CBAs. For ESAs a change from the desired ecological state is most significant elsewhere in the landscape through the indirect loss of biodiversity due to a breakdown, interruption or loss of an ecological process pathway (e.g. removing a corridor results in a population going extinct elsewhere or a new plantation locally results in a reduction in stream flow at the exit to the catchment which affects downstream biodiversity). All natural non-FEPA wetlands and larger rivers have a minimum category of ESA.

Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) for the study are indicated in terms of the Western Cape Biodiversity Spatial Plan (2017) and the Northern Cape CBA Map (2016) (Figure 3.23).

The south-eastern half of the DBF SEF site consists of CBA 1 and CBA 2 (Figure 3.23) and there are additional areas of CBA along the initial section of the grid connection route as well. The total extent of CBA within the PV footprint is estimated at 240 ha and under the current layout cannot be avoided. There are also some ESAs present within the PV area and along the grid route associated with the minor drainage features of the area and while the grid is likely to be able avoid significant impact to these areas, there would likely be some impact to the ESAs within the PV area. These watercourse features have been mapped by the Aquatic Specialist and a buffer of from the delineated edge of the watercourse features was specified by the specialist; 35 m buffer for small tributaries and 50 m buffer for the Leeu River. The lookup layer associated with the CBA

layer indicates that these areas are classified as CBA primarily for water resource protection. This is likely as the site falls within an area that has been significantly modified to direct water into the nearby Leeu Rivier and into the earth dam that north of the site. Due to the flat nature of the site, the disturbance has had negative impact on the vegetation cover of some areas which have come to be pan-like in nature and the diversion banks that have been constructed have created drainage features across the site which have been mistaken for natural features in the CBA mapping. Despite the disturbance that has been created, some parts of the site are still considered relatively sensitive as seasonally-wet flat-silty plains are not a common feature within the wider area. As discussed in Chapter 3.1, the PV footprint area recommended to be authorised in Chapter 7 will avoid the very high, high and medium ecological constraints (including CBAs) mapped by the Terrestrial Biodiversity specialists in Figure 3.23.

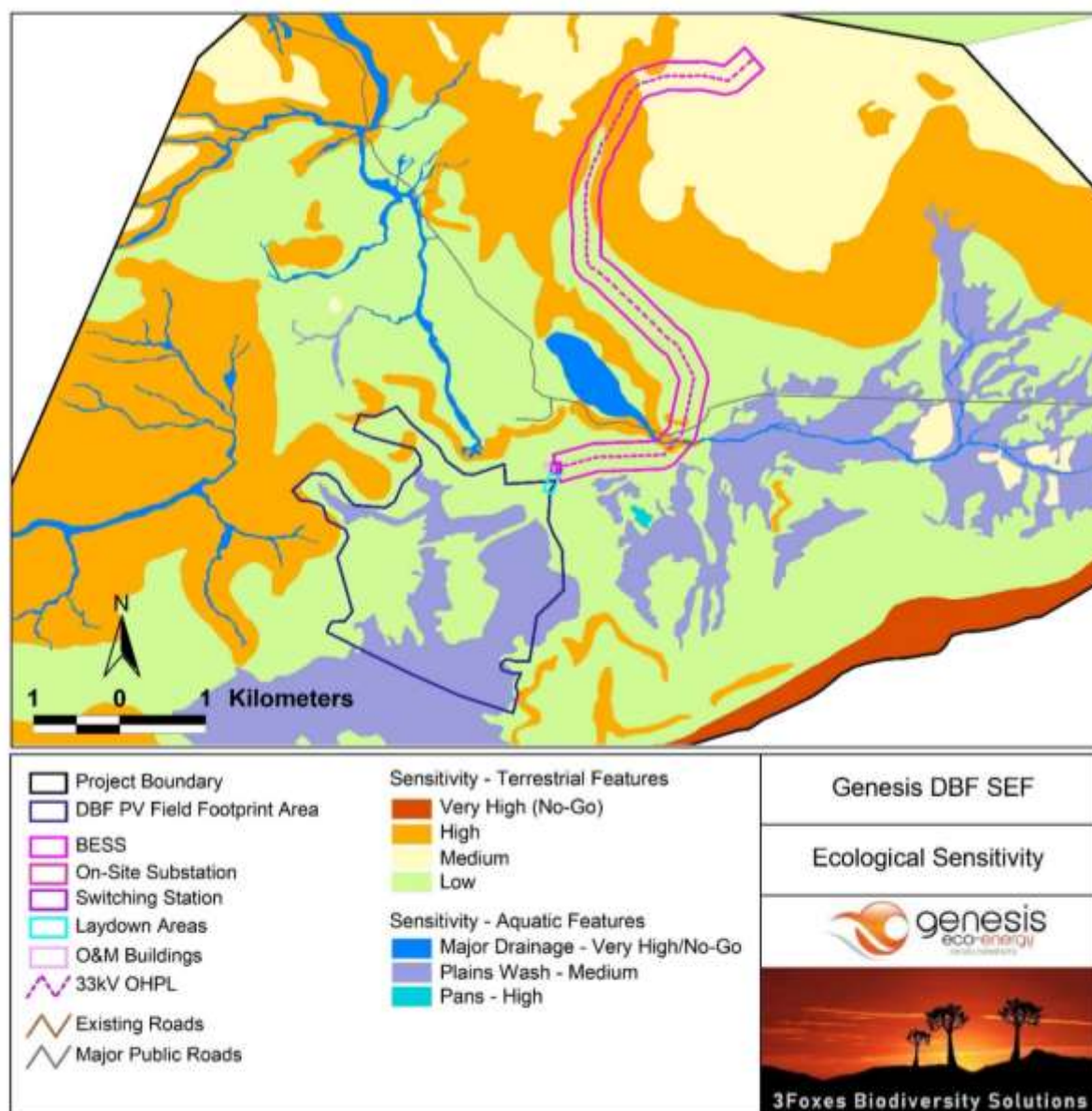


Figure 3.23: Ecological constraints map for the DBF SEF for all infrastructure (Source: S Todd, 2023, Appendix G.2).

National Protected Area Expansion Strategy (NPAES) Focus Areas

According to the South African Protected Areas Database (SAPAD), the project area is not located within any formally Protected Areas, as defined by the National Environmental Management: Protected Areas Act (Act 57 of 2003) (NEM: PAA).

However, the project area falls within the National Protected Area Expansion Strategy (NPAES) Focus Area associated with the Karoo National Park. The NPAES focus areas for land-based expansion are comprised of large, intact and unfragmented areas of importance for biodiversity representation and ecological persistence. As such, these areas are suitable for the creation or

expansion of extensive Protected Areas. Figure 3.24, below, illustrates the proposed DBF South SEF in relation to the Karoo National Park and its associated NPAES Focus Area. NPAES focus areas extend to the north and west of the KNP, across the Western Cape and Northern Cape provinces. The NPAES (DEA, 2018) has identified Nama-Karoo habitat as under protected, with only 1% of the 24.8 million hectares of this habitat protected (as at 2014) and sets the target of protecting 11% of this habitat within 20 years. The strategic spatial plan in the NPAES (DEA, 2018) is to add in the order of 1 million hectares of protected areas to the north and west of the Karoo National Park.

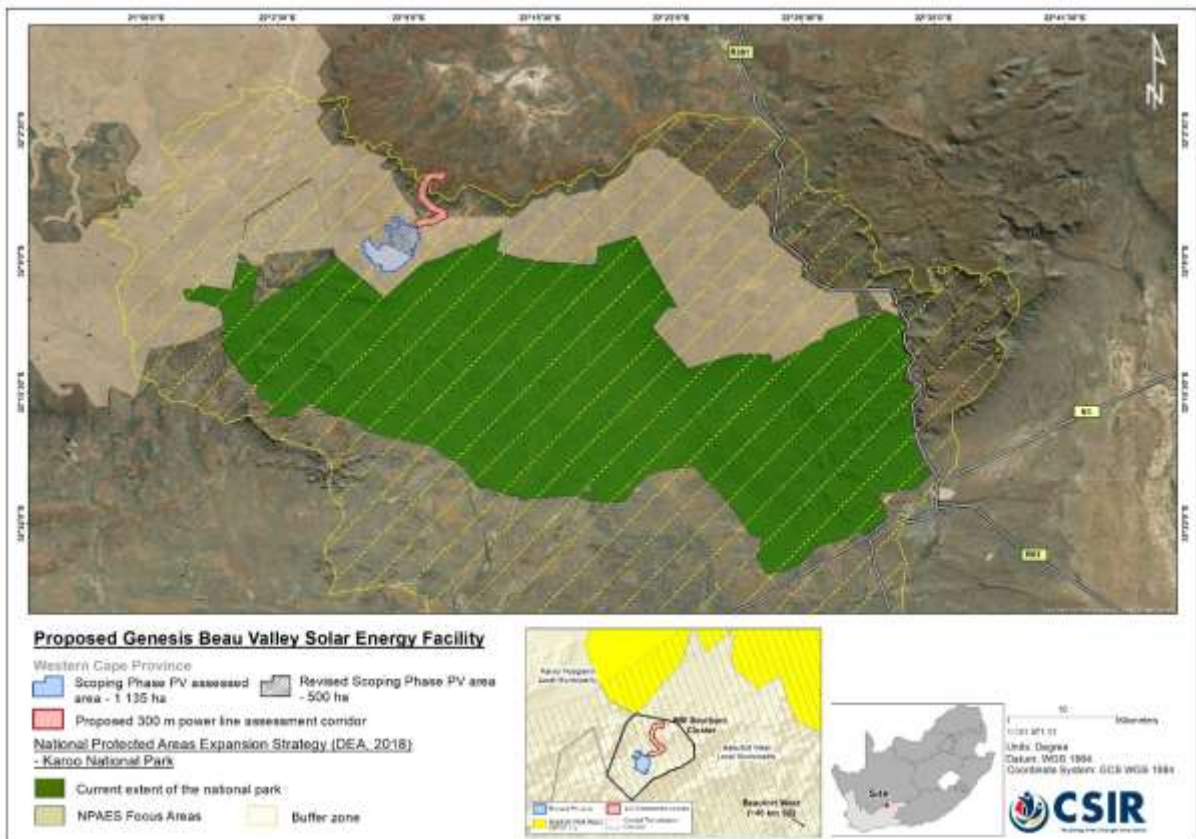


Figure 3.24: The Proposed Development Site in relation the Karoo National Park and the NPAES Focus Area.

In terms of the National Environmental Management: Protected Areas Act (NEM: PA, Act 57 of 2003, as amended), the legal procedure for the declaration of protected areas requires that in the case of privately owned land, the landowners' consent to the declaration in the form of a written agreement entered into with the Minister or with the MEC. In accordance with Section 33 of NEM: PA, the declaration of private land as a protected area requires that an extensive public participation and consultation process be undertaken. This process requires that the Minister or MEC "must" "*send a copy of the proposed notice by registered post to the last known address of each owner of the land within the area to be declared, and inform in an appropriate manner any other person whose rights in such land may materially or adversely be affected by such declaration.*" Preceding the landowner consent process and the formal declaration of the affected properties as a protected area, the National Protected Area Expansion Strategy has limited legal

basis to restrict a landowner from exercising their legal discretionary rights to pursue development on the land as provided in Section 25 of the Constitution of the Republic of South Africa.

The NPAES (DEA, 2018) identifies three mechanisms for protected area expansion:

- (1) acquisition of land (which is recognised as involving large upfront costs);
- (2) contract agreements with landowners who maintain ownership of their land; and
- (3) declaration of public or state land that requires reassigning of the land to a protected area agency (this option has limited potential as very little of the priority areas are public or state land).

The NPAES (DEA, 2018) states that the negotiation and conclusion of contractual agreements with landowners was the predominant mechanism for achieving protected area expansion in phase 1 (2008 to 2014). This option is often much more cost effective than acquisition of land and is used increasingly as part of biodiversity stewardship programmes (DEA, 2018: xi & 12), as it is clearly recognised in the NPAES that financing is a very significant constraint to the ability of protected area agencies to meet their targets for management effectiveness and protected area expansion.

The presence of a solar energy development on the site would have some impact on the value of the affected area for formal conservation expansion. Therefore, in order to reduce the impact of the development on the NPAES Focus Area, the Terrestrial Biodiversity specialist (Section 6.2 of the Terrestrial Biodiversity Scoping Phase Study) recommended that (1) the development footprint within the NPAES Focus Area should be reduced as much as possible, and (2) SANParks should be engaged at the earliest stage during the Scoping and EIA phase.

Accordingly, as discussed in Chapter 2 and 3.1, the PV footprint area that will be recommended to be authorised in Chapter 7 of this EIA Report has been reduced to approximately 207 ha from an original scoping phase PV assessment area of 1135 ha. Therefore, the reduced PV area is not considered to be a highly significant impact given the size of the NPAES Focus Area adjacent to the Karoo National Park (40 000 ha). A map of the reduced proposed footprint to be considered in for EA is included in Chapter 7 of this EIA Report. It can further be noted that in addition to the reduced size of the final development footprint, indigenous vegetation beneath the solar arrays will be retained and maintained by livestock grazing (the current land use) to reduce fire risk. This will allow the roots and some plant upper storey to persist which will enable enhanced habitat recovery post development.

In Section 6.2 of the Terrestrial Biodiversity Scoping Phase Study, it is noted that to mitigate the impact on NPAES Focus Areas, potential measures that can be implemented to reduce negative effects on the existing KNP and reduce impacts on the future use value of the project area should be investigated in collaboration with SANParks. Accordingly, during the Scoping Phase 30-day public participation process extending from 4 March 2023 to 3 April 2023, a site meeting was held between SANParks, the Project Developer and the CSIR on 14 March 2023. Further engagements between SANParks, the Project Developer and the affected landowners will be held during the EIA phase. Consultation with the Karoo National Park/ SANParks was therefore initiated at an early stage during the Scoping and EIA process, and these engagements will be ongoing during the EIA phase. The purpose of these engagements will be to find a mechanism to achieve the balanced objectives of both the NPAES and the various government policies and initiatives for renewable energy development, decarbonization of the energy sector and meeting South Africa's

international climate change commitments. Mitigation measures such as committing some of the land adjacent to the Park to stewardship or similar conservation commitment will be investigated in collaboration with SANParks and the Karoo National Park management. In Chapter 7 of this EIA Report, the above mitigation measure is recommended by the EAP as a condition to be included in the EA by the Competent Authority, the DFFE. The implementation of this mitigation measure will represent a collaborative and co-generated approach between the parties to find a balance and achieve the imperatives of biodiversity conservation and renewable energy development.

3.2.7.3 Faunal Communities

In terms of the fauna that potentially occur at the site, the potential diversity is considered to be moderate and numbers approximately 38 mammals, 28 reptiles and about 6 frog and toads. Mammals observed at the site or immediate vicinity directly or indirectly include Steenbok, Kudu, Cape Hare, Cape Porcupine, Suricate, Bat-eared Fox, Cape Fox, Cape Mongoose, Yellow Mongoose, Common Genet, Aardwolf and Black-backed Jackal. Reptiles and amphibians observed on the site or in the immediate environment include Leopard Tortoise, Southern Tent Tortoise, Karoo Girdled Lizard, Spotted Sand Lizard, Southern Rock Agama, Cape Thick-toed Gecko, Variegated Skink, Ground Agama and Karoo Toad.

The DFFE Screening Tool identified the Karoo Dwarf Tortoise and Riverine Rabbit as being of potential concern at the site. In terms of these two species, there is some habitat present at the site and particularly along the grid connection that considered suitable for the Karoo Dwarf Tortoise. There is however no habitat present that is considered suitable for the Riverine Rabbit. In the Upper Karoo, the Riverine Rabbit is associated with specific riparian vegetation communities which can readily be recognised. Such habitat is not present within the affected area and the Riverine Rabbit is considered absent from the site. There are several other fauna species of concern that occur in the wider area (Table 3.7) that also warrant consideration. However, interrogation of these species and their associated habitats and distribution suggests that none of these other species are likely to occur within the affected area site as they all occur in habitats that are not well-represented within the site.

The Karoo Dwarf Tortoise, *Chersobius boulengeri*, occurs in association with dolerite ridges and rocky outcrops of the southern Succulent and Nama Karoo biomes, and peripherally in the Albany Thicket biome in the southeast, at altitudes of approximately 800 to 1,500 m. The vegetation usually consists of dwarf shrubland that often contains succulent and grassy elements. The tortoises usually take shelter under rocks in vegetated areas or in rock crevices. However, these are quite specific in terms of their requirements with the result that suitable retreats for the species are not common. Due to their strong habitat association, populations are isolated on rocky outcrops with specialized vegetation. Since some of the dolerite ridges along the grid route are quite extensive, it will not be possible to fully avoid these areas, with the result that there will inevitably be some habitat loss resulting from the power line component of the development. It is not possible to provide a reliable estimate of the population size within the DBF SEF. Firstly, there are no reliable estimates of population density for this species that can be extrapolated across the range and secondly, the reported population declines appear to be widespread with the result that it is not possible to ascertain what proportion of the suitable habitat within the site would actually be occupied. The Area of Occurrence (AO) of this species is 13 5090 km² and the footprint within the PV area and the grid connection within suitable habitat would be less than 5 ha, which is

insignificant relative to the national distribution of this species. Direct habitat loss within the site would be minimal and is not considered a significant threat for this species resulting from the development.

Table 3.7: Red-listed mammals known from the broad area and their likely presence in the DBF South SEF site and the likely consequence thereof.

Species	Status	Likely Presence & Consequence	
		Wider Study Area	DBF South SEF
Riverine Rabbit <i>Bunolagus monticularis</i>	CR	There are records from the wider area and confirmed sightings by the consultant on the nearby Hoogland South WEF projects.	Unlikely to be present as there is no suitable habitat present.
Black-footed Cat <i>Felis nigripes</i>	VU	Previously recorded from within the Karoo National Park, but no recent records.	No recent records from the area and the regular presence of this species within the site is considered unlikely. The site is considered low sensitivity for this species.
Grey Rhebok <i>Pelea capreolus</i>	NT	Present on higher ground, especially the Nuweveld mountains.	Not observed within the site and the affected area is not considered highly suitable for this species, which prefers higher-lying areas.
Karoo Dwarf Tortoise <i>Chersobius boulengeri</i>	NT	Occasional records from the broad area. Associated with dolerite outcrops.	Potentially present as there is some suitable habitat within the site and there are some records from similar habitat in the wider area.

In terms of the sensitivity mapping relating more generally to mammals, the larger riparian areas have been classified as Very High sensitivity based on their value as Riverine Rabbit habitat but also as a result of their general ecological importance. The more rugged parts of the rocky hills and steep slopes have been classified as Very High sensitivity on account of the value of these areas as habitat for mammals associated with rocky areas and the more general ecological value of these areas.

3.2.7.4 Screening Tool Descriptions and Site Sensitivity Verification

Figure 3.26, Figure 3.27 and Figure 3.28 below indicate the results of the Screening Tool in terms of terrestrial plant species, terrestrial animal species, and the terrestrial biodiversity combined sensitivity, respectively, for the proposed project.

Plant Species

The Screening Tool shows Medium sensitivity for the Plant species theme for the whole site, due to the potential presence of four different Sensitive Species as listed in Table 3.8. The habitats, distribution and likely presence of these species within the DBF South SEF footprint area is discussed below in Table 3.8. None of these species were observed within the site and it is considered that these species are either highly unlikely to be present within the site or can be confirmed absent from the site. Since no other plant SCC were observed on the site, the site can

be considered Low sensitivity for the Plant Species Theme. As conditions at the time of the field assessment were favourable and the site is relatively homogenous in terms of vegetation, it is unlikely that any such species were missed. The site verification therefore confirms the low sensitivity of the whole of the site and the lack of any plant SCC on-site.

Table 3.8: Sensitive Species as listed by the DFFE Screening Tool for the DBF South SEF site and the likely presence of these species within the site.

DFFE Site Status	Name	IUCN Status	Possible presence within the DBF South SEF site
Medium	Sensitive species 945	Rare	This seasonal geophyte species is associated with dolerite outcrops in high-lying areas of the Sneeuberg, Agter-Sneeuberg and Nuweveld Mountains. It was not observed within the DBF SEF site and there no habitat deemed suitable for this species within the site. As a result, this species is considered absent from the site and hence the site is considered low sensitivity for this species.
Medium	Sensitive species 484	Rare	This small cryptic succulent occurs from the Roggeveld Escarpment to the Nuweveld Mountains. This species was observed north of the site on flat silty plains and although the habitat within the DBF site is similar, it was not observed during the field assessment, but as this species is difficult to spot it is possible that it was overlooked or occurs in parts of the site that were not inspected.
Medium	Sensitive species 886	Rare	This asteraceous shrub grows on the Roggeveld and Hantamsberg Mountains. The habitat is considered to represent steep or gentle slopes of a mainly southern aspect in low karroid scrub. This species was not observed within the site and it is assumed to be absent from the site.
Medium	<i>Cliffortia arborea</i>	VU	This is a conspicuous species that grows on cliffs from the Hantamsberg Mountain to the Nuweveld Mountains. There is no suitable habitat for this species at the site and it can be confirmed that this species is not present within the DBF SEF footprint.

Animal Species

The animal species theme sensitivity map is illustrated below in Figure 3.27 and shows that the site is classified as High sensitivity for avifauna, and Medium sensitivity for terrestrial fauna. Refer to Section 3.2.8 of this chapter for the EIA-level assessment and Site Sensitivity Verification for avifaunal species. Table 3.9 indicates that the Medium terrestrial fauna sensitivity is due to the potential presence of the Riverine Rabbit and the Karoo Dwarf Tortoise in the area. Although there are confirmed observations from the broader area of Riverine Rabbit, these are outside of the of the site and there is no suitable riparian habitat within the development footprint. The site verification therefore finds that the site can be classified as low sensitivity for the Riverine Rabbit. The Karoo Dwarf Tortoise *Chersobius boulengeri* occurs in association with dolerite ridges and rocky outcrops of the southern Succulent and Nama Karoo biomes, and peripherally in the Albany Thicket biome in the southeast, at altitudes of approximately 800 to 1,500 m. The vegetation usually consists of dwarf shrubland that often contains succulent and grassy elements. These tortoises usually take shelter under rocks in vegetated areas or in rock crevices. However, these are quite specific in terms of their requirements with the result that suitable retreats for the species are not common. Due to their strong habitat association, populations are isolated on rocky outcrops with specialized vegetation. The typical dolerite outcrops associated with this species do not occur within the PV footprint areas and there are only suitable areas of habitat along the grid

connection route. As such, it is concluded that the DBF SEF can be confirmed to be High sensitivity for this species and that a full assessment for the Karoo Dwarf Tortoise would be required as a result. Based on the site verification, the sensitivity of the site for other terrestrial fauna is considered to be low .

Table 3.9: Animal Species Theme features for the DBF South SEF project area.

Sensitivity	Feature(s)
High	Aves- <i>Neotis ludwigii</i>
High	Aves- <i>Aquila verreauxii</i>
Medium	Aves- <i>Afrotis afra</i>
Medium	Reptilia- <i>Chersobius boulengeri</i>
Medium	Mammalia- <i>Bunolagus monticularis</i>

The Karoo Dwarf Tortoise Species Assessment, included in Appendix G.2 of this EIA Report, found that there is approximately 3.5 ha of Karoo Dwarf Tortoise habitat within the DBF SEF PV footprint area, that should be avoided in the final layout (see Figure 3.25). In addition, there is some habitat along the grid connection route that would result in an estimated extent of habitat loss along the grid route at construction of approximately 1 ha. The overall extent of habitat within the PV assessment area is insignificant when considered in context of the range of this species (Less than 0.02% of the national range). Direct habitat loss is therefore not considered to represent a significant source of potential impact associated with the DBF SEF on the Karoo Dwarf Tortoise.

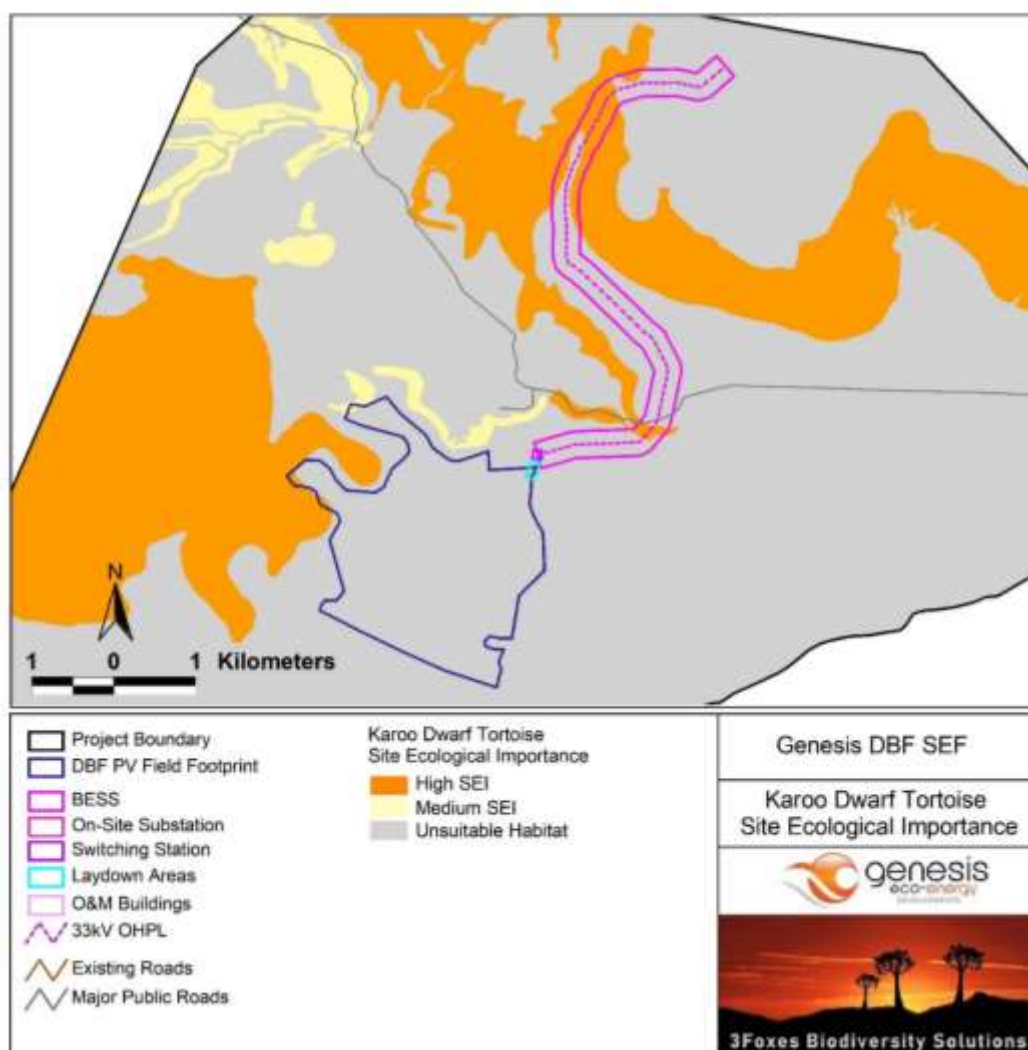


Figure 3.25: Site Ecological Importance (SEI) for the Karoo Dwarf Tortoise within the SEF Site (Source: S Todd, 2023, Appendix G.2).

In order to mitigate potential negative impacts of the development of the SEF on the Karoo Dwarf Tortoise through avoidance and changes to the layout of the development, the following avoidance and mitigation should be implemented:

- Areas of suitable Dwarf Tortoise habitat that have been mapped as having a High SEI should be avoided by the SEF wherever possible. Under the layout assessed, there is approximately 3.5 ha within the PV field that should be avoided. The PV footprint recommended for EA in Chapter 7 has been reduced and avoids all areas considered suitable for the Karoo Dwarf Tortoise. The habitat along the power line cannot be avoided and the 1 ha of predicted habitat loss along the power line and associated service road is considered an acceptable level of impact given the low footprint that would occur in this area.
- Any overhead cabling with associated pylons within and near (within 1 km) areas of suitable habitat should be designed so as to discourage crows from nesting on the structures.

- Crow nests should be removed from the pylons within and near (within 1 km) mapped areas of suitable habitat regularly.

With the implementation of the above mitigation measures and those provided in Chapter 6 and the EMPr (Appendix H of the EIA Report), the direct impact of the DBF SEF Site on the Karoo Dwarf Tortoise habitat would be low and is considered acceptable. Indirect impacts, particularly predation by crows would potentially represent a more persistent, long-term threat to the Karoo Dwarf Tortoise population within the site. However, with the implementation of the suggested mitigation and avoidance measures, it is likely that his impact can be reduced to an acceptable, low level. Consequently, the development of the DBF SEF is considered acceptable with the implementation of the suggested avoidance and monitoring as indicated and should be allowed to proceed with regards to potential impacts on the Karoo Dwarf Tortoise.

Terrestrial Biodiversity

The terrestrial biodiversity theme is illustrated below in Figure 3.28 and illustrates that whole of the DBF South SEF project area is mapped as Very High sensitivity due to the presence of areas of CBA 1, CBA 2, ESA 2, PAES Focus Areas and buffer for the Karoo National Park. The site verification confirms the presence of some noteworthy biodiversity features within the wider site. As a result of the Very High sensitivity ranking for the Terrestrial Biodiversity Theme, a full terrestrial biodiversity assessment for the development is required which is included as Appendix G.2 of this EIA Report.

Table 3.10: Terrestrial Biodiversity Theme features for the DBF South SEF project area.

Sensitivity	Feature(s)
Very High	Critical Biodiversity Area 1
Very High	Critical Biodiversity Area 2
Very High	Ecological Support Area 2
Very High	National Protected Areas Expansion Strategy
Very High	SANParks (Buffer) - Karoo National Park

Based on the results of the site verification, the following studies (included in Appendix G.2 of this EIA Report) were considered appropriate for the EIA phase for the proposed project and were accordingly undertaken:

- Plant Species Compliance Statement
- Terrestrial Biodiversity and Animal Species Assessment
- Karoo Dwarf Tortoise Species Assessment.

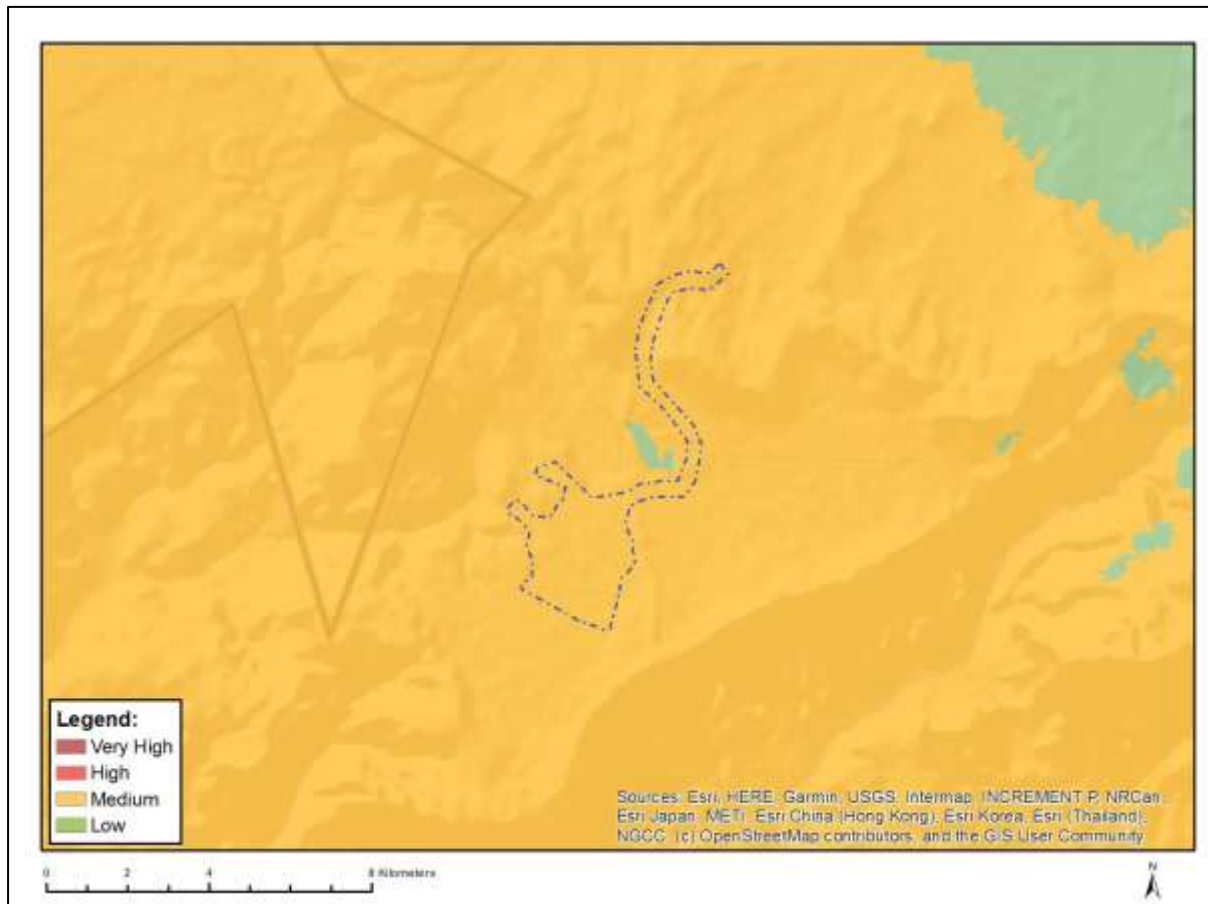


Figure 3.26: Terrestrial Plant Species sensitivity of the proposed development site for the DBF South SEF and associated 132 kV power line corridor based on the Screening Tool (Source: Screening Tool, 2023)

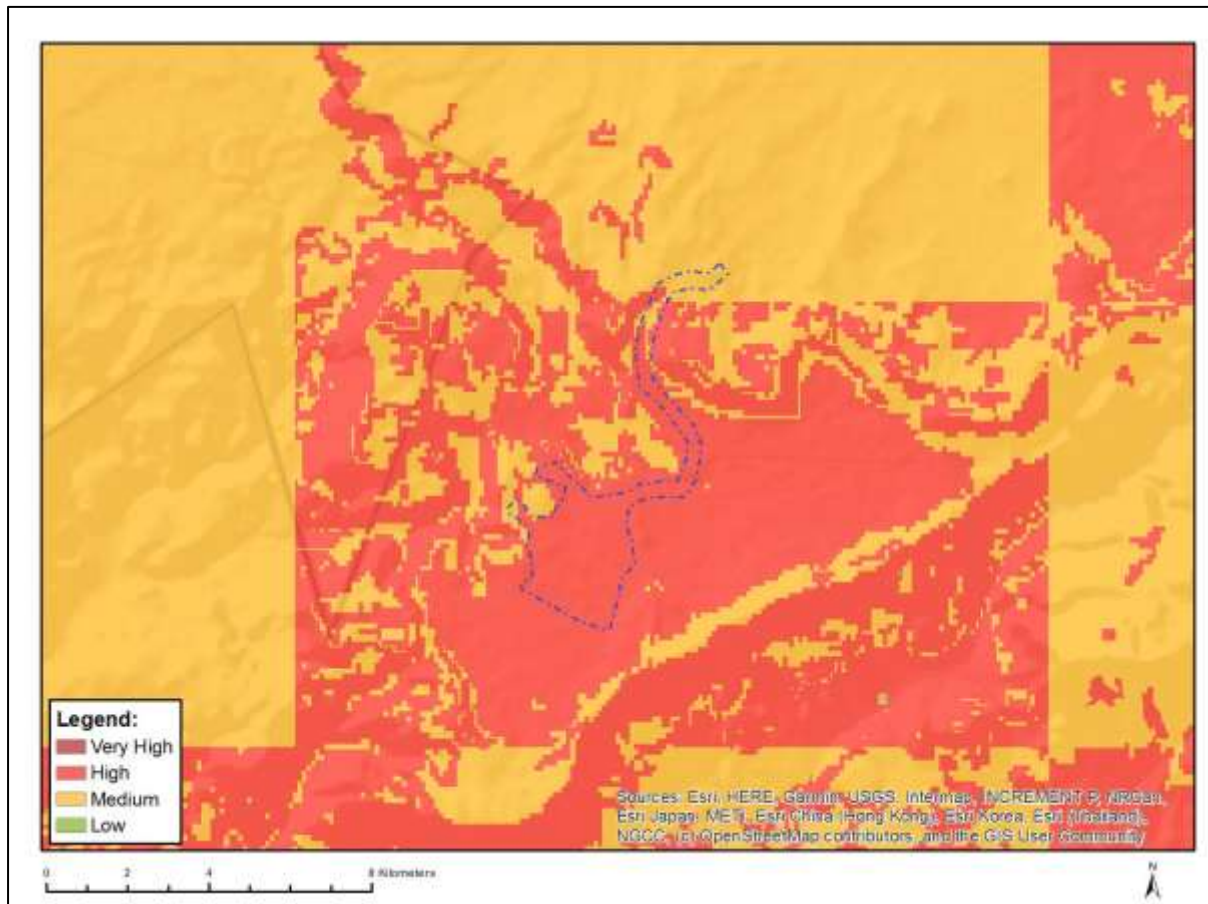


Figure 3.27: Terrestrial Animal Species sensitivity of the proposed development site for the DBF South SEF and associated 132 kV power line corridor based on the Screening Tool (Source: Screening Tool, 2023)

3.2.8 Avifauna

The information described below is based on EIA-level inputs provided by the Avifauna Specialist, which are included in Appendix G.4 of this EIA Report.

The main source of information on the avifaunal diversity and abundance at the avifaunal Project Area of Impact (PAOI) is an integrated pre-construction monitoring programme that was implemented at the southern cluster of the proposed Genesis renewable energy projects, including the proposed DBF South SEF and PAOI, which was completed between December 2020 and August 2022.

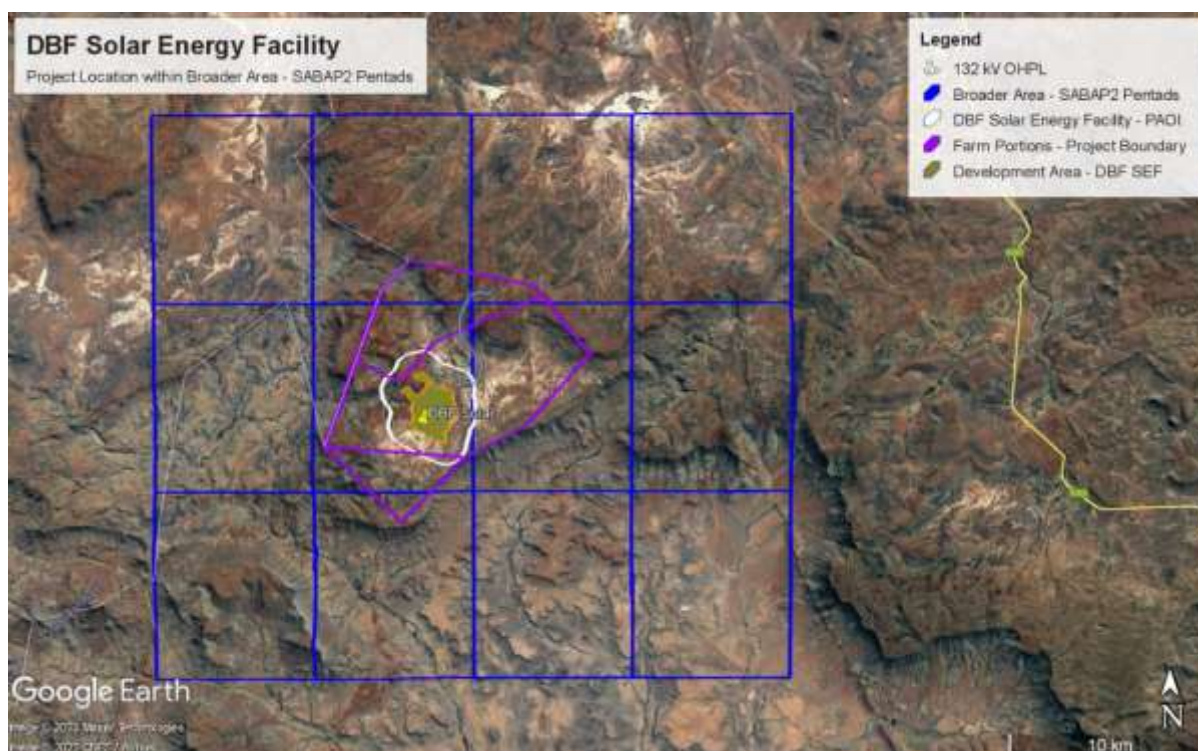


Figure 3.29: The 12 pentads of the Second Southern African Bird Atlas Project (SABAP2) comprise the Broader Area where the PAOI (outlined in white) is located

A total of 107 species could potentially occur within the Broader Area where the proposed Project is located. Of these, 38 are classified as priority species for solar developments. All 38 priority species were recorded during the on-site monitoring so far and all have a medium to high probability of occurring regularly in the PAOI. Eight (8) Red Data species were recorded during the on-site surveys, namely Blue Crane, Ground Woodpecker, Karoo Korhaan, Kori Bustard, Ludwig's Bustard, Martial Eagle, Secretarybird, and Verreaux's Eagle.

Refer to Table 3.11 for a list of priority species potentially occurring in the study area and potential impacts on them by the proposed project.

Table 3.11: List of Priority species potentially occurring in the PAOI on a regular basis and the potential impacts of the DBF South SEF on avifauna. CR = Critically Endangered EN = Endangered VU = Vulnerable NT = Near-threatened (Source: Chris van Rooyen Consulting, 2023, Appendix G.4)

Specie name	Scientific name	SABAP2 Reporting Rate %		Global Conservation Status	Regional Conservation Status	Endemic (SA)	Recorded during monitoring	Likelihood of regular occurrence in the PAOI	Nama Karoo	Surface water: Drainage lines, dams and water troughs	Cliffs and ridges	Agriculture	Solar - Collisions with solar panels	Solar - Displacement: Disturbance (breeding)	Solar - Displacement: Habitat transformation	Solar - Entanglement in fences	Powerline - Electrocution MV & substation	Powerline - Collision MV	Powerline - Collision HV
		Full protocol	Ad hoc protocol																
African Sacred Ibis	<i>Threskiornis aethiopicus</i>	10,61	0,00	-	-		x	M		x		x	x			x	x	x	x
African Spoonbill	<i>Platalea alba</i>	1,52	0,00	-	-		x	M		x			x					x	x
Black-eared Sparrow-Lark	<i>Eremopterix australis</i>	12,12	0,00	-	-	x	x	M	x					x	x				
Black-headed Canary	<i>Serinus alario</i>	45,45	16,67	-	-	x	x	H	x			x		x	x				
Blacksmith Lapwing	<i>Vanellus armatus</i>	22,73	1,85	-	-		x	H		x		x	x	x					
Blue Crane	<i>Grus paradisea</i>	10,61	1,85	VU	NT		x	M	x	x		x	x	x	x	x		x	x
Booted Eagle	<i>Hieraaetus pennatus</i>	3,03	1,85	-	-		x	M		x	x			x	x		x		
Cape Shoveler	<i>Spatula smithii</i>	1,52	0,00	-	-		x	M		x			x					x	x
Cape Spurfowl	<i>Pternistis capensis</i>	1,52	0,00	-	-	x	x	M	x			x	x	x	x				
Cape White-eye	<i>Zosterops virens</i>	15,15	0,00	-	-	x	x	M	x	x			x	x	x				
Egyptian Goose	<i>Alopochen aegyptiaca</i>	36,36	7,41	-	-		x	H		x		x	x			x	x	x	x
Fairy Flycatcher	<i>Stenostira scita</i>	25,76	1,85	-	-	x	x	H	x	x			x	x	x				
Grey Tit	<i>Melaniparus afer</i>	18,18	3,70	-	-	x	x	H	x	x		x	x	x	x				
Grey-winged Francolin	<i>Scleroptila afra</i>	15,15	1,85	-	-	x	x	H	x			x	x	x	x				
Ground Woodpecker	<i>Geocolaptes olivaceus</i>	7,58	5,56	NT	LC	x	x	M	x		x			x	x				
Jackal Buzzard	<i>Buteo rufofuscus</i>	31,82	7,41	-	-	x	x	H		x	x			x	x		x		
Karoo Eremomela	<i>Eremomela gregalis</i>	27,27	14,81	-	-	x	x	H	x				x	x	x				
Karoo Korhaan	<i>Eupodotis vigorsii</i>	62,12	18,52	-	NT		x	H	x				x	x	x	x		x	x
Karoo Lark	<i>Calendulauda albescens</i>	18,18	5,56	-	-	x	x	H	x			x	x	x	x				
Karoo Prinia	<i>Prinia maculosa</i>	50,00	9,26	-	-	x	x	H	x				x	x	x				
Karoo Thrush	<i>Turdus smithi</i>	15,15	3,70	-	-	x	x	H		x			x	x	x				
Kori Bustard	<i>Ardeotis kori</i>	3,03	3,70	NT	NT		x	M	x	x				x	x	x		x	x
Large-billed Lark	<i>Galerida magnirostris</i>	31,82	9,26	-	-	x	x	H	x			x	x	x	x				

Specie name	Scientific name	SABAP2 Reporting Rate %		Global Conservation Status	Regional Conservation Status	Endemic (SA)	Recorded during monitoring	Likelihood of regular occurrence in the PAOI	Nama Karoo	Surface water: Drainage lines, dams and water troughs	Cliffs and ridges	Agriculture	Solar - Collisions with solar panels	Solar - Displacement: Disturbance (breeding)	Solar - Displacement: Habitat transformation	Solar - Entanglement in fences	Powerline - Electrocution MV & substation	Powerline - Collision MV	Powerline - Collision HV
		Full protocol	Ad hoc protocol																
Lesser Kestrel	<i>Falco naumanni</i>	0,00	0,00	-	-		x	M			x		x	x	x		x		
Ludwig's Bustard	<i>Neotis ludwigii</i>	21,21	3,70	EN	EN		x	H	x					x	x	x		x	x
Martial Eagle	<i>Polemaetus bellicosus</i>	3,03	1,85	EN	EN		x	M		x	x			x	x		x		
Namaqua Warbler	<i>Phragmacia substriata</i>	15,15	1,85	-	-	x	x	H	x				x	x	x				
Pale Chanting Goshawk	<i>Melierax canorus</i>	34,85	14,81	-	-		x	H	x	x	x		x	x	x		x		
Pied Starling	<i>Lamprotornis bicolor</i>	28,79	11,11	-	-	x	x	H	x			x	x	x	x				
Red-billed Teal	<i>Anas erythrorhyncha</i>	3,03	0,00	-	-		x	M		x			x					x	x
Rock Kestrel	<i>Falco rupicolus</i>	33,33	7,41	-	-		x	H			x		x	x	x		x		
Secretarybird	<i>Sagittarius serpentarius</i>	4,55	0,00	EN	VU		x	M	x	x				x	x	x		x	x
Sickle-winged Chat	<i>Emarginata sinuata</i>	33,33	14,81	-	-	x	x	H	x			x	x	x	x				
South African Shelduck	<i>Tadorna cana</i>	36,36	1,85	-	-		x	H		x			x					x	x
Spotted Eagle-Owl	<i>Bubo africanus</i>	3,03	0,00	-	-		x	M		x	x		x	x	x	x	x	x	x
Spur-winged Goose	<i>Plectropterus gambensis</i>	7,58	0,00	-	-		x	M		x		x	x					x	x
Verreaux's Eagle	<i>Aquila verreauxii</i>	31,82	7,41	-	VU		x	H		x	x			x	x		x	x	x
Yellow-billed Duck	<i>Anas undulata</i>	7,58	1,85	-	-		x	M		x			x					x	x

3.2.8.1 Screening Tool Descriptions and Site Sensitivity Verification

In terms of the Screening Tool, the PAOI and immediate environment is classified as Medium and High sensitivity for bird species according to the Terrestrial Animal Species Theme. The Medium sensitivity classification is linked to the potential occurrence of Ludwig's Bustard (Globally and Regionally Endangered) and the High sensitivity classification is linked to the possible occurrence of Verreaux's Eagle (Regionally Vulnerable) and Ludwig's Bustard. The PAOI contains confirmed habitat for species of conservation concern (SCC) as defined in the Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species (Government Gazette No 43855, 30 October 2020). The occurrence of SCC was confirmed during the on-site surveys. The following SSC were recorded: Martial Eagle (Globally and Regionally Endangered), Verreaux's Eagle (Regionally Vulnerable), Blue Crane (Globally Vulnerable and Regionally Near-threatened), Secretarybird (Globally Endangered and Regionally Vulnerable) and Ludwig's Bustard (Globally and Regionally Endangered).

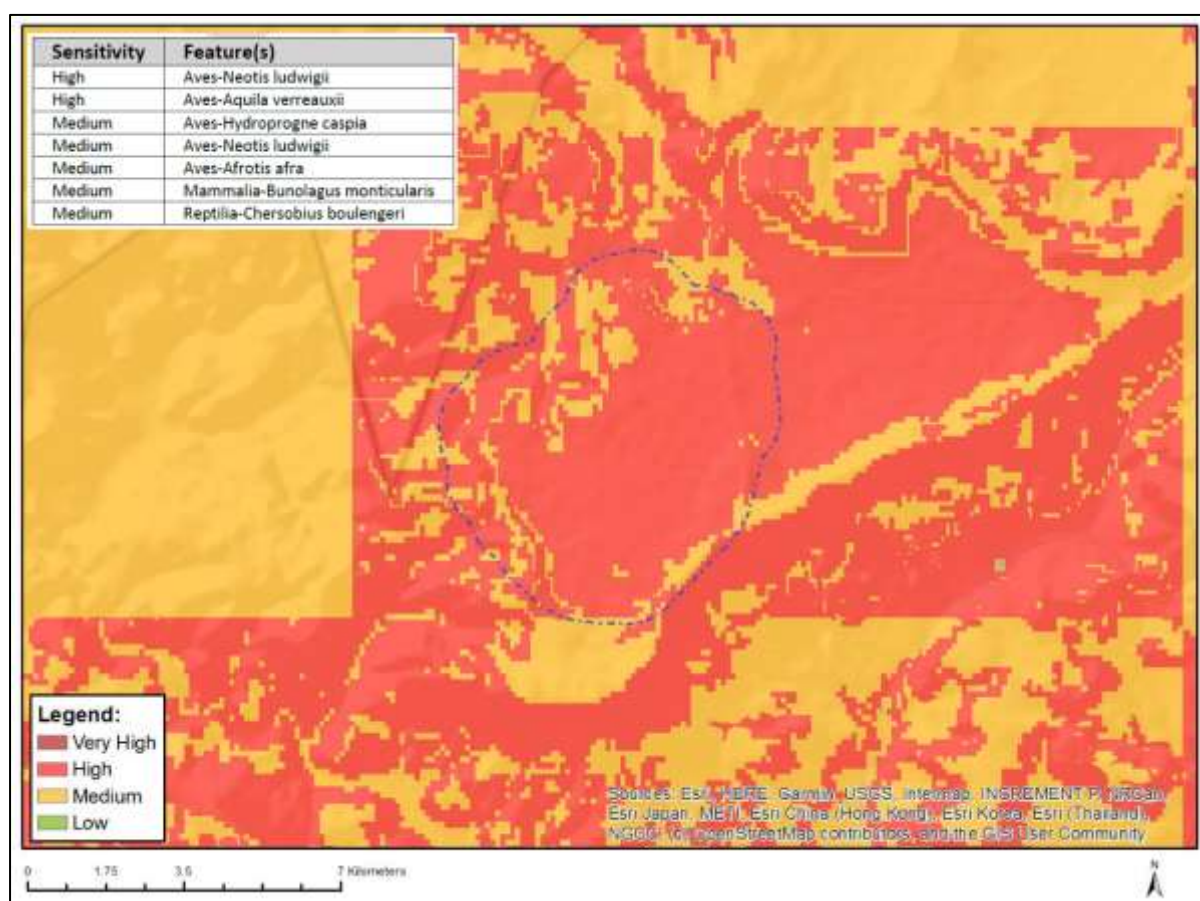


Figure 3.30: The National Web-Based Environmental Screening Tool map of the PAOI, indicating sensitivities for the Terrestrial Animal Species theme. The Medium sensitivity classification is linked to Ludwig's Bustard *Neotis ludwigii* and the High sensitivity classification is linked to Verreaux's Eagle *Aquila verreauxii* and Ludwig's Bustard (Source: Chris van Rooyen Consulting, 2023, Appendix G.4)

Based on the SSV surveys conducted in the course of the integrated pre-construction monitoring conducted between December 2020 and August 2022, the specialists concluded that the PAOI is of high sensitivity for avifauna from a solar perspective.

The following sensitive zones and buffers were recommended by the specialists:

- **All infrastructure exclusion zones:** A 1km all infrastructure exclusion zone is recommended to prevent the displacement of breeding Verreaux's Eagles during the construction phase due to disturbance (Figure 3.31). In addition, the buffer area will reduce the risk of injury to the juvenile bird due to collision with the solar panels, when it starts flying and practicing its hunting technique around the nest. There is currently no infrastructure planned within these exclusion zones.
- **Solar panel exclusion zones (other infrastructure allowed):**
 - **Drainage lines, dams, and waterpoints:** Surface water in this semi-arid habitat is crucially important for priority avifauna and many non-priority species. The PAOI and the immediate surrounding area contain several non-perennial rivers and drainage lines which are sources of surface water. It is preferable to leave some open space where possible with no solar panels, for birds to access and leave the surface water areas unhindered. Surface water is also important area for raptors to hunt birds which congregate around water troughs, and they should have enough space for fast aerial pursuit. This will also benefit Blue Cranes which prefer to breed close to water bodies. The buffer zones as recommended by the Freshwater Specialist should be followed. In addition, water troughs (if any) located within the PV footprint should be relocated outside the project area to ensure the continued availability of this water source to avifauna.
 - **High sensitivity zones:** The entire PAOI is a high sensitivity zone due to the confirmed presence of several Species of Conservation Concern (SCCs) (see Appendix G.4) namely, Blue Crane, Ground Woodpecker, Karoo Korhaan, Kori Bustard, Ludwig's Bustard, Martial Eagle, Secretarybird, and Verreaux's Eagle which could utilise the whole PAOI for foraging. However, these species do not require specific avoidance measures at this stage because there is still adequate habitat available outside the PAOI.

Refer to Figure 3.31 for the avifaunal sensitivity zones identified for the study area based on avifaunal monitoring.

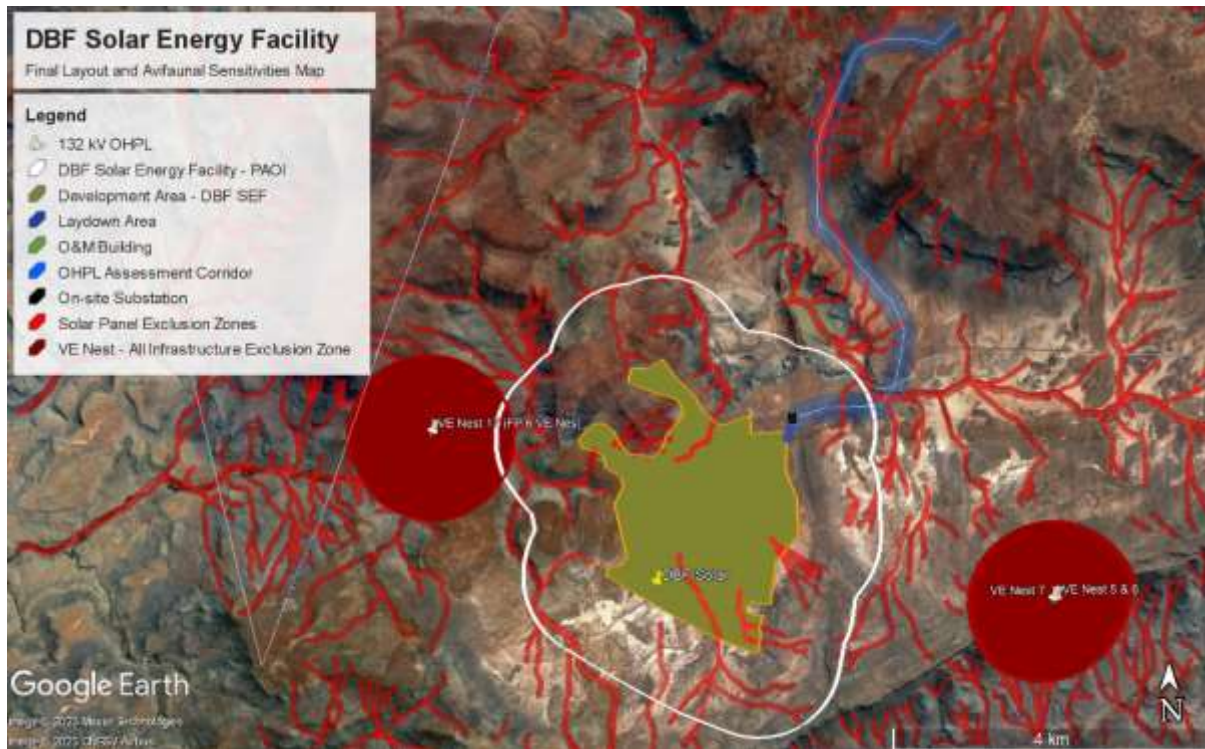


Figure 3.31: Avifaunal sensitivity zones identified for the study area based on pre-construction avifaunal monitoring data obtained (Source: Chris Van Rooyen Consulting, 2023, Appendix G.4).

3.2.9 Visual Aspects and Sensitive Receptors

The information described below is based on EIA-level inputs provided by the Visual Specialist, and the Heritage and Cultural Landscape Specialist which are included in Appendix G.5 and Appendix G.6 of this EIA Report, respectively.

The visual assessment provides information on landscape, terrain, and vegetation, as well as other aspects such as land use and sensitive receptors. As described in Section 3.2.2 of this chapter, the proposed site lies on the plateau, north of the Great Escarpment. The proposed development site itself is located at an average elevation of 1 750 m a.s.l, comprising a wide flat area surrounded by hills and drained by small watercourses.

The approach and methodology for the visual specialist study is based on the “Guideline for Involving Visual and Aesthetic Specialists in EIA Processes” (Oberholzer, 2005), and the use of a 3D digital terrain model of the study area to determine the viewshed of the proposed project, the sourcing of relevant spatial data (e.g. cadastral features, vegetation types, land use activities, topographical features, site placement), the identification of sensitive visual receptors as well as the creation of viewshed analysis from the proposed project site in order to determine the visual exposure and the topography’s potential to absorb the potential visual impact.

The assessment concluded that the viewshed, or zone of visual influence, potentially extends for some 6 km radius of the proposed development site. The greater environment has a vast,

undeveloped and rugged character with numerous mountains such as the Nuweveldberge situated south of the proposed development site. Farm residences, or homesteads, dot the landscape and are generally located at fair distances from each other (i.e. more than 5 km apart). The greater environment with its wide open, undeveloped landscapes is considered to have a high visual quality.

It should be noted that there are a very limited number of sensitive visual receptors within the viewshed of the proposed PV facility. Potential sensitive visual receptors include residents of a single homestead, Modderdrift and observers travelling along the secondary farm road.

This study area is known as a tourist destination owing to the presence of the Karoo National Park, a midway stop between Gauteng and Cape Town, as well as the small historic town of Beaufort West.

The visibility analysis undertaken in the Visual specialist assessment (Appendix G.5 of the EIA Report) found that while the proposed DBF South SEF falls within the Karoo National Park viewshed protection zone, it is not considered to be an area of high sensitivity. This is due to the location of the proposed facility on the plateau (higher lying ground), and subsequently the visual barrier created by the Nuweveldberge to the south of the proposed site that will visually screen the Karoo National Park from the proposed facility (Figure 3.32).

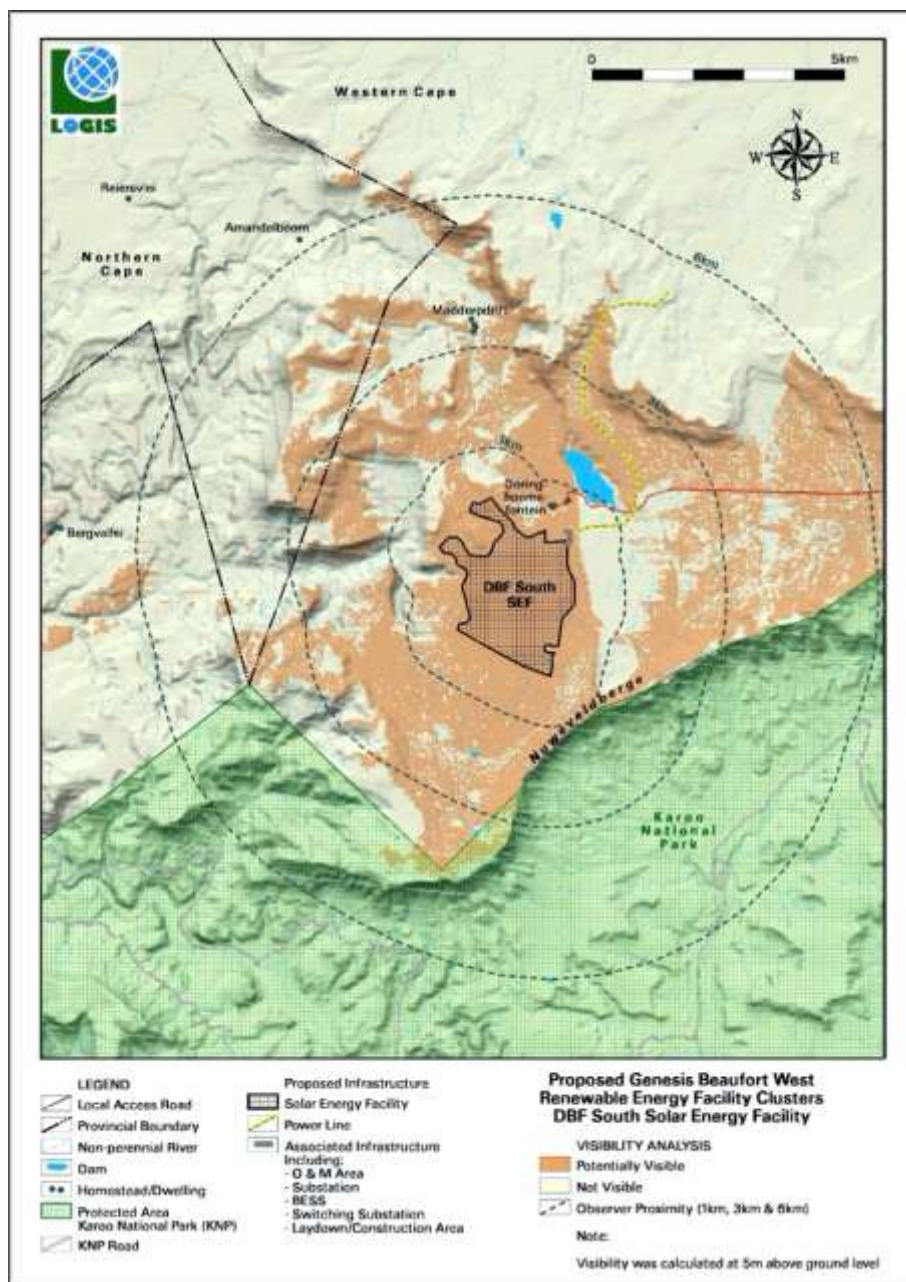


Figure 3.32: Potential visual exposure (visibility analysis) for DBF South SEF shown in relation to the northern edge of the Karoo National Park (green-shaded area). Note the line of hills (Nuweveldberge) on the boundary between the Study Area and national park which will ensure that the solar facility is not visible from the park (Source: J Gribble, 2023, Appendix G.6).

3.2.9.1 Screening Tool Descriptions and Site Sensitivity Verification

The Screening Tool “Landscape” Combined Sensitivity Map as it relates to solar energy developments in the region is reported to be Very High across the majority of the study area, where the very high sensitivities are mainly linked to slopes of more than 1:4., i.e. mountain tops and high

In terms of the SKA sensitivity distance guidelines (Table 3.12), the proposed GEED Southern Renewable Energy Cluster (inclusive the DBF South SEF) is located in a low sensitivity zone as it is more than 48 km, specifically ~171 km, away from the SKA core area (Figure 3.34). In addition, the proposed project is located outside of the Karoo Central Astronomy Advantage Area (KCAAA) (Figure 3.34). The South African Radio Astronomy Observatory (SARAO) is registered on the project I&AP database as a key stakeholder and was invited to comment on the project during the pre-application phase. During the **Scoping** Phase, SARAO responded with their findings of an assessment of the potential impact of the proposed project on the SKA radio telescopes. SARAO found that the project represents a low risk of interference to the nearest SKA radio telescope with a compliance surplus of 28.42 dBm/Hz. Accordingly, they had no objection to the proposed project. Therefore, RFI and EMI specialist studies will not be commissioned by the S&EIA project team as SARAO's assessment and findings are considered conclusive in respect of the RFI and EMI sensitivity themes. Copies of the comments received from SARAO are included in Appendix E.5 of this FSR and captured and responded to as part of the Comments and Responses Report in Appendix E.7.

Table 3.12: SKA Sensitivity distance guidelines (Source: DFFE, 2019: Part 3)

Colour	Sensitivity	Distance from SKA Facility	
		Wind	Other Solar PV
Dark Red	Very High	Less than 18 km	Less than 8 km
Red	High	Between 18 and 26 km	Between 8 and 14 km
Orange	Medium	Between 26 and 48 km	Between 14 and 32 km
Green	Low	Greater than 48 km	Greater than 32 km

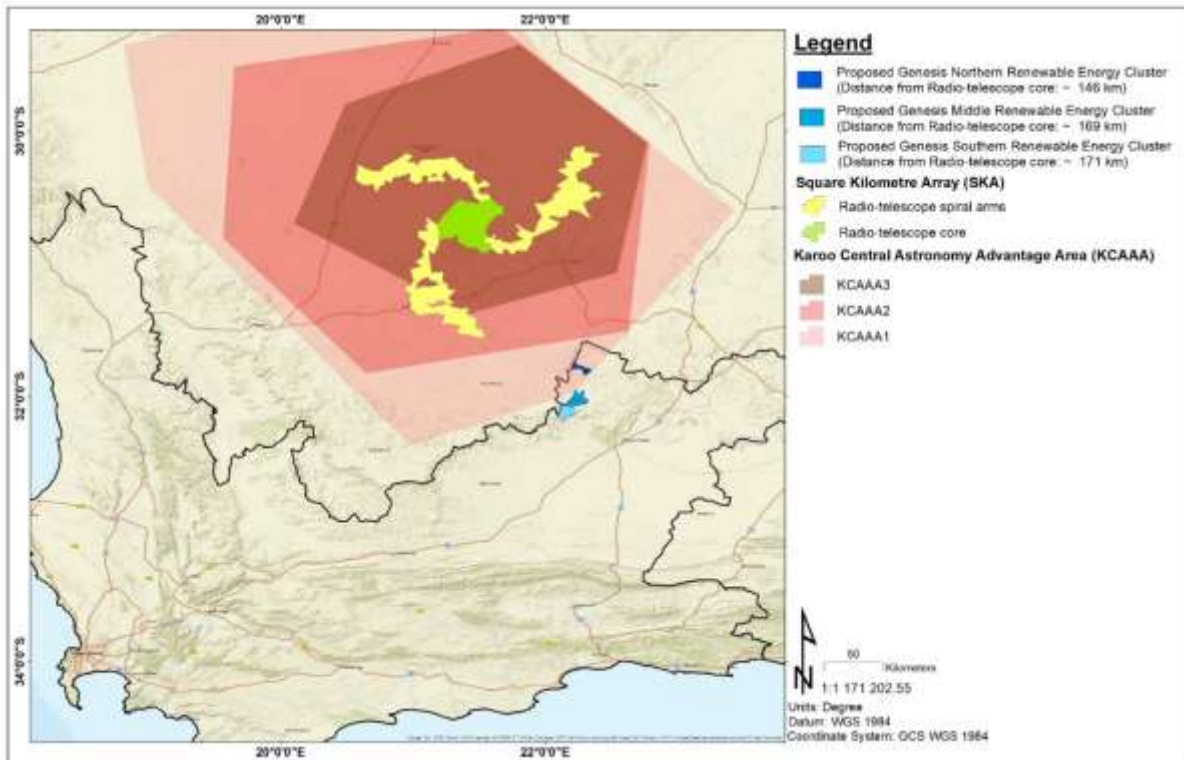


Figure 3.34: The proposed GEED Renewable Energy Clusters in relation to the Square Kilometre Array and the Karoo Central Astronomy Advantage Area.

3.2.10 Heritage: Archaeology and Cultural Landscape

The information described below is based on EIA-level inputs provided by the Heritage Specialist, and which are included in Appendix G.6 of this EIA Report. A detailed description of the archaeological features and cultural landscape within the study area is provided in the Heritage Impact Assessment (Archaeology and Cultural Landscape) included Appendix G.6 of this EIA Report.

The heritage impact assessment comprised an archaeological site visit and impact assessment of the proposed development site by ACO Associates and a palaeontological site visit and desk-based impact assessment conducted by Dr Elize Butler. As requested by Heritage Western Cape in their response to the Notice of Intent to Develop, the results of the visual impact assessment conducted by LOGIS were considered in the heritage impact assessment. The results of these studies have been integrated into the heritage impact assessment (Appendix G.6 of this EIA report) which assesses the impacts of the project on heritage resources.

The heritage impact assessment was informed by a high-level desk-based research was conducted to gather information about the heritage context of the project site and wider area. Thereafter, the DBF South SEF site was visited by John Gribble and Gail Euston-Brown of ACO Associates as part of a heritage field survey for the Beaufort West Cluster conducted on 16 and 25-27 January 2023. The site survey took place at the height of summer and although there had

been recent good rains and vegetation was thick in places, ground visibility and thus the visibility of archaeological material was generally good. A ten-day palaeontological field survey of the Beaufort West Cluster was conducted by Dr Butler in January 2023 during which the DBF South SEF project footprint was visited.

According to the Heritage Specialist, it is intended under Section 7(2) of the National Heritage Resources Act (Act 25 of 1999) (NHRA) that the various provincial authorities formulate a system for the further detailed grading of heritage resources of local significance. During the heritage site survey, the specialists identified several heritage resources within the study area; these include Middle Stone Age lithics and an Earlier Stone Age core, and historical buildings of the Doringboomfontein farmstead. Two historical graveyards were recorded in the study area. A small graveyard consisting of at least six marked graves located was recorded adjacent to the farm road, east of the current Doringboomfontein farm complex. The second, a small formal (walled in) graveyard is located approximately 250 m north of the Doringboomfontein farmstead. However, both these historical graveyards are outside the development area and will not be impacted by the proposed SEF. The Heritage Specialist conclude that although several archaeological and historical era heritage sites were recorded in the study area these are of low heritage significance (Grade: 3C) according to the grading system developed by Heritage Western Cape (HWC) (2016).

This assessment found that the area identified for the proposed DBF South SEF is a heritage environment of variable sensitivity but that significant impacts on heritage resources arising from the construction of the project are unlikely. . The landscape has a relatively low cultural significance.

3.2.10.1 Screening Tool Descriptions and Site Sensitivity Verification

Figure 3.35 indicates the archaeological and heritage sensitivity as assigned by the Screening Tool for the study area. The overall heritage sensitivity of the study area, as per the Screening Tool, is low with no sites of any significance marked on the map shown. The site survey by the specialist showed that much of the study area is indeed of low sensitivity, although few archaeological sites and materials or other cultural heritage resources were found in the study area. These are places where archaeological and other heritage resources were found, but these resources are graded as 3C for low/local significance.

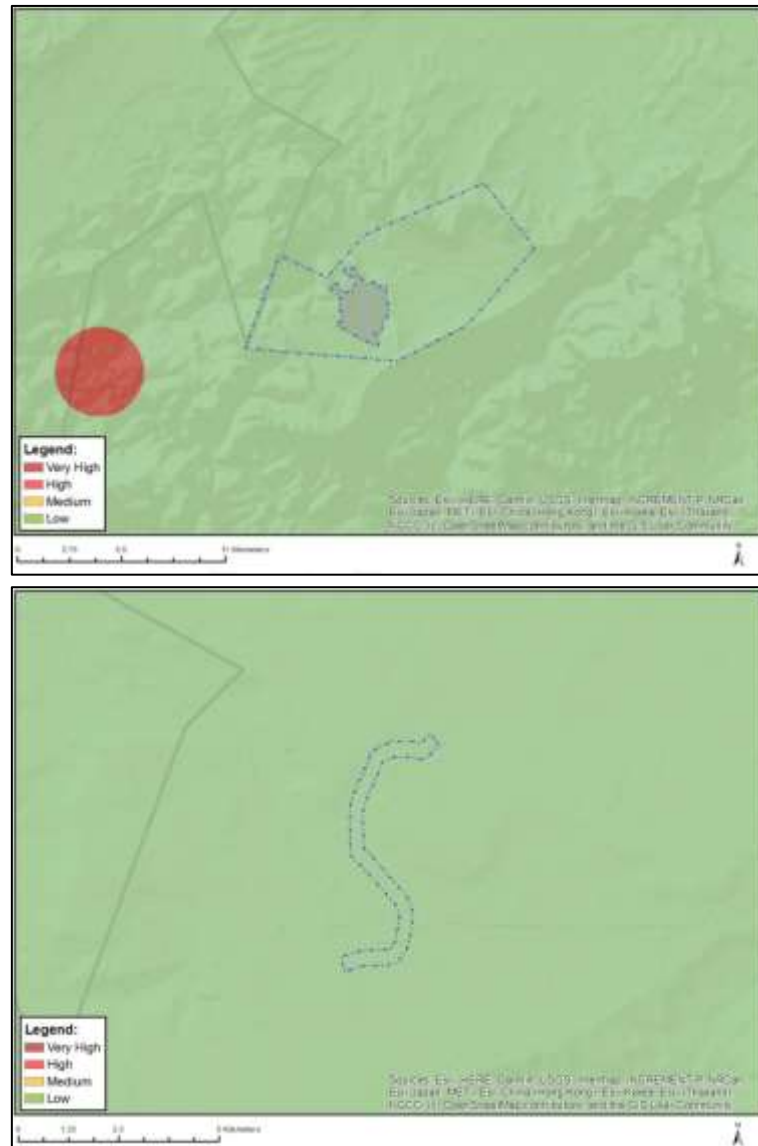


Figure 3.35: Archaeology and Cultural Heritage Combined Sensitivity of the proposed development footprint for the DBF South SEF (top) and associated 132 kV power line corridor (bottom) based on the Screening Tool (Source: Screening Tool, 2023).

3.2.11 Palaeontology

The information described below is based on the Palaeontology Impact Assessment, which is included in Appendix G.7 of this EIA Report.

The proposed DBF South SEF is located on the Swartrug plateau. Most of the proposed development site and the grid infrastructure and roads on the plains of the central portion of the development are underlain by the Middle to Late Permian Teekloof Formation (Adelaide Subgroup, Beaufort Group). These potential fossiliferous sedimentary bedrocks have often been thermally metamorphized by overlying dolerite sills compromising their palaeontological sensitivity. Overlying these sediments are Caenozoic superficial sediments. According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) and the DFFE Screening Tool the Palaeontological Sensitivity of the Teekloof Formation of the Adelaide Subgroup is Very High attributed to the rich Permian fossil assemblages from the lower Beaufort Group in the Karoo Basin. The south-eastern portion of the site is located on Jurassic dolerite that is rated as Zero/unfossiliferous as it is igneous in origin.

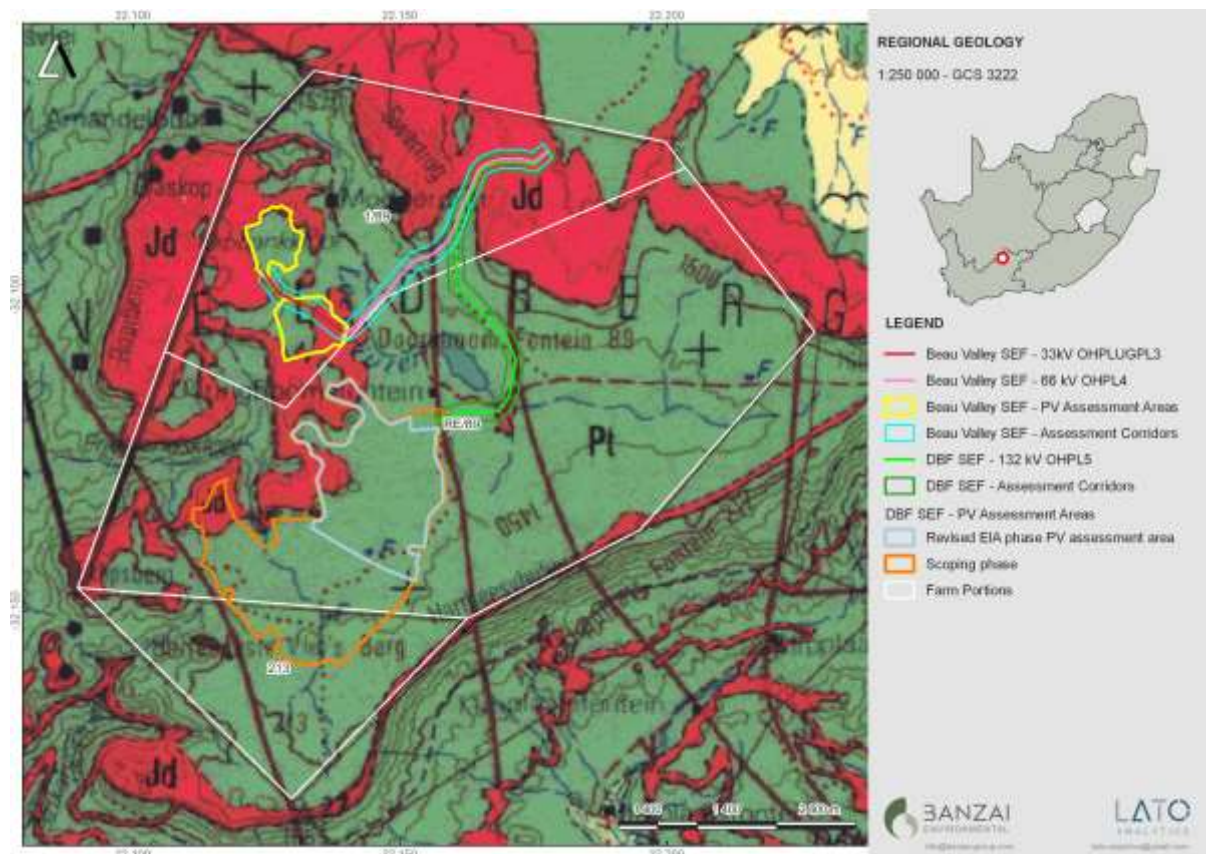


Figure 3.36: Extract of the 1: 250 000 SAHRIS PalaeoMap map (Council of Geosciences) indicating the study area (E Butler, 2023, Appendix G.7).

A ten day-comprehensive site-specific field survey of the development footprint for the combined GEED Renewable Energy Cluster was conducted on foot and motor vehicle in January 2023. Although a few fossiliferous sites were identified in the proposed footprint of the GEED Renewable

Energy Cluster, no fossils were recovered from the DBF South SEF footprint. This could be attributed to the following:

- extensive dolerite intrusions that metamorphized potentially fossiliferous Beaufort sediments,
- low relief of the central development area,
- poor bedrock exposure, and
- relative unfossiliferous superficial sediments.

However, it must be emphasised that the presence of well-preserved fossils is not ruled out.

Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the DBF South SEF footprint is relatively rare. This is in contrast with the High Sensitivity allocated to the development area by the SAHRIS Palaeosensitivity Map and DFFE Screening Tool. A low Palaeontological Significance has been allocated for the construction phase of the SEF development pre-mitigation and a very low significance post mitigation. The construction phase will be the only development phase impacting Palaeontological Heritage and no significant impacts are expected to impact the Operational and Decommissioning phases.

3.2.11.1 Screening Tool Descriptions and Site Sensitivity Verification

According to the Screening Tool, the study area has a Very High palaeontological sensitivity (Figure 3.37). The SAHRIS PalaeoMap indicates that the Palaeontological Sensitivity of the proposed development is underlain by sediments with a Zero to Very High (red) Palaeontological Sensitivity (Figure 3.36). The SAHRIS PalaeoMap indicates that the Palaeontological Sensitivity of the Jurassic Dolerite is Zero as it is igneous in origin and thus unfossiliferous while that of the Adelaide Subgroup is Very High. A site investigation in January of 2023, by the specialist palaeontologist, did not report any fossiliferous outcrops. The Screening Tool and SAHRIS classification is thus contested as far as the impact of the DBF South SEF is concerned, based on actual conditions recorded on the ground during the site survey.

However, it must be emphasised that the presence of well-preserved fossils is not ruled out. Therefore, if any fossiliferous deposits are exposed by surface clearance or excavations during the construction phase of the development, the Chance Fossils Finds Protocol (included in Appendix G.7 of the EIA Report) should be fully implemented. These mitigation measures have been translated into EMPr for the proposed project, included in Appendix H of this EIA Report.

Therefore, the project area for the solar PV facilities, on-site substations, grid connection corridors and associated infrastructure are of low palaeo-sensitivity.

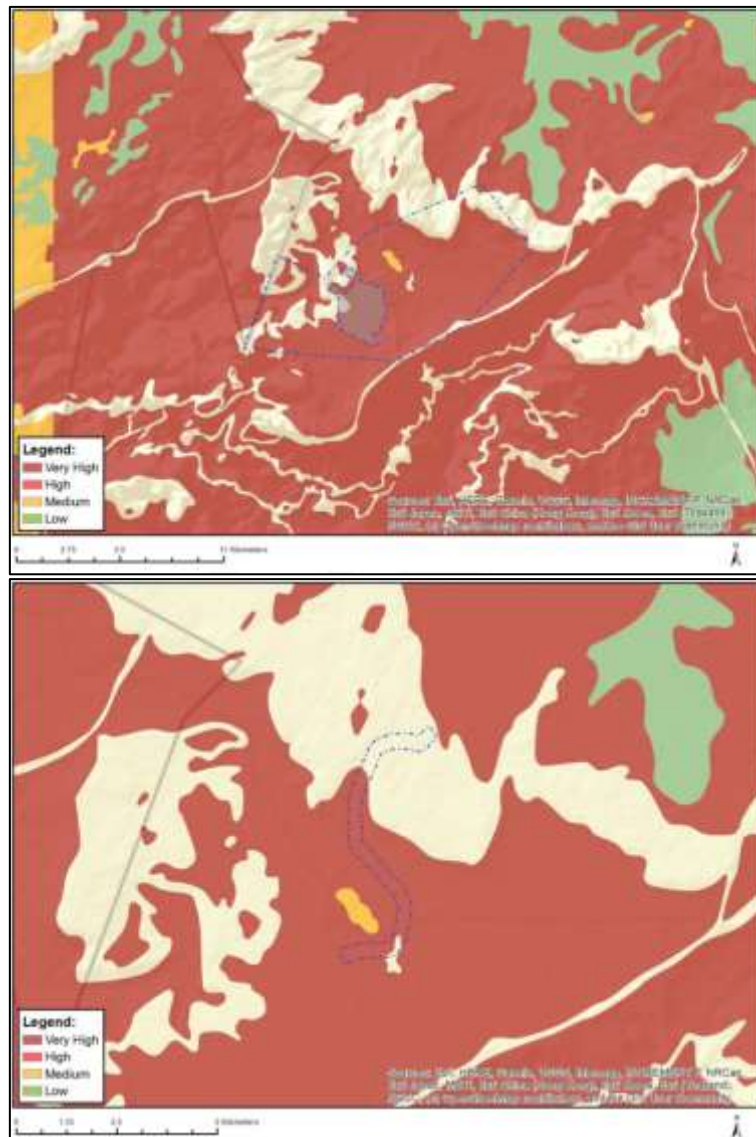


Figure 3.37: Palaeontology sensitivity of the proposed development footprint for the DBF South SEF (top) and associated 132 kV power line corridor (bottom) based on the Screening Tool (Source: Screening Tool, 2023)

3.3 Socio-Economic Environment

The available data used to compile the socio-economic baseline for the Beaufort West Local Municipality (BWLM) and the Central Karoo District Municipality (CKDM), although not exhaustive, is interpreted in terms of professional opinion and is indicative of generally accepted trends within the Western Cape Province and the broader South Africa.

The information described below is based on EIA-level inputs provided by the Socio-Economic Specialist, which are included in Appendix G.8 of this EIA Report, as well as a review of various planning documents such as IDPs and SDFs.

3.3.1 Regional Context – Central Karoo District Municipality

The Central Karoo DM is situated in the north-eastern part of the Western Cape and comprises the Laingsburg, Prince Albert and BWLMs. It is the largest District in the Western Cape Province, covering 38 854 km², or 27.7% of the provincial area, and had a population of 75 673 in 2021 (Appendix G.8). The Central Karoo DM is predominantly rural, with discrete development areas (“service centres”) which include Beaufort West, Prince Albert, Laingsburg and Murraysburg.

3.3.1.1 Demographics

The CKDM population increased by 4.4% between 2011 and 2016, less than the 6.6% increase in the overall Western Cape population. The CKDM is the most sparsely populated District in the Western Cape, with only ~2 people / km², and accounts for less than 10% of the Western Cape population. The DM population is expected to increase annually by 0.8% from 2022 to 2026, well below the anticipated provincial population annual growth of 1.7% (Appendix G.8).

Beaufort West is the largest and most populous LM in the District; it covers 21 916 km², equivalent to 56 % of the total CKDM geographical area and had 51 556 residents in 2021, equivalent to 67% of the District population (Table 3.13).

Table 3.13: Populations in the Central Karoo DM (Source: Appendix G.8 of the EIA Report)

Municipality	2011	2016	2021	2022*	2023*	2024*
Laingsburg	8 289	8 895	9 338	9 421	9 528	9 635
Prince Albert	13 136	14 272	14 770	14 894	15 071	12 229
Beaufort West	49 586	51 080	51 556	51 582	51 814	52 000
Central Karoo DM	71 011	74 274	75 673	75 897	76 413	76 863

Note: * Population forecast

Of the Central Karoo DM population, 32% are youth (15-34), slightly lower than the national figure (36%). Children under 14 constitute 29% of the District's population. The average household size was 3.9 people in 2021. Each 100 working-age persons on average support 63 dependents, higher than the provincial ratio (45 dependents per 100 working-age persons) (Appendix G.8).

3.3.1.2 Economy

The CKDM economy is dominated by the tertiary sector (services), which accounted for 74.7% of the Regional Gross Domestic Product (GDPR) in 2020, followed by the primary sector (agriculture and mining) with 15% (see Figure 3.38). The CKDM tertiary sector includes general government (21% of overall GDPR), community services (18%), finance (13%), trade (12%) and transport (10%). The regional economy thus strongly depends on the public rather than the private sector, and on agriculture (14% of DM GDPR, compared to only 4.2% of provincial GDPR). Recent droughts have hindered agricultural productivity and thus economic growth in the region, while the less important mining sector also contracted by 14% in 2021. The DM economy shrank by 0.6% in 2021 (compared to a provincial contraction of 0.4%) due to the compounding effects of drought,

load-shedding, national recession, inflation and the Covid-19 pandemic (which also caused a decline in tourism). With a GDP of R3.5 billion in 2021 the CKDM contributed only 0.5% to the Western Cape economy (Appendix G.8).

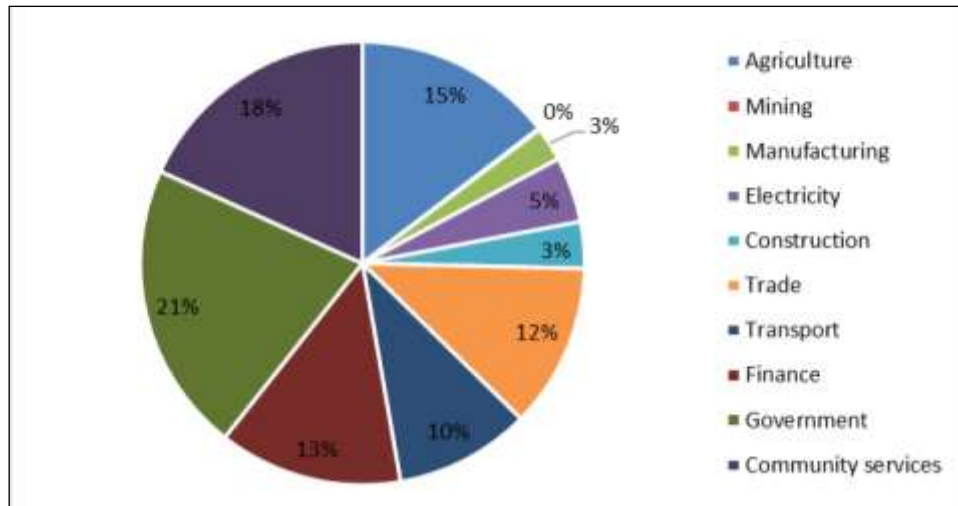


Figure 3.38: Sectoral contribution to Central Karoo DM GDP, 2020 (Source: Appendix G.8 of the EIA Report)

The agricultural sector generates approximately 25% of all employment opportunities in the District (compared to only 10% in the Western Cape), far above its relative contribution to DM GDP. Agricultural jobs are typically low-skilled and low-income opportunities, which limits earning potential but provides opportunities for unskilled labour. Other sectors that generate significant employment opportunities are within the tertiary sector, namely community services (24%), trade (21%) general government (11%) and finance (9%), also typically low to semiskilled. Overall, the tertiary sector generates ~70% of employment opportunities, while the secondary sector only accounts for 6.6% of employment opportunities, with contributions from construction (5%) and manufacturing (1.5%) (see Figure 3.39) (Appendix G.8).

The CKDM had 17 748 formal employment opportunities in 2020, of which 20% were skilled, 43% were semi-skilled and 37% were low skilled, which mirrors the sectors that generate most employment. Informal employment was estimated at 4 180 opportunities in 2020. BWLM accounts for 64.7% of employment in the Central Karoo District in 2021, followed by Prince Albert (20.1%) and Laingsburg LMs (15.2%) (Appendix G.8).

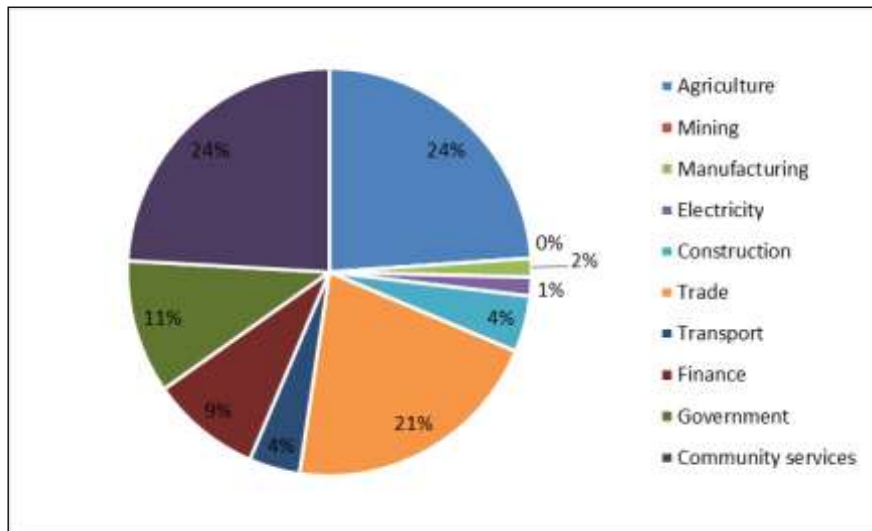


Figure 3.39: Sectoral employment in the Central Karoo DM – (2020) (Source: Appendix G.8 of the EIA Report)

3.3.1.3 Social Characteristics

The official unemployment rate in the Central Karoo was 22.7% in 2020, slightly above that of the Western Cape at 21%. Only half of the Central Karoo DM's working age population (aged 15 to 64) is economically active (part of the labour force), which is much lower than the provincial rate (62%). Unemployment is highest in the BWLM at 25%, with lower rates in Prince Albert (18%) and Laingsburg LMs (17%) (CKDM DDM, 2021 cited in Appendix G.8).

Not surprisingly, given the economic characteristics of the District, 63% of households fell within the low income bracket in 2016, with 4.7% of households in the high income bracket (CKDM SDF, 2019 cited in Appendix G.8). Approximately 8.5% of households did not have an income in 2016 (CKDM SDF, 2019 cited in Appendix G.8). Social grants remain a significant source of income for households, particularly in rural areas. More than 64% of the Central Karoo DM population depended on grants in 2020 (CKDM IDP, 2020; CKDM DDM, 2021 cited in Appendix G.8).

Approximately half the population lives below the Upper-Bound Poverty Line¹¹ (see Figure 3.40), and more than 80% of Central Karoo DM households earn less than the South African monthly household average income of R11 514 (CKDM DDM, 2021 cited in Appendix G.8). The percentage of people living in poverty slightly decreased between 2009 and 2019 (CKDM DDM, 2021 cited in Appendix G.8).

In 2016, the Central Karoo DM had 29 schools and 14 333 learners (CKDM DDM, 2021 cited in Appendix G.8). For every 32 learners there is one teacher in the region. Approximately 38% of children drop out of school before completing grade 12.

¹¹ The national poverty lines based on April 2020 prices were (StatsSA, 2020):

- Food Poverty Line: R585 monthly income (amount required to purchase minimum energy intake)
- Lower-Bound Poverty Line: R840 (must choose between food and important non-food items)
- Upper-Bound Poverty Line: R1 268 (cannot afford minimum lifestyle desired by most South Africans)

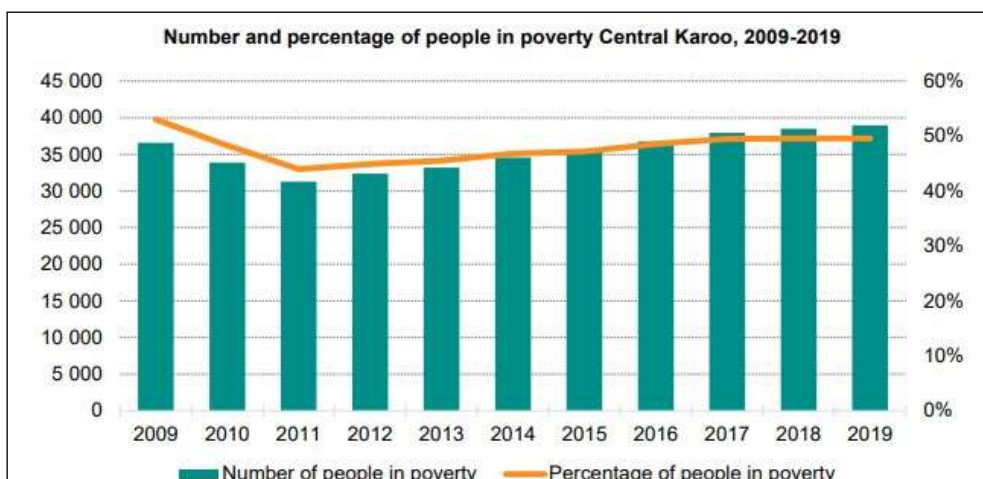


Figure 3.40 Poverty rate for Central Karoo DM between 2009 and 2019 (Source: Appendix G.8 of the EIA Report)

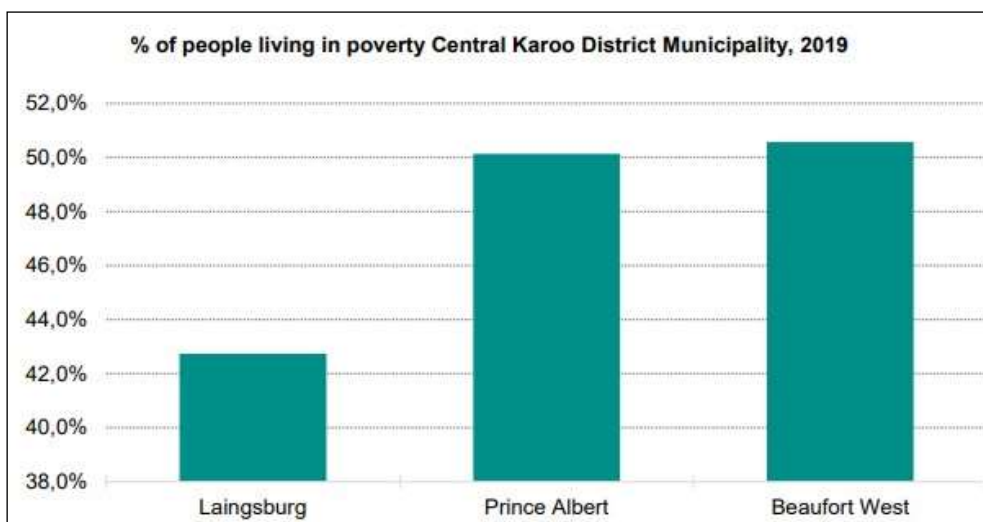


Figure 3.41: Poverty rate for LMs in Central Karoo DM in 2019 (Source: Appendix G.8 of the EIA Report)

The Central Karoo DM is serviced by six hospitals, nine primary health care facilities and 26 clinics (SEP, 2021 cited in Appendix G.8). Just over 2 000 people receive antiretroviral treatment (ART) for the Human Immunodeficiency Virus (HIV) in the Central Karoo DM, with a slight downward trend. HIV incidence is 2.7% (CKDM DDM, 2021 cited in Appendix G.8).

In 2016, approximately 97% of households had formal housing, 2% resided in traditional housing while 0.5% resided in informal dwellings. Some 76% of households had piped water inside their dwelling (CKDM DDM, 2021 cited in Appendix G.8).

Crime rates and sexual offences recorded in the Central Karoo DM declined in recent years, but drug related crime, driving under the influence of drugs or alcohol and residential burglaries remains higher than provincial averages.

3.3.2 Local Context – Beaufort West Local Municipality

BWLM is the largest municipality in the Central Karoo DM, accounting for 56.4% of the District area (21 916 km²) and is the economic and administrative centre of the CKDM (CKDM DDM, 2021 cited in Appendix G.8). The BWLM is divided into four wards – the project lies on the northern boundary of the large and rural Ward 7.

3.3.2.1 Demographics

The BWLM accommodates 68% of the Central Karoo DM population and recorded a very low annual growth rate of 0.4% (SEP, 2021 cited in Appendix G.8).

The population density in the BWLM is 2 people/km², similar to the District average of ~2 people/km² (Wazimap, 2023 cited in Appendix G.8) whereas Ward 7 has a lower population density of ~1.3 people/km² and 10 377 residents, reflecting the predominantly rural nature of the project area (Wazimap, 2023 cited in Appendix G.8). The average household size in the BWLM is 3.9 in 2021.

The age distribution and ethnic composition of the municipality's population are similar to that in the District population.

3.3.2.2 Education

Education levels are low in the BWLM. Approximately 32% of the population completed secondary education (matric) in 2016, while another 39% obtained at least some secondary education (see Figure 3.42). A sizable share of the population (5%) had received no schooling, and 12% only had primary education. Less than 3% of the population had any form of tertiary education (Wazimap, 2023 cited in Appendix G.8).

The percentage of the population who completed matric increased from 24% in 2011 to 35.5% in 2016, while learner enrolment increased marginally between 2018 and 2020 (SEP, 2021 cited in Appendix G.8) (Wazimap, 2023 cited in Appendix G.8), indicating that education levels are improving. BWLM had 18 public schools, 14 of which are no-fee schools. Some 11 300 learners were enrolled in school in 2020 (equivalent to 61% of all residents 18 years and younger) (SEP, 2021 cited in Appendix G.8).

Only 28% of households in the BWLM have access to the internet, suggesting limited opportunities to participate in today's increasingly online world and associated educational and employment opportunities (Wazimap, 2023 cited in Appendix G.8).

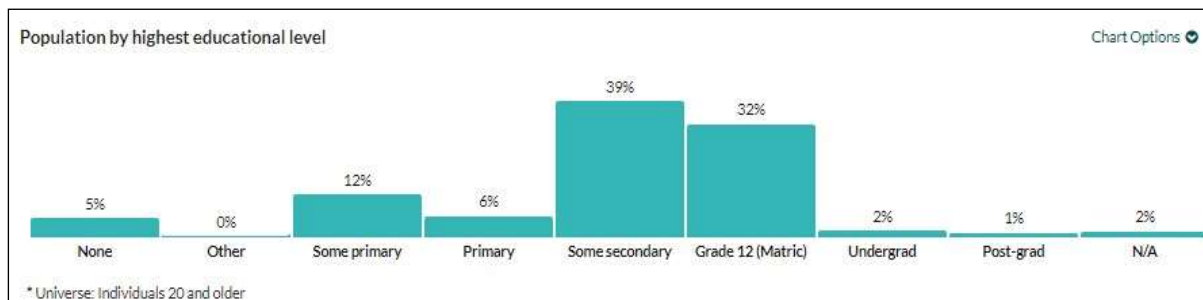


Figure 3.42: Education levels in the BWLM, 2016
(Source: Appendix G.8 of the EIA Report)

3.3.2.3 Economy

The BWLM economy is the economic hub of the Central Karoo and contributed 69.7% (or ~R2.4 billion) to the District GDP (MERO, 2022 cited in Appendix G.8).

Municipal GDP growth rates were positive but low and below the District rates between 2011 and 2018 and turned negative in 2019, reflecting a range of challenges such as drought, loadshedding and the COVID-19 pandemic (see Figure 3.43). Economic conditions are expected to remain difficult.

GDP per capita growth was positive in all years except 2020 (see Figure 3.44). Growth declined over most of the period but was nevertheless significantly higher than GDP growth, implying that the population grew slower than the economy, as evidenced by the very low annual growth rate of 0.4 %, likely through emigration from the region.

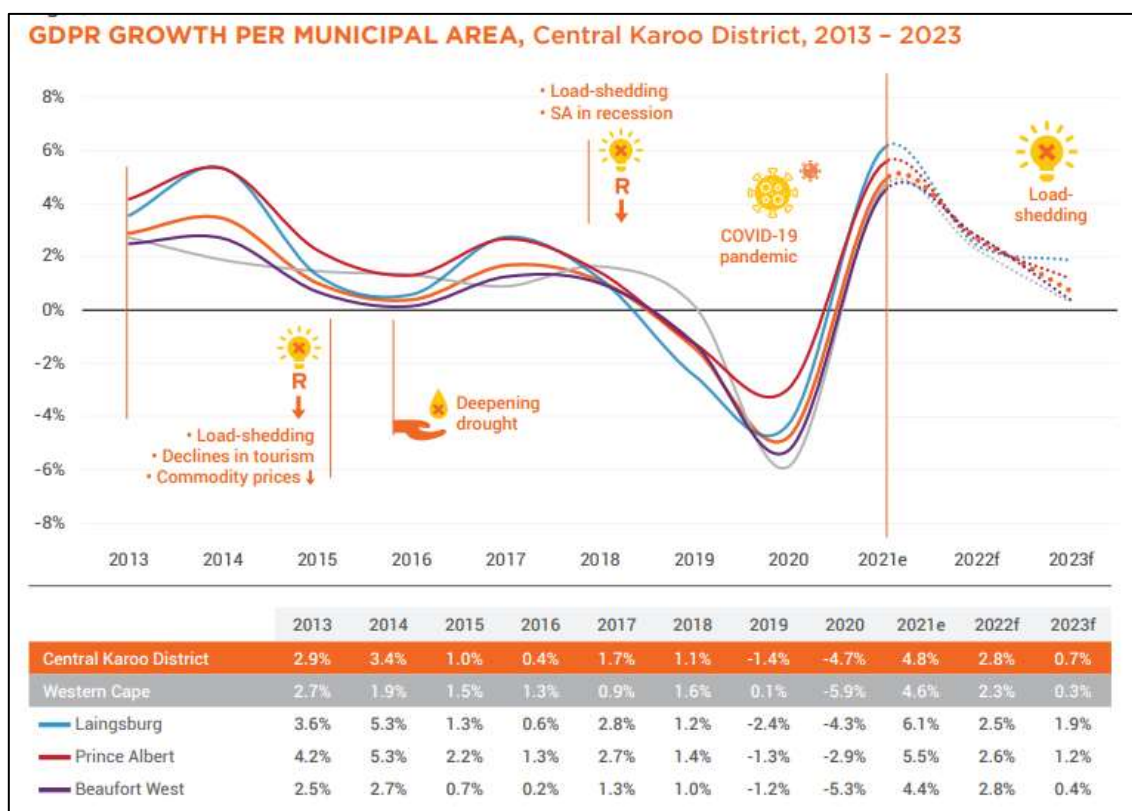


Figure 3.43: GDPR growth in the BWLM, Central Karoo DM and Western Cape (Source: Appendix G.8 of the EIA Report)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021e
Central Karoo District	9.6%	8.1%	7.8%	8.1%	8.6%	8.2%	4.3%	2.8%	1.0%	0.8%	8.3%
Western Cape	5.6%	4.7%	6.3%	5.2%	5.6%	5.8%	4.5%	2.6%	2.1%	-3.9%	8.1%
Laingsburg	10.9%	9.0%	7.7%	9.9%	9.4%	10.1%	3.6%	2.1%	-0.5%	3.6%	8.6%
Prince Albert	9.7%	8.1%	7.8%	9.3%	9.1%	9.9%	4.4%	2.8%	0.6%	2.7%	8.7%
Beaufort West	9.3%	7.9%	7.8%	7.6%	8.3%	7.4%	4.4%	3.0%	1.4%	-0.1%	8.2%

Source: Quantec Research, 2022 (e denotes estimate)

Figure 3.44: GDPR per capita growth (Source: Appendix G.8 of the EIA Report)

Similar to the Central Karoo DM, the tertiary sector contributed the most to municipal GDPR (~78%) in 2020 (MERO, 2022), particularly general government (21.3% of municipal GDPR), community services (17.2%), finance (11.0%), transport (11.3%) and trade (11.1%). The primary and secondary sectors, with respective contributions of 12.9% and 9.2%, are small (see Figure 3.45) (CKDM DDM, 2021 cited in Appendix G.8)

The agricultural sector is the second largest economic sector in the BWLM and despite relatively low historic growth, the sector recently benefitted from higher prices for mutton and wool (MERO, 2022 cited in Appendix G.8).

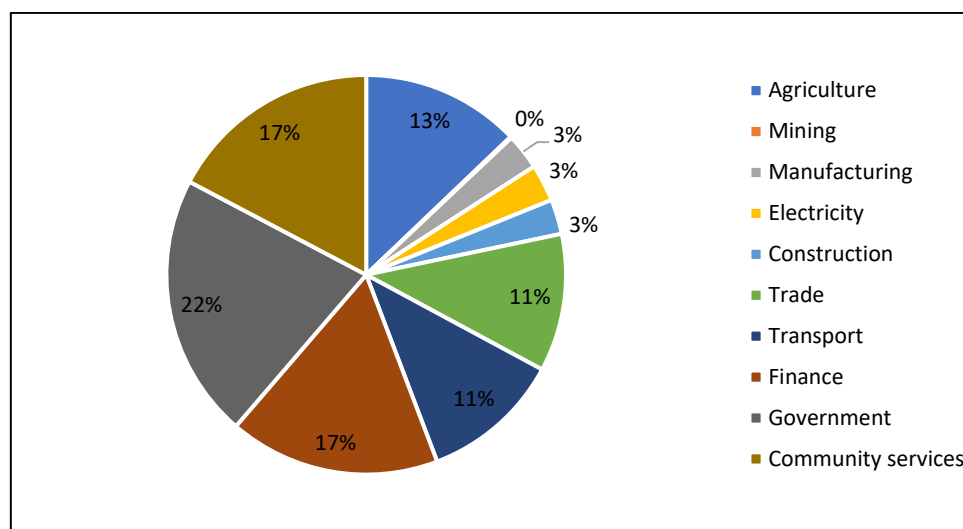


Figure 3.45 Sectoral contribution to BWLM GDP, 2020 (Source: Appendix G.8 of the EIA Report)

3.3.2.4 Employment and Income

Similar to the Central Karoo DM, the community services, trade and agricultural sectors generated most employment opportunities in the BWLM (24%, 23% and 19% respectively) (MERO, 2022 cited in Appendix G.8)).

The official unemployment rate of 23.4% in 2016 was higher than in the Central Karoo DM and the Western Cape, and decreased by one percentage point between 2016 and 2020 (see Table 3.14). The poverty rate shows a similar slowly decreasing trend as unemployment (SEP, 2021 cited in Appendix G.8).

Table 3.14: Unemployment rates for the project area and region (Source: Appendix G.8 of the EIA Report)

Area	2010	2016	2020
Beaufort West LM	24.4%	23.4%	22.4%
Central Karoo DM	23.0%	21.3%	20.3%
Western Cape	15.9%	17.7%	18.9%

More than half of people in the BWLM lived below the Upper-Boundary Poverty Line in 2019, the highest percentage within the Central Karoo DM (see Figure 3.41). A significant portion of the population is reliant on social grants. The employment characteristics in Ward 7 broadly mirror those in the LM.

Some 10% of municipal households had no income in 2011, while a further 31% of households earned less than R20 000 per annum in 2011. Household income distribution is similar in the BWLM and Central Karoo DM. The Western Cape Province has a higher percentage of higher-income households, while incomes are noticeably lower in Ward 7 (see Table 3.15).

The 2021 Gini coefficient in the BWLM (0.60) broadly aligns with the Gini coefficient of the Central Karoo DM (0.607) and the Western Cape Province (0.627) (MERO, 2022 cited in Appendix G.8).

Table 3.15: Monthly household income distribution (2011) (Source: Appendix G.8 of the EIA Report)

Monthly household income	Ward 7	BWLM	CKDM	Western Cape
R0	8%	10%	9%	14%
Under R5 000	4%	3%	3%	3%
R5 000 – R10 000	10%	6%	5%	4%
R10 000 – R20 000	23%	22%	21%	12%
R20 000 – R40 000	29%	24%	25%	18%
R40 000 – R75 000	14%	15%	16%	16%
R75 000 – R150 000	6%	9%	10%	13%
More than R150 000	4%	11%	11%	22%

3.3.2.5 Health and Community Services

The BWLM was serviced by two District hospitals and 10 primary clinics in 2019. In 2020 BWLM recorded 1 558 patients receiving antiretroviral treatment for HIV/AIDS, with a small increase in 2021 (SEP, 2021 cited in Appendix G.8).

3.3.2.6 Municipal Services

Some 85% of households in the BWLM resided in formal dwellings in 2011 while 97% resided in formal dwellings in Ward 7 (see Figure 3.46).

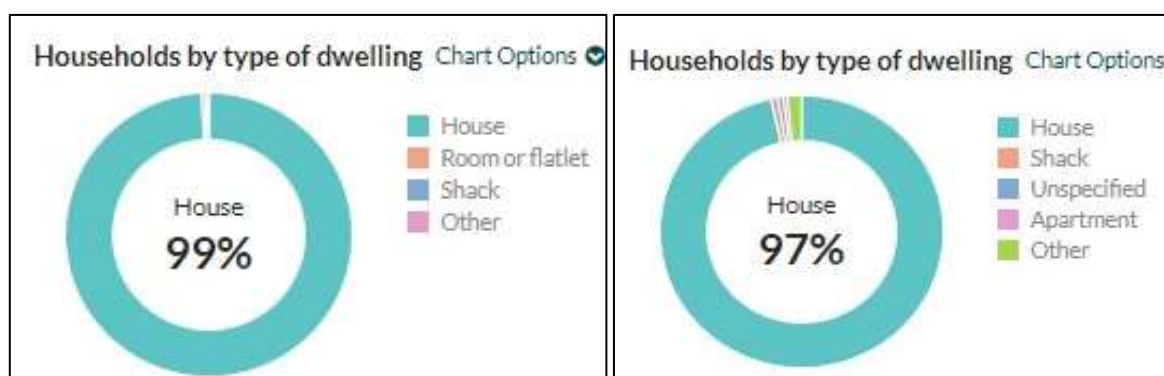


Figure 3.46: Households by type of dwelling in 2011 (left) in the BWLM and Ward 7 (Source: Appendix G.8 of the EIA Report)

Access to services is generally high in the BWLM. Not surprisingly in rural areas such as Ward 7, fewer people have access to municipal services and rely more on borehole water and own waste disposal (Table 3.16). Some 5 275 people were on the BWLM housing waiting list in 2017.

Table 3.16: Basic service delivery in Ward 7, Beaufort West and Central Karoo Municipality in 2011 (Source: Appendix G.8 of the EIA Report)

Area	Water		Toilets	Refuse Removal	
	Service Provider	Borehole	Access to flush toilet	Service Provider	Own dump
Ward 7	76%	17%	91%	80%	14%
Beaufort West LM	95%	1%	98%	95%	3%
Central Karoo DM	94%	1%	97%	94%	4%

Overall, it is evident that the BWLM and Ward 7 have many socio-economic challenges and needs. Conditions, on average, are slightly worse than in the wider region, as evidenced by slightly lower education levels, slightly more households in the very low income bands and higher unemployment.

Ward 7 is a huge rural ward extending over more than 8 000 km² and is sparsely populated at 1.1 persons / km² in 2011. Opportunities therefore cannot be evenly distributed across the area, and averages even within Ward 7 will not appropriately reflect the situation in any one area. Unemployment figures suggest there is a ready, albeit small, pool of unskilled workers.

3.3.3 Study Area Context

The project area is remote and primarily used for small stock farming (grazing), notably sheep. Small areas are also under irrigation and produce e.g., lucerne, garlic and onions. A prolonged regional drought has significantly affected farming activities and reduced farming income. The Agricultural Compliance Statement (Appendix G.1) indicates that the proposed development offers some positive impact on agriculture by way of improved financial security for farming operations, as well as wider, societal benefits.

Very few people are employed on farms in the project area. Similarly, very few people reside permanently on the farms; those who do are primarily the landowners and their family members who have contractual agreements with the developers. Infrastructure, such as roads and communications networks, is reported to be in poor condition.

A small number of farmsteads (less than 10) and cultivated areas are located in and around the project area, primarily near ephemeral streams and farm dams. Carrying capacity, water availability and activity levels are evidently very low.

A relatively small number of other homesteads are located within ~5 km of the cluster boundaries. The nearest towns are Beaufort West (~40 km, with an estimated population of ~38 700 in 2023), Loxton (~35 km, with an estimated population of ~1 000 in 2011), Leeu Gamka (~70 km, with an estimated population of ~2 700 in 2011) and Fraserburg (~65 km, with an estimated population of ~3 000 in 2011).

3.4 Eco-Tourism Activities

The information described below is based on EIA-level inputs provided by the Visual and Socio-economic Specialists, which are included in Appendix G.5 and G.8, respectively, of this EIA Report.

This study area is known as a tourist destination owing to the presence of the Karoo National Park, a midway stop between Gauteng and Cape Town, as well as the small historic town of Beaufort West. The proposed development site is located approximately 2 km north of the Karoo National Park.

In order to avoid visual impacts on the wilderness character, experience, recreation amenity and tourism economy associated with many protected areas and tourist facilities, visual buffers are recommended to be placed around these potential sensitive receptor sites. It is recommended that large scale REF infrastructure should not be placed within the boundary of these identified or within the established buffer zones. The potential land use conflict between nature orientated tourism and the potential visual impacts associated with REFs may be mitigated to some degree by adhering to the following exclusion zone buffers:

- National Parks – 2 km buffer
- Nature Reserves – 1 km buffer
- Private reserves and game farms – 500 m buffer

A limited portion of the southern extent of the Original Scoping Phase Assessment Area is located within the 2km exclusion buffer zone for the Karoo National Park. However, the proposed site situated on the plateau (higher lying ground) and is, therefore, screened by the visual barrier created by the Nuweveldberge that visual intercepts the Karoo National Park from the proposed facility. It is highly unlikely that the proposed solar project would be visible from the Karoo National Park.

Roads (especially scenic routes) are considered potential sensitive receptors whereby the travellers may be negatively impacted on by the exposure to the GEED Renewable Energy Cluster. In order to avoid encroachment of the infrastructure on public roads (especially in natural, rural and scenic areas), and thereby reducing the potential visual impact on road users and tourists, the following buffers are recommended:

- National roads - 500m buffer
- Arterial and main roads – 350m buffer
- Secondary roads – 150m buffer

DBF South SEF is not located within the roads buffer.

3.5 Civil Aviation

The Screening Tool has indicated that the study area is of low sensitivity as it relates to Civil Aviation (Figure 3.47). The low sensitivity was verified during a site survey undertaken in August 2022, whereby no civil aviation features or installations were found within the study area. Therefore, as required by GN 320, a Civil Aviation SSV was compiled and is included in Appendix

G.13 of this EIA Report. Additionally, in line with GN 320, no further requirements are applicable i.e., a Civil Aviation Compliance Statement is not required.

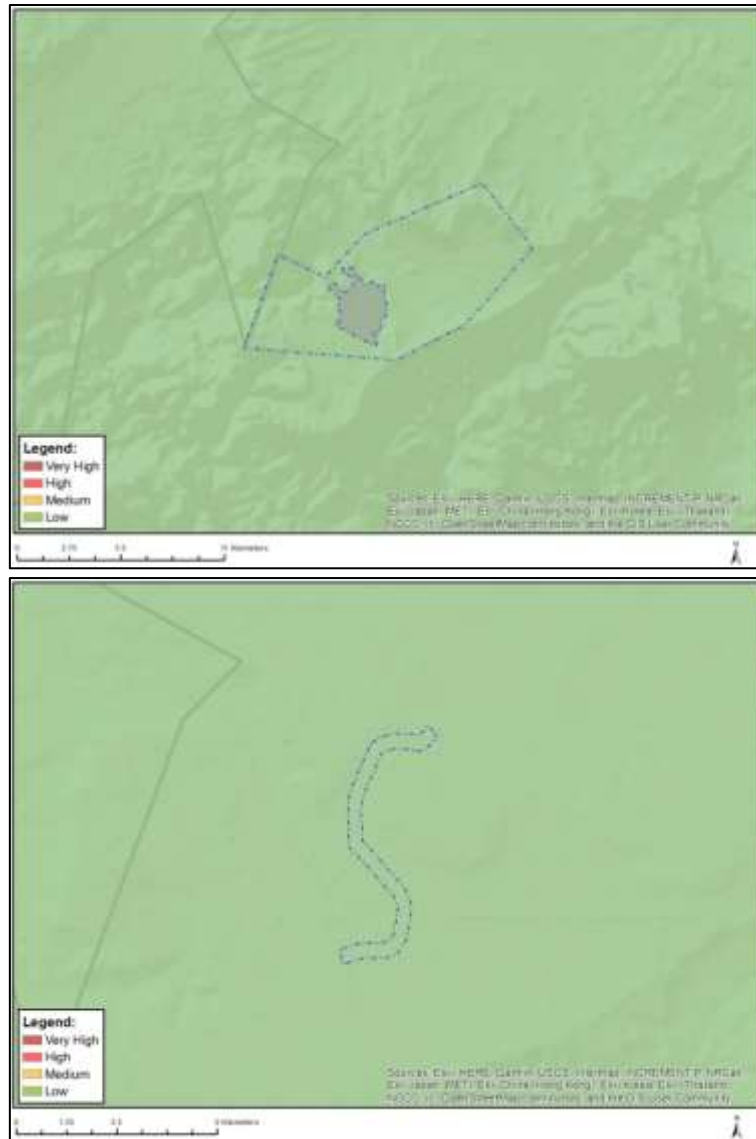


Figure 3.47: Civil Aviation sensitivity of the proposed development footprint for the DBF South SEF based (top) and associated 132 kV power line corridor (bottom) on the Screening Tool (Source: Screening Tool, 2023)

The Air Traffic and Navigation Services SOC Limited (ATNS) data has confirmed that there are two SACAA registered aerodromes within the 30 km radius of the study area. The De Panne Aerodrome (R 091) (31° 58' 45.22" S; 22° 14' 25.26" E) is located approximately 20 km northeast of the study area. The De Panne Aerodrome was not identified by the Screening Tool, thus no sensitivities have been identified. The Bergplaas Aerodrome (R 007) (32° 20' 58.47" S; 21° 59' 26.85" E) is located approximately 27 km southwest of the study area. The Bergplaas Aerodrome is indicated on the Screening Tool as medium sensitivity for solar PV developments; and high sensitivity within 8 km of the aerodrome for substation and EGI developments (based on the general methodology); however, the actual aerodrome will not be impacted on by the proposed solar facility and associated infrastructure due to its distance from the proposed project.

ATNS data further confirmed verified that a licensed aerodrome falls outside of the 30 km radius of the study area. The Karoo Gateway Aerodrome (International Civil Aviation Organisation Code: FABW) near Beaufort West is located approximately 53 km southeast of the study site.

The location of the Karoo Gateway Aerodrome, which is approximately 1.4 km long and is oriented SE to NW, is indicated on the Screening Tool as medium sensitivity for solar PV developments; and high sensitivity within 8 km of the aerodrome for substation and EGI developments (based on the general methodology); however, the actual aerodrome will not be impacted on by the proposed solar facility and associated infrastructure due to its distance from the proposed project.

In relation to Conventional Air Traffic Service (ATS) Routes, Lower ATS Routes (i.e., A405 (Upper) and A405 (Lower)), along with an Upper ATS Route (i.e., UA405 (Upper)), are located approximately 27 km north of the study area. Two Area Navigation Routes (RNAV) flank the study area 9 km to the northwest and 11 km to the southeast (at its closest points). The one directional RNAV (Z/UZ39) positioned north of the study area is associated with the TETAN waypoint and the Bloemfontein (BLV) Very High Frequency Omni-Directional Range (VOR) beacon/ Distance Measuring Equipment (DME), whereas the one directional RNAV (Z/UZ40) south of the study site is associated with the BLV VOR/DME and the ESRUK waypoint.

The proposed solar panels will have an approximate height of 3.5 m, the substation complex is estimated to extend up to 10 m from ground level with lightning masts up to 25 m, and the internal EGI will have a line height of up to 21 m. As such, the proposed solar facility and its associated infrastructure is not likely to impact negatively on airspaces, aerodromes, ATS, and RNAV Routes or any civil aviation installations/ air traffic in general. The proposed project study area was determined and verified to be of low sensitivity (as it relates to civil aviation). Figure 3.48 indicates the location of the civil aviation features noted above, which informed this Site Sensitivity Verification.

The South African Civil Aviation Authority (SACAA) and the ATNS are included as key stakeholders on the project's I&AP database and were afforded the opportunity to comment on the Scoping Report, including this Site Sensitivity Verification Report for the Civil Aviation (Solar) Theme applicable to the proposed project. Note that the SACAA did not provide comments on the Genesis DBF South SEF during the release of the DSR. However, comment was provided on the adjacent Beau Valley SEF. The SACAA stated that ATNS is responsible for Solar Obstacle Applications. The Project Applicant is aware of this and will lodge the necessary application documents for the Obstacle Application and approval with the ATNS, when required, outside of

the NEMA process. In Chapter 7, the undertaking of the Obstacle Application and obtaining of approval from ATNS will be recommended to be conditioned in the EA, should it be granted.

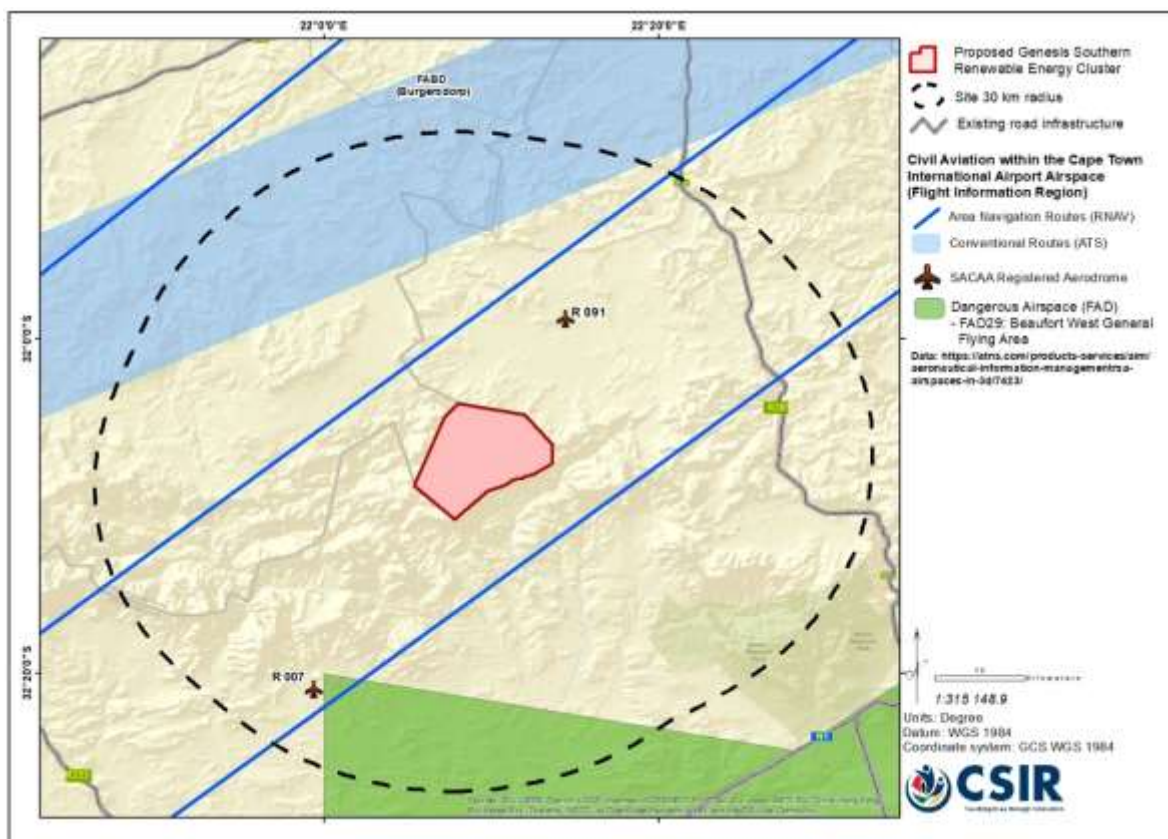


Figure 3.48: Civil Aviation features relative to the proposed project study area based on the site visit and existing databases.

3.6 Defence

The Screening Tool has indicated that the study area is of low sensitivity as it relates to Defence (Figure 3.49). The low sensitivity was verified during a site visit undertaken in August 2022, whereby no defence features or installations were found within the study area. Therefore, as required by GN 320, a Defence SSV was compiled and is included in Appendix G.14 of this EIA Report. Additionally, in line with GN R320, no further requirements are applicable i.e., a Defence Compliance Statement is not required.

The Screening Tool shows this area as low sensitivity in relation to the solar methodology and in relation to the general methodology for substations and power lines. Desktop research and the Screening Tool for solar PV methodology confirm that there are no military or defence sites within a 30 km radius of the proposed project study site. Although the Screening Tool based on the general methodology for substations and EGI indicate two military and defence sites as very high sensitivity located approximately 36 km southeast (most likely a Sentech High Power Terrestrial Broadcasting Facility or telecommunication facility) and 43 km southwest of the study area, they will not be impacted on by the proposed project due to their vast distance from the study site.

Accordingly, the proposed project study area was determined and verified to be of low sensitivity (as it relates to defence installations).

Figure 3.50 indicates the location of the defence features noted above, which informed the SSV.

The South African National Defence Force (SANDF) and Department of Defence (DoD) are included as a key stakeholder on the project I&AP database and was afforded the opportunity to comment on the DSR, including the Defence Site Sensitivity Verification Report. Note that no comments were received from the SANDF or the DoD on the DSR. This EIA Report will be made available to the SANDF and DoD for comment during the 30-day public participation period.

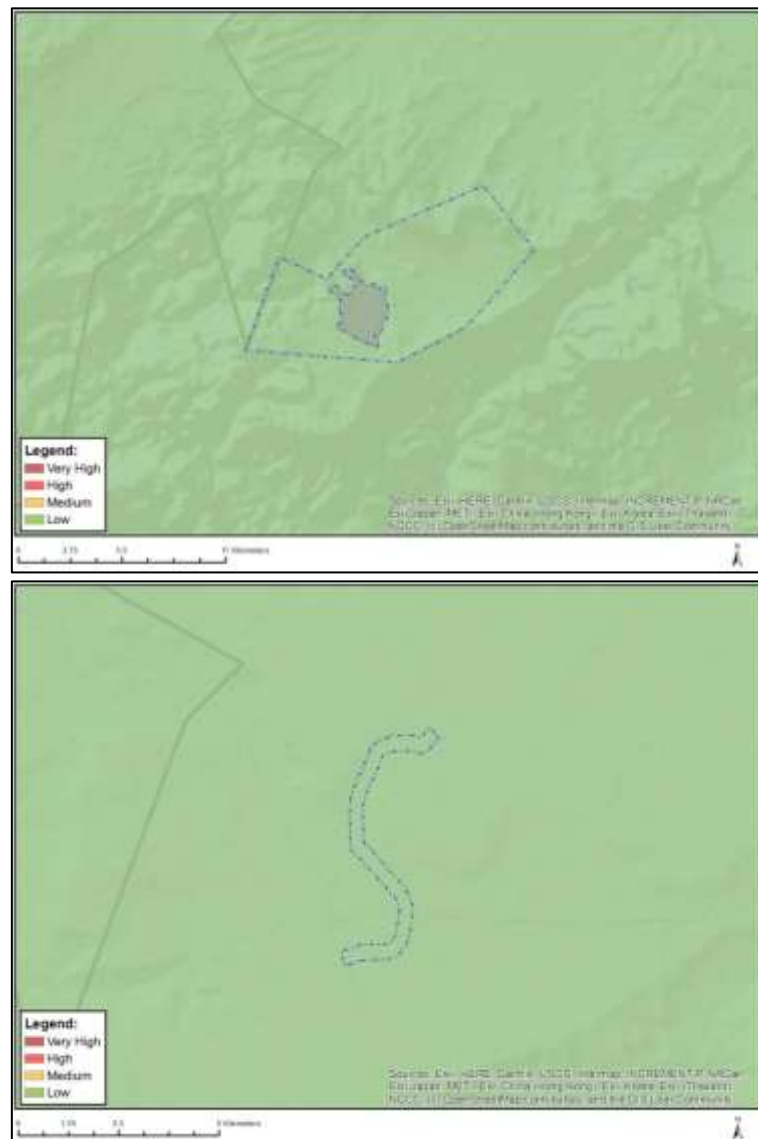


Figure 3.49: Defence sensitivity of the proposed development footprint for the DBF South SEF (top) and associated 132 kV power line corridor (bottom) based on the Screening Tool (Source: Screening Tool, 2023)

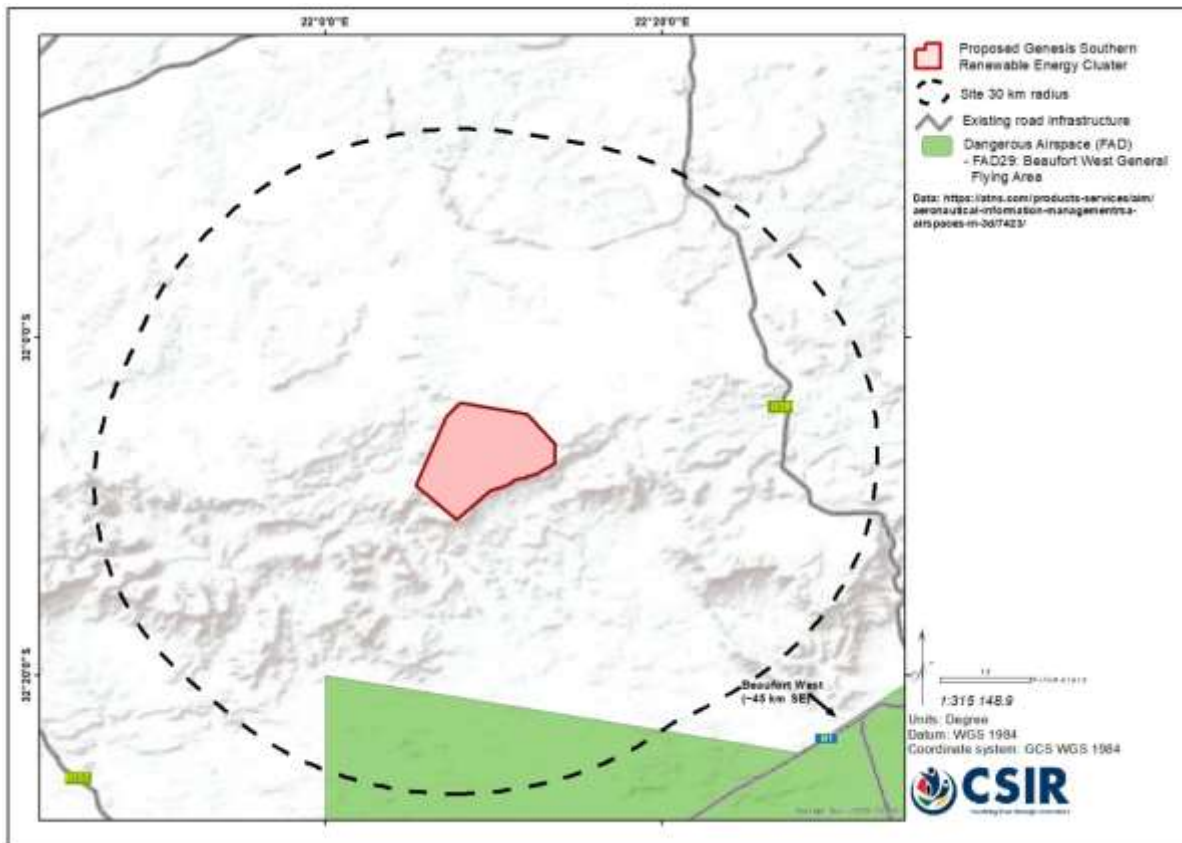


Figure 3.50: Defence features relative to the proposed project study area based on the site visit and existing databases.

Scoping and Environmental Impact Assessment for the
proposed development of the Genesis DBF South Solar
Energy Facility and associated infrastructure near
Beaufort West in the Western Cape



FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER 4: Approach to EIA and Public Participation Process



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4. APPROACH TO THE EIA PROCESS AND PUBLIC PARTICIPATION

This chapter gives particular attention to the legal context and guidelines that apply to this Environmental Impact Assessment (EIA) for the proposed Genesis DBF South Solar Energy Facility (hereafter referred to as the “DBF South SEF” or “proposed project”), and the steps in the Public Participation Process (PPP) of the EIA, in accordance with Regulations 41, 42, 43 and 44 of Government Notice (GN) R326 of the 2014 National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) EIA Regulations (as amended), and the schedule for the Scoping and EIA Process. The EIA Phase is shaped by the findings of the Scoping Process. For information from the Scoping Phase, including the approach to stakeholder engagement, identification of issues, overview of relevant legislation, and key principles and guidelines that provide the context for this EIA Process, refer to the Final Scoping Report (FSR) (CSIR, 2023¹).

4.1 Purpose of EIA and Requirements of the EIA Regulations

As captured in Section 2 of Appendix 3 of the 2014 NEMA EIA Regulations (as amended), which specifies the content requirements for EIA Reports, “the purpose of the EIA Phase is to, through a consultative process:

- Determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the accepted scoping report;
- Identify the location of the development footprint within the approved site as contemplated in the accepted scoping report based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- Determine the:
 - nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
 - degree to which these impacts: (aa) can be reversed; (bb) may cause irreplaceable loss of resources, and (cc) can be avoided, managed or mitigated;
- Identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted scoping report based on the lowest level of environmental sensitivity identified during the assessment;
- Identify, assess and rank the potential impacts that the activity will impose on the development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity;
- Identify suitable measures to avoid, manage or mitigate identified impacts; and

¹ CSIR, 2023. Scoping and Environmental Impact Assessment (EIA) Process for the proposed development of the Genesis DBF South Solar Energy Facility and associated infrastructure, near Beaufort West in the Western Cape Province. Scoping Report: CSIR/SPLA/SECO/ER/2023/0020/B.

- Identify residual risks that need to be managed and monitored.”

The EIA Phase consists of three parallel and overlapping processes:

- Central assessment process through which inputs are integrated and presented in an EIA Report that is submitted for approval to the National Department of Forestry, Fisheries and the Environment (DFFE) and other commenting authorities (Sections 7.2, 7.3 and 7.4 of this chapter);
- Undertaking of a PPP whereby findings of the EIA Phase are communicated and discussed with Interested and Affected Parties (I&APs) and responses are documented (Section 7.3 of this chapter); and
- Undertaking of specialist assessments that provide additional information or assessments required to address the issues raised in the Scoping Phase (Sections 7.5, 7.6 and 7.8 of this chapter).

The EIA process is a planning, design and decision-making tool used to demonstrate to the responsible authority, the DFFE, and the Project Applicant, what the consequences of their choices will be in biophysical, social, and economic terms. As such it identifies potential impacts (negative and positive) that the project may have on the environment. The EIA makes recommendations to mitigate negative impacts and enhance positive impacts associated with the proposed project.

4.2 Legislation, Policies and Guidelines Pertinent to this EIA

The scope and content of this EIA Report has been informed by the main legislation, policies, guidelines and information series documents described in this section. Additional information on applicable legislation is provided in the Specialist Assessments included in Appendix G of this EIA Report.

4.2.1 National Legislation

4.2.1.1 *The Constitution of the Republic of South Africa (Act 108 of 1996)*

The Constitution, which is the supreme law of the Republic of South Africa, provides the legal framework for legislation regulating environmental management in general, against the backdrop of the fundamental human rights. Section 24 of the Constitution states 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 that –
 - prevent pollution and ecological degradation;
 - promote conservation; and
 - secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”

Section 24 of the Bill of Rights therefore guarantees the people of South Africa the right to an environment that is not detrimental to human health or well-being, and specifically imposes a duty

on the State to promulgate legislation and take other steps that ensure that the right is upheld and that, among other things, ecological degradation and pollution are prevented.

In support of the above rights, the environmental management objectives of the proposed project are to protect ecologically sensitive areas and support sustainable development and the use of natural resources, whilst promoting justifiable socio-economic development in the towns nearest to the study area.

4.2.1.2 NEMA and EIA Regulations

Chapter 1, Section 2 of the NEMA sets out several principles to give guidance to developers, private landowners, members of the public and authorities. The proclamation of the NEMA gives expression to an overarching environmental law. Various mechanisms, such as cooperative environmental governance, compliance and non-compliance, enforcement, and regulating government and business impacts on the environment, underpin NEMA. NEMA, as the primary environmental legislation, is complemented by many sectoral laws governing marine living resources, mining, forestry, biodiversity, protected areas, pollution, air quality, waste and integrated coastal management. Principle number 3 determines that a development must be socially, environmentally and economically sustainable. Principle Number 4(a) states that all relevant factors must be considered, *inter alia* i) that the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied; ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied; vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised; and viii) that negative impacts on the environment and on peoples' environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.

Section 24 (1) of the NEMA, as amended states that *"In order to give effect to the general objectives of integrated environmental management laid down in this Chapter, the potential impact on the environment of listed activities must be considered, investigated, assessed and reported to the Competent Authority charged by this Act with granting the relevant EA"*. The reference to "listed activities" in Section 24 (1) of NEMA relates to the regulations promulgated in GN R982, R983, R984 and R985 in Government Gazette (GG) 38282, dated 4 December 2014, which came into effect on 8 December 2014. These were amended in GN R326, R327, R325 and R324 in GG 40772, dated 7 April 2017. GN R326 contains the regulations for the Environmental Assessment Process. GN R327 and GN R324 includes listed activities that trigger the need for a Basic Assessment (BA) Process, whereas GN R325 includes listed activities that trigger the need for a full Scoping and EIA Process.

The 2014 NEMA EIA Regulations (as amended) were further amended as follows:

- GG 41766, GN 706 on 13 July 2018;
- GG 43358, GN 599 on 29 May 2020;
- GG 44701, GN 517 on 11 June 2021; and
- GG 45999, GN 1816 on 3 March 2022.

Based on the transitional arrangements, these amendments (where they have been commenced with) apply to the proposed project as the Application for Environmental Authorisation (EA) was

not submitted before the above amendments took effect (where relevant). The relevant amendments have been taken into consideration in this Scoping and EIA Process.

In terms of the NEMA and the 2014 NEMA EIA Regulations (as amended), a Scoping and EIA Process is required for the proposed development of the project and associated infrastructure. Refer to Section 4.2 of this chapter for additional information on the 2014 NEMA EIA Regulations (as amended).

4.2.1.3 GN 960 (published 5 July 2019)

GN 960 was published on 5 July 2019 and came into effect for compulsory use of the National Web Based Environmental Screening Tool (hereafter referred to as the Screening Tool) from 4 October 2019. The notice outlines the requirement to submit a report generated by the Screening Tool, in terms of Section 24(5)(h) of the NEMA and Regulation 16(1)(b)(v) of the 2014 NEMA EIA Regulations (as amended), when submitting an Application for EA in terms of Regulations 19 and 21 of the 2014 NEMA EIA Regulations (as amended). As such, the Application for EA for the proposed project has been run through the Screening Tool, and the associated reports generated and attached to the Application for EA, which is being submitted to the Department of Forestry, Fisheries and the Environment (DFFE) with the Scoping Report. In addition, the findings of the Screening Tool Report are discussed in the Scoping Level Specialist Assessments included in Appendix G of this Scoping Report, as well as Chapters 3 and 4 of this Scoping Report. The Screening Tool Reports are also included in Appendix J of this report.

4.2.1.4 GN 320 (published 20 March 2020)

GN 320 prescribes the general requirements for undertaking site sensitivity verifications and protocols for the assessment and minimum report content requirements for identified environmental impacts for environmental themes in terms of Sections 24(5)(a) and (h) and 44 of NEMA, when applying for EA. The protocols were enforced within a period of 50 days of publication of the notice i.e., on 9 May 2020.

The Specialist Assessments undertaken as part of this Scoping and EIA Process will comply with GN 320, where applicable, specifically Agriculture, Terrestrial Biodiversity, and Aquatic Biodiversity. Some of the remaining specialist assessments will comply with Appendix 6 of the 2014 NEMA EIA Regulations (as amended), and where relevant, Part A of GN 320 which contains site sensitivity verification requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed. This specifically applies to the Visual; Heritage (Archaeology and Cultural Heritage); Palaeontology; Socio-Economic; Traffic; Geohydrology; and Geotechnical Assessments. However, in some instances there are no themes on the Screening Tool that relate to some of these studies and as such sensitivities cannot be verified against the Screening Tool. More information in this regard is included in Appendix G of this Scoping Report. Some of the specialist assessments will comply with the Assessment Protocols published in GN R1150 on 30 October 2020, specifically Terrestrial Biodiversity and Species and Avifauna (as described below). The Battery Energy Storage System (BESS) High Level Safety, Health and Environment Risk Assessment will serve as a technical report, and the aforementioned legislation will thus not be applicable.

The site sensitivity verifications for Civil Aviation and Defence will also comply with GN 320. Additional detail on Civil Aviation and Defence is included in Appendix G.13 and Appendix G.14 respectively of this Scoping Report.

4.2.1.5 GN 1150 (published on 30 October 2020)

GN 1150 prescribes procedures and protocols in respect of specific environmental themes for the assessment of, as well as the minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the NEMA, when applying for EA. GN 1150 includes a protocol for the specialist assessment and minimum report content requirements for environmental impacts on a) terrestrial animal species and b) terrestrial plant species. The requirements of these protocols apply from the date of publication (i.e., from 30 October 2020), except where the Project Applicant provides proof to the Competent Authority that the specialist assessment affected by these protocols had been commissioned prior to the date of publication of these protocols in the GG, in which case Appendix 6 of the 2014 NEMA EIA Regulations (as amended) will apply to such applications.

The Terrestrial Biodiversity and Species Assessment that is being undertaken as part of this Scoping and EIA Process was commissioned following the publication date of the Species Protocols. Therefore, the Terrestrial Animal and Plant Species components will be undertaken in compliance with GN 1150. One combined report will be compiled for Terrestrial Biodiversity, Terrestrial Animal Species and Terrestrial Plant Species. The Scoping Level Terrestrial Biodiversity, Terrestrial Plant Species and Terrestrial Animal Species Assessment is included in Appendix G.2 of this Scoping Report. The Avifauna Assessment will also comply with GN 1150.

GN R3717 was promulgated on 28 July 2023 which amends the terrestrial plant and animal species protocol that was published in GN R1150 in October 2020. The amendment entails the removal of the term “terrestrial” from the protocol to ensure that it applies to all plant and animal species, including freshwater species. However, the Aquatic Biodiversity specialist was appointed in 2021, prior to the promulgation of the amendment in GN R3717. Therefore, the amendment is not applicable to the proposed project. The Aquatic Biodiversity specialist assessment has been undertaken in compliance with GN R320.

4.2.1.6 National Environmental Management: Biodiversity Act (Act 10 of 2004)

The National Environmental Management: Biodiversity Act (Act 10 of 2004, as amended) (NEMBA) provides for “the management and conservation of South Africa’s biodiversity within the framework of the NEMA, the protection of species and ecosystems that warrant national protection, and the use of indigenous biological resources in a sustainable manner, amongst other provisions”. The Act states that the state is the custodian of South Africa’s biological diversity and is committed to respect, protect, promote and fulfil the constitutional rights of its citizens.

Overall, the NEMBA focuses on the protection of national biodiversity through the regulation of activities that may affect biodiversity including habitat disturbance, culture of and trade in organisms, both exotic and indigenous. Lists of threatened ecosystems (Sections 52 (1) (a)), threatened and protected species (Sections 56 (1)), and alien invasive organisms (Section 97 (1)) have been published and maintained in terms of NEMBA.

Chapter 1 sets out the objectives of the Act, and they are aligned with the objectives of the Convention on Biological Diversity, which are the conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of the benefits of the use of genetic resources. The Act also gives effect to CITES, the Ramsar Convention, and the Bonn Convention on Migratory

Species of Wild Animals. The State is endowed with the trusteeship of biodiversity and has the responsibility to manage, conserve and sustain the biodiversity of South Africa.

This Act therefore serves to control the disturbance and land utilisation within certain habitats, as well as the planting and control of certain exotic species. Effective disturbance and removal of threatened or protected species encountered on or around the sites, will require specific permission from the applicable authorities.

Furthermore, NEMBA states that the loss of biodiversity through habitat loss, degradation or fragmentation must be avoided, minimised or remedied. The loss of biodiversity includes *inter alia* the loss of endangered, threatened or protected plant and animal species.

4.2.1.6.1 Threatened Ecosystems

GG 34809, GN 1002, published on 9 December 2011 in terms of Section 52 (1) (a) of the NEMBA, provides a list of threatened terrestrial ecosystems categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) and Protected.

However, a revised national list of ecosystems that are threatened and in need of protection was published in GG 47526, GN 2747 on 18 November 2022 in terms of Section 52 (1) (a) of NEMBA. The revised list includes threatened terrestrial ecosystem types that are classed as CR, EN and VU.

The list of threatened ecosystems includes threatened ecosystems based on vegetation types present within these ecosystems. Should a project fall within a listed vegetation type or ecosystem that is listed, actions in terms of NEMBA are triggered. In addition, Listing Notice 3 (GN R324) of the 2014 NEMA EIA Regulations (as amended) includes Listed Activity 12, for the clearance of an area of 300 m² or more of indigenous vegetation in the Western Cape, specifically within any CR or EN ecosystem listed in terms of Section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as CR in the National Spatial Biodiversity Assessment 2004.

4.2.1.6.2 Threatened and Protected Species

The 2007 Threatened or Protected Species Regulations of the NEMBA declares species of high conservation value, national importance or that are considered threatened and in need of protection. Furthermore, the regulations provide for the prohibition of specific restricted activities involving specific listed threatened or protected species.

The list of CR, EN, VU or Protected species was published in GG 29657, GN R151 on 23 February 2007 in terms of Section 56 (1) of the NEMBA. The list was further amended in GG 30568, GN R1187 on 14 December 2007, as well as in GG 43386, GN R627 of 3 June 2020. Should a project include threatened and protected species that are listed, actions in terms of NEMBA are triggered.

The faunal species identified in the broader area based on the site sensitivity verification undertaken by the Terrestrial Biodiversity Specialist are noted in Appendix G.2 of this EIA Report.

This will be detailed as part of the Terrestrial Biodiversity and Species Assessment to be undertaken during the EIA Phase.

4.2.1.6.3 Alien and Invasive Species

Chapter 5 of NEMBA (Sections 73 to 75) regulates activities involving invasive species, and lists duty of care as follows:

- the landowner/land user must take steps to control and eradicate the invasive species and prevent their spread, which includes targeting offspring, propagating material and regrowth, in order to prevent the production of offspring, formation of seed, regeneration or re-establishment;
- take all required steps to prevent or minimise harm to biodiversity; and
- ensure that actions taken to control/eradicate invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment.

The Alien and Invasive Species Regulations, published in 2014 and amended in 2020, in terms of the NEMBA provides for the protection of biodiversity through the control and eradication of listed alien and invasive species categorised as follows:

- Category 1a Listed Invasive Species – must be combatted or eradicated;
- Category 1b Listed Invasive Species – must be controlled or ‘contained’ in accordance with the requirements of an Invasive Species Management Programme;
- Category 2 Listed Invasive Species – require a permit to carry out a restricted activity e.g. cultivation within an area;
- Category 3 Listed Invasive Species – species that are less-transforming invasive species, but introduction, trade or transportation should be limited. Category 3 plant species are automatically Category 1b species where located within riparian and wetland areas;
- Exempted Alien Species – species that are not regulated; and
- Prohibited Alien Species – species for which a permit for restricted activities (e.g., *inter alia* hunting, gathering, breeding, cultivating, trading, transporting) may not be issued.

The Alien and Invasive Species List was published in terms of sections 66(1), 67(1), 70(1)(a), 71(3) and 71A of the NEMBA in GG 40166, GN 864 on 29 July 2016.

4.2.1.7 The National Heritage Resources Act (Act 25 of 1999)

The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) introduces an integrated and interactive system for the management of national heritage, archaeological and palaeontological resources (which include landscapes and natural features of cultural significance).

Parts of sections 35(4), 36(3) (a) and 38(1) of the NHRA apply to the proposed project:

Archaeology, palaeontology and meteorites:

Section 35 (4) – No person may, without a permit issued by the responsible heritage resources authority:

- a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
- b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite; and
- c) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

Burial grounds and graves:

Section 36 (3) (a) - No person may, without a permit issued by South African Heritage Resources Agency (SAHRA) or a provincial heritage resources authority:

- a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- b) destroy, damage, alter, exhume, 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; or
- c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

Heritage resources management:

38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorized as:

- a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- b) the construction of a bridge or similar structure exceeding 50 m in length;
- c) any development or other activity which will change the character of the site –
 - (i) exceeding 5 000 m² in extent, or
 - (ii) involving three or more erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA, or a provincial resources authority;
- d) the re-zoning of a site exceeding 10 000 m² in extent; or
- e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

While landscapes with cultural significance do not have a dedicated Section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(c) and (d) list “historical settlements and townscapes” and “landscapes and natural features of cultural significance” as part of the National Estate. Furthermore, Section 3(3) describes the reasons a place or object may have cultural heritage value. Section 38 (2a) of the NHRA states that if there is reason to believe that heritage resources will be affected then an impact assessment report must be submitted.

A Heritage Impact Assessment (Archaeology and Cultural Heritage) has been commissioned and included in Appendix G.6 of this EIA Report. The Heritage Impact Assessment includes a an assessment of potential impacts on archaeology and cultural heritage, as well as a site sensitivity

verification. The Screening Tool indicates that the study area is of low sensitivity in terms of the archaeological and cultural heritage theme. The initial site visit indicates that the Screening Tool assessment is largely accurate, with relatively few archaeological sites and materials or other cultural heritage resources present in much of the Study Area and project footprint. However, based on the initial heritage site visit the specialist concluded that the current Screening Tool sensitivity assessment is largely correct, and that although several archaeological and heritage sites were recorded in the study area these are of low heritage significance according to the grading system developed by Heritage Western Cape (HWC) (2016).

Additional detail is provided in Chapters 3 and 6 of this EIA Report. A Heritage Impact Assessment (including Archaeology and Cultural Landscape) will be undertaken during the EIA Phase of the proposed project in accordance with GN 320 (Part A) and Appendix 6 of the 2014 NEMA EIA Regulations (as amended). This specialist study is included as Appendix G.6 in this EIA Report.

In terms of Palaeontology, a Palaeontology Impact Assessment was undertaken, as included in Appendix G.7 of this EIA Report. The Screening Tool indicates that the proposed development has a Very High Palaeontological Sensitivity. Based on a site visit undertaken by the specialist this provisional assessment is contested here due to the fact that no fossils were recovered in the ten-day palaeontological site investigation. It is concluded that the study area generally has a low palaeontological sensitivity. If Palaeontological Heritage is uncovered during surface clearing and excavations, the Chance find Protocol (attached to the Palaeontological Impact Assessment) should be implemented immediately. These recommendations should be incorporated into the EMPr and fully implemented during the construction phase of the development. Refer to Appendix G.7 for additional information. Heritage Western Cape (HWC) is required to provide comment on the proposed project. A Notice of Intent to Develop (NID) (Appendix J of the EIA Report) was submitted to HWC on 10 March 2023. HWC provided comment on the NID on 24 March 2023 stating that a full Heritage Impact Assessment (HIA) which makes reference to the Palaeontological Impact Assessment, Archaeological Impact Assessment and the Visual Impact Assessment must be undertaken in terms of Section 38(3) of the National Heritage Resources Act (NHRA, Act 25 of 1999, as amended) during the EIA phase.

The proposed project may require a permit in terms of the NHRA prior to any fossils or artefacts being removed by professional palaeontologists and archaeologists. If archaeological mitigation is needed, then the appointed archaeologist will need to contact SAHRA and/or the Heritage Western Cape in order to confirm requirements to conduct the work. The permit application must be carried out well in advance of construction to ensure that there is enough time for the authorities to approve the mitigation work before construction commences. Should professional palaeontological mitigation be necessary during the construction phase, the palaeontologist concerned will need to apply for a Fossil Collection Permit. Palaeontological collection should comply with international best practice. All fossil material collected must be deposited, together with key collection data, in an approved depository (museum / university). Palaeontological mitigation work including the ensuing Fossil Collection reports should comply with the minimum standards specified by SAHRA (2013).

4.2.1.8 National Forests Act (Act 84 of 1998)

The National Forests Act (Act 84 of 1998, as amended) (NFA) allows for the protection of certain tree species. The Minister has the power to declare a particular tree to be a protected tree. The most recent list of protected tree species was published in 2018 in GN 536. In terms of Section

15(1) of the NFA, 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 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 DFFE is authorised to issue licences for any removal, cutting, disturbance, damage to or destruction of any protected trees. Therefore, the removal of any protected tree species listed within the NFA will require a tree removal permit, which can be obtained from the DFFE.

The Terrestrial Biodiversity and Species Impact Assessment (Appendix G.2 of this EIA Report) did not list any protected trees on site in terms of the NFA.

In addition, protection of natural forests through gazetted lists of Natural Forests in terms of Sections 7 (2) of the NFA must also be highlighted. In terms of section 7(1) of the NFA, no person may cut, disturb, damage or destroy any indigenous tree in, or remove or receive any such tree from a natural forest except in terms of (a) a license issued under subsection (4) or section 23 of the NFA; or (b) an exemption from the provisions of subsection (4) of the NFA published by the Minister in the Gazette.

4.2.1.9 Conservation of Agricultural Resources Act (Act 43 of 1983)

The objectives of the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) are to provide for the conservation of the natural agricultural resources of South Africa by the:

- maintenance of the production potential of land;
- combating and prevention of erosion and weakening or destruction of the water sources; and
- protection of the vegetation and the combating of weeds and invader plants.

The CARA states that no land user shall utilise the vegetation of wetlands (a watercourse or pans) in a manner that will cause its deterioration or damage. This includes cultivation, overgrazing, diverting water run-off and other developments that damage the water resource. The CARA includes regulations on alien invasive plants. According to the amended regulations (GN R280 of March 2001), declared weeds and invader plants are divided into three categories:

- Category 1 may not be grown and must be eradicated and controlled,
- Category 2 may only be grown in an area demarcated for commercial cultivation purposes and for which a permit has been issued, and must be controlled, and
- Category 3 plants may no longer be planted and existing plants may remain as long as their spread is prevented, except within the flood line of watercourses and wetlands. It is the legal duty of the land user or land owner to control invasive alien plants occurring on the land under their control.

Invasive alien species likely to occur on site are listed above and in the Terrestrial Biodiversity and Species Impact Assessment (Appendix G.2 of this EIA Report). These alien plant species will be managed in line with the EMPr.

As noted in the Agriculture Compliance Statement (Appendix G.1 of this EIA Report), rehabilitation after disturbance to agricultural land is managed by the CARA. A consent in terms of CARA is

required for the cultivation of virgin land. Cultivation is defined in CARA as “any act by means of which the topsoil is disturbed mechanically”. The purpose of this consent for the cultivation of virgin land is to ensure that only land that is suitable as arable land is cultivated. Therefore, despite the above definition of cultivation, disturbance to the topsoil that results from the construction of a renewable energy facility and its associated infrastructure does not constitute cultivation as it is understood in CARA. This has been corroborated by the National Department of Agriculture, Land Reform and Rural Development (DALRRD). The construction and operation of the proposed project will therefore not require consent from the DALRRD in terms of this provision of CARA.

4.2.1.10 Subdivision of Agricultural Land Act (Act 70 of 1970)

As noted in the Agriculture Compliance Statement (Appendix G.1 of this EIA Report), two approvals from the DALRRD are required if a proposed renewable energy facility is located on agriculturally zoned land.

The first approval is a No Objection Letter for the change in land use issued by the Deputy Director General (Agricultural Production, Health and Food Safety, Natural Resources and Disaster Management). This letter is one of the requirements for receiving municipal rezoning. It is advisable to apply for this as early in the process as possible. A positive EA does not assure DALRRD’s approval of this. This application requires a motivation backed by good evidence that the development will not significantly compromise the future agricultural production potential of the development site, and the Agricultural Compliance Statement will suffice in this regard. Such an application will be submitted for the proposed project.

The second required approval is a consent for long-term lease in terms of the Subdivision of Agricultural Land Act (Act 70 of 1970) (SALA). If the DALRRD approval for the proposed project has already been obtained in the form of the No Objection Letter, then SALA approval should not present any difficulties. Note that SALA approval is not required if the lease is over the entire farm portion. In the case of the proposed project, only portions of the farm portion would be leased. SALA approval can only be applied for once the Municipal Rezoning Certificate and EA are in hand.

4.2.1.11 National Water Act (Act 36 of 1998)

One of the important objectives of the National Water Act (Act 36 of 1998) (NWA) is to ensure the protection of the aquatic ecosystems of South Africa’s water resources. Section 21 of this Act identifies certain land uses, infrastructural developments, water supply/demand and waste disposal as ‘water uses’ that require authorisation (licensing) by the Department of Water and Sanitation (DWS). Chapter 4 (Part 1) of the NWA sets out general principles for the regulation of water use. Water use is defined broadly in the NWA, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering the bed, banks, course or characteristics of a watercourse, removing water found underground for certain purposes, and recreation. In general, a water use must be licensed unless it is listed in Schedule I, is an existing lawful use, is permissible under a General Authorisation (GA), or if a responsible authority waives the need for a licence. The Minister may limit the amount of water which a responsible authority may allocate. In making regulations the Minister may differentiate between different water resources, classes of water resources and geographical areas.

All water users who are using water for agriculture: aquaculture, agriculture: irrigation, agriculture: watering livestock, industrial, mining, power generation, recreation, urban and water supply service must register their water use. This covers the use of surface- and groundwater.

Section 21 of the NWA lists the following water uses that need to be licensed:

- a) taking water from a water resource;
- b) storing water;
- c) impeding or diverting the flow of water in a watercourse;
- d) engaging in a stream flow reduction activity contemplated in section 36;
- e) engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
- f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- g) disposing of waste in a manner which may detrimentally impact on a water resource;
- h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- i) altering the bed, banks, course or characteristics of a watercourse;
- j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- k) using water for recreational purposes.

Any activities that take place within the outer edge of the 1 in 100 year flood line and /or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam; within a watercourse; within 100 m of the edge of a watercourse; or within 500 m of a delineated wetland boundary, will require a water use authorisation in terms of Section 21 (c) and Section 21 (i) of the NWA. An application for water use authorisation for the proposed project may be required should any of the planned structures or infrastructure associated with the proposed project trigger water uses in terms of Section 21 (c) and Section 21 (i) of the NWA.

The GA for Section 21 (c) and (i) water uses as defined under the NWA were revised in 2016 (GN R509). Determining if a Water Use Licence is required for these water uses is now associated with the risk of degrading the ecological status of a watercourse. A low risk of impact could be authorised in terms of a GA. According to the Aquatic Biodiversity Impact Assessment (Appendix G.3 of this EIA Report), the Risk Assessment that was undertaken determined that the proposed project poses a LOW risk of impacting aquatic habitat, water flow and water quality if the facilities are placed within the area mapped as being the wash area containing the mosaic of depression wetlands. With the findings of the risk assessment, the water use activities associated with the proposed project would need to be authorised with a Water Use Licence for Section 21(c) and (i) water uses. Should the location of the facilities be located outside of the mapped aquatic features and buffers, the risk would be reduced to low such that the water use activities associated with the proposed project could potentially be authorised through the general authorisations for Section 21(c) and (i) water uses.

The NWA also provides for measures to prevent, control and remedy the pollution of surface and groundwater sources. The property on which the proposed project is located falls within the J22G quaternary catchment. This proposed project falls under the Breede Gouritz Water Management Area (DWS, 2016). The groundwater General Authorisation (GA) for this catchment is 45 m³ /ha/a.

This means that in this catchment, 45 m³ of water can be abstracted per year for every hectare, under the GA. For example, a 100 ha property could be abstracting a maximum of 4 500 (45 x 100) m³ /a under the GA. However, the GA volume is capped at 40 000 m³/a (1.27 L/s) per property. Therefore, a property with an extent of 20 000 ha would only be allowed to abstract 40 000 m³/a under the GA. If larger volumes are needed, a Water Use Licence will have to be applied for

This will be undertaken post EA. Refer to the Geohydrology Assessment in Appendix G.11 of this EIA Report for additional information.

4.2.1.12 Water Services Act (Act 108 of 1997)

Water will be required during the construction, operational and decommissioning phases of the proposed project. Potable water is only to be utilised for human consumption purposes, whereas greywater is to be used for earthworks, dust suppression, etc. Water will be sourced from the following potential sources: Beaufort West Local Municipality; third-party water supplier; existing boreholes or drilled boreholes on site. Should the latter be selected for water use, the boreholes will be subjected to complete geohydrological testing and an assessment, as well as a Water Use Licence Application process. This will be undertaken as a separate process, once more detailed information becomes available, outside of the current EA Application for the proposed project. Compliance with the Water Services Act (Act 108 of 1997) will be undertaken during the relevant phase of the proposed project, in consultation with the local and district municipalities.

4.2.1.13 Hazardous Substances Act (Act 15 of 1973)

During the proposed project, fuel and diesel will be utilised to power vehicles, generators and equipment. In addition, potential spills of hazardous materials could occur during the relevant phases. Such management actions will be recommended in the EMPr, which are included as Appendix H to this EIA Report.

4.2.1.14 National Environmental Management: Waste Act (Act 59 of 2008, as amended) (NEMWA)

The National Environmental Management: Waste Act (Act 59 of 2008, as amended) (NEM:WA) was published with one of the main objectives to reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. Section 19 of the NEM:WA allows the Minister to publish a List of Waste Management Activities that have, or are likely to have, a detrimental effect on the environment published. Such a list specifies the waste management activities that will require a Waste Management Licence.

The List of Waste Management Activities was originally published in GN 921 on 29 November 2013, and thereafter amended in GN 332 on 2 May 2014; GN 633 on 24 July 2015; GN 1094 on 11 October 2017; and GN 1757 on 11 February 2022. The List of Waste Management Activities include Categories A, B and C. If any waste management activities listed in Category A are triggered by a development, a BA process must be undertaken in terms of the 2014 NEMA EIA Regulations (as amended), as part of the Waste Management Licence application. Waste management activities in Category B will, however, require a full Scoping and EIA Process in terms of the 2014 NEMA EIA Regulations (as amended), as part of the Waste Management Licence application. If any of the waste management activities in Category C are triggered, then the relevant Norms and Standards must be followed.

Based on a review of the project description, the proposed project will **not** trigger the need for a Waste Management Licence. However, general and hazardous waste will be generated during the construction, operational and decommissioning phases, which will require proper management. Such management actions will be recommended in the EMP, which is included as Appendix H to this EIA Report.

4.2.1.15 National Environmental Management: Air Quality Act (Act 39 of 2004)

The National Environmental Management: Air Quality Act (Act 39 of 2004, as amended) (NEM: AQA) was published in 2004 and came into full effect on 31 March 2010, when the Atmospheric Pollution Prevention Act (Act 45 of 1965) (APPA) was repealed. The NEM: AQA was published with the overall objective to:

- *“reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development;*
- *provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto”.*

The list of activities which result in atmospheric emissions which have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage was published under GN 248, GG 33064 dated 31 March 2010 and thereafter amended in GN 893, GG 37054 dated 22 November 2013. The list of activities was further amended in GN 551, GG 38863 dated 12 June 2015; GN 1207, GG 42013 dated 31 October 2018; GN 687, GG 42472 dated 22 May 2019; and GN 421, GG 43174 dated 27 March 2020.

Section 22 of the NEM: AQA deals with the consequences of listing, and it states that “no person may without a provisional atmospheric emission licence or an atmospheric emission licence conduct an activity (a) listed on the national list anywhere in the Republic; or (b) listed on the list applicable in a province anywhere in that province”. Therefore, a Provisional Atmospheric Emissions Licence (AEL) and/or AEL is required for any plant or proposed development that triggers a listed activity.

Based on a review of the project description, the proposed project will **not** trigger the need for an AEL. However, the proposed stockpiling activities, including earthworks, may result in the unsettling of, and temporary exposure to, dust. Appropriate dust control methods will need to be applied. Such management actions will be recommended in the EMP, which is included as Appendix H to this EIA Report.

4.2.1.16 National Environmental Management: Protected Areas Act (NEM:PA) (Act 57 of 2003)

According to the South African Protected Areas Database (SAPAD), the project area is not located within any formally Protected Areas, as declared under the National Environmental Management: Protected Areas Act (Act 57 of 2003) (NEM: PAA).

However, the project area falls within the National Protected Area Expansion Strategy (NPAES) Focus Area associated with the Karoo National Park. The NPAES focus areas for land-based expansion are comprised of large, intact and unfragmented areas of importance for biodiversity representation and ecological persistence. As such, these areas are suitable for the creation or expansion of extensive Protected Areas. Figure 4.1, below, illustrates the proposed DBF South SEF in relation to the Karoo National Park and its associated NPAES Focus Area. NPAES focus areas extend to the north and west of the KNP, across the Western Cape and Northern Cape provinces. The NPAES (DEA, 2018) has identified Nama-Karoo habitat as under protected, with only 1% of the 24.8 million hectares of this habitat protected (as at 2014) and sets the target of protecting 11% of this habitat within 20 years. The strategic spatial plan in the NPAES (DEA, 2018) is to add in the order of 1 million hectares of protected areas to the north and west of the Karoo National Park.

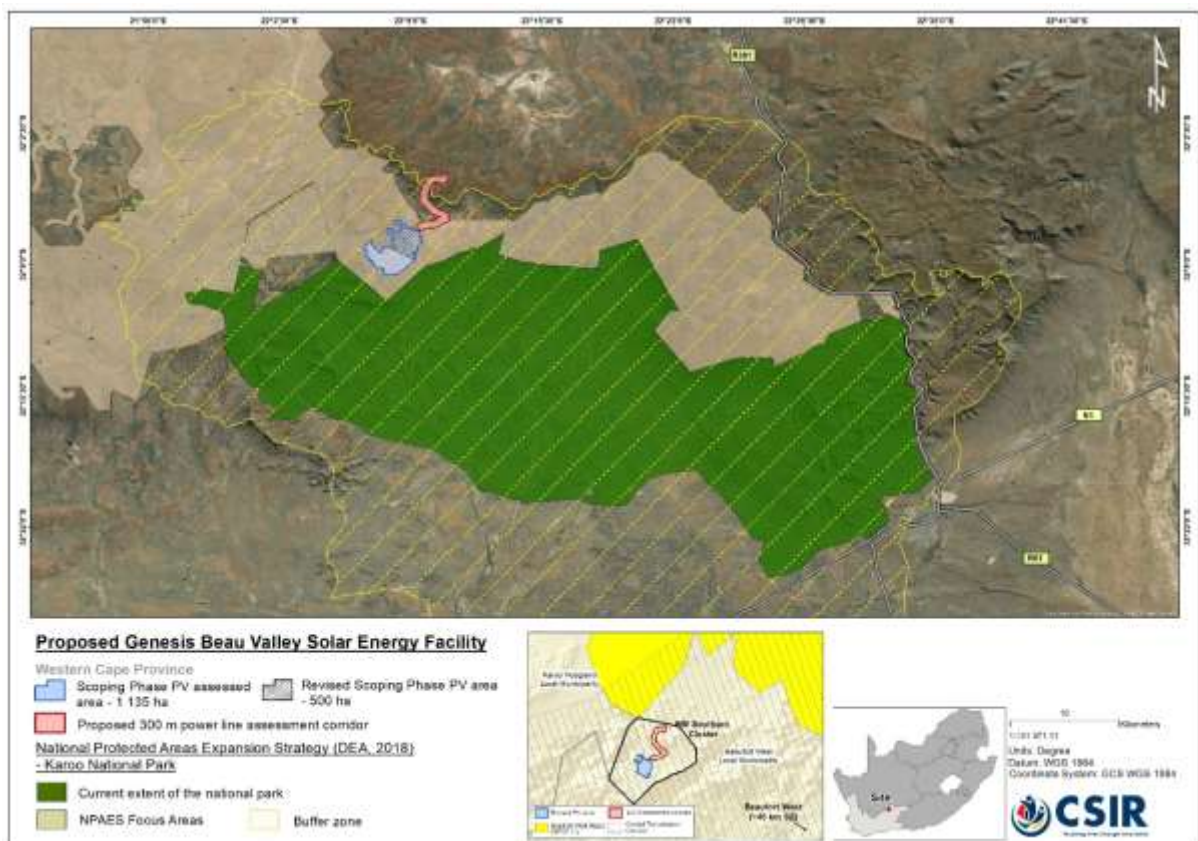


Figure 4.1: The Proposed Development Site in relation the Karoo National Park and the NPAES Focus Area.

In terms of the National Environmental Management: Protected Areas Act (NEM: PA, Act 57 of 2003, as amended), the legal procedure for the declaration of protected areas requires that in the

case of privately owned land, the landowners' consent to the declaration in the form of a written agreement entered into with the Minister or with the MEC. In accordance with Section 33 of NEM: PA, the declaration of private land as a protected area requires that an extensive public participation and consultation process be undertaken. This process requires that the Minister or MEC "must" *"send a copy of the proposed notice by registered post to the last known address of each owner of the land within the area to be declared, and inform in an appropriate manner any other person whose rights in such land may materially or adversely be affected by such declaration."* Preceding the landowner consent process and the formal declaration of the affected properties as a protected area, the National Protected Area Expansion Strategy has limited legal basis to restrict a landowner from exercising their legal discretionary rights to pursue development on the land as provided in Section 25 of the Constitution of the Republic of South Africa.

The NPAES (DEA, 2018) identifies three mechanisms for protected area expansion:

- (1) acquisition of land (which is recognised as involving large upfront costs);
- (2) contract agreements with landowners who maintain ownership of their land; and
- (3) declaration of public or state land that requires reassigning of the land to a protected area agency (this option has limited potential as very little of the priority areas are public or state land).

The NPAES (DEA, 2018) states that the negotiation and conclusion of contractual agreements with landowners was the predominant mechanism for achieving protected area expansion in phase 1 (2008 to 2014). This option is often much more cost effective than acquisition of land and is used increasingly as part of biodiversity stewardship programmes (DEA, 2018: xi & 12), as it is clearly recognised in the NPAES that financing is a very significant constraint to the ability of protected area agencies to meet their targets for management effectiveness and protected area expansion.

4.2.1.17 Astronomy Geographic Advantage (Act 21 of 2007)

The Astronomy Geographic Advantage (AGA) Act (Act 21 of 2007) aims to provide for the preservation and protection of areas within the Republic that are uniquely suited for optical and radio astronomy; to provide for intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas; and to provide for matters connected therewith. The purpose of the AGA Act is to preserve the geographic advantage areas that attract investment in astronomy. The AGA Act also notes that declared astronomy advantage areas are to be protected and properly maintained in terms of Radio Frequency Interference (RFI). The AGA Act is administered by the Department of Higher Education, Science and Technology (previously the Department of Science and Technology).

According to the CSIR Wind and Solar Phase 2 SEA (Department of Environment, Forestry and Fisheries (DEFF), 2019: Part 3, Page 2²), the majority of the mid-frequency dish array of the Square Kilometre Array (SKA) will be constructed in the core which is located in the Northern Cape; with dish antennas being located in the spiral arms. The South African component of the SKA will consist of approximately 3 000 receptors comprising dish antennas, each with a diameter of 15 m, and radio receptors known as dense aperture-arrays. The outer stations in the spiral arms

² Department of Environment, Forestry and Fisheries (DEFF), 2019. Phase 2 Strategic Environmental Assessment for wind and solar PV energy in South Africa. CSIR Report Number: CSIR/SPLA/SECO/ER/2019/0085 Stellenbosch, Western Cape.

will extend beyond the borders of South Africa and at least 3 000 km from the core area. About 80% of the receptors, including a dense core and up to 5 spiral arms, will be located in the Karoo Central Astronomy Advantage Area (KCAAA) (DEFF, 2019²: Part 3, Page 2).

The KCAAA, which is located between Brandvlei, Van Wyksvlei, Carnarvon and Williston in the Northern Cape Province, was officially declared in 2014 by the Minister of Science and Technology in terms of the AGA Act for the purposes of protection RFI and Electromagnetic Interference (EMI). The declaration of the KCAAA ensures the long-term viability of the area to be used for astronomical installations (DEFF, 2019²: Part 3, Page 2).

PV installations are known to have unintentional radiated emissions from electrical and electronic equipment that have the potential to interfere with the SKA Radio Telescope project in the Northern Cape. This can result in interference to celestial observations and/or data loss. Such interference is typically referred to as RFI (DEFF, 2019²: Part 3, Page 2).

The location of the proposed project does not pose an EMI or RFI risk to the SKA, as the proposed project is located outside of the Northern Cape as well as the KCAAA. Refer to Figure 4.2 for the location of the proposed project in relation to the SKA and KCAAA. Furthermore, the proposed project site falls within an area of low sensitivity in terms of SKA sensitivity for the development of solar energy (Table 4.1).

Table 4.1: SKA sensitivity distance guidelines (Source: DFFE, 2019: Part 3, Page 2)

Colour	Sensitivity	Distance from SKA Facility	
		Wind	Other Solar PV
Dark Red	Very High	Less than 18 km	Less than 8 km
Red	High	Between 18 and 26 km	Between 8 and 14 km
Orange	Medium	Between 26 and 48 km	Between 14 and 32 km
Green	Low	Greater than 48 km	Greater than 32 km

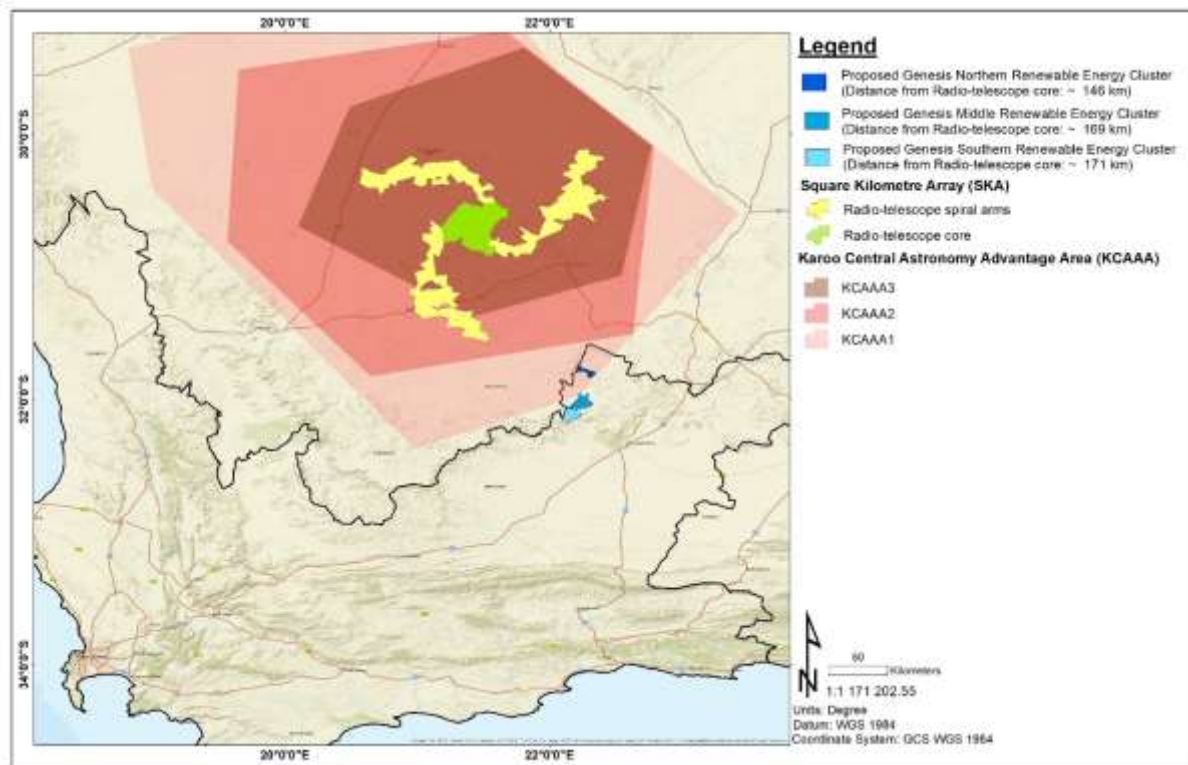


Figure 4.2: Location of the proposed project in relation to the SKA and KCAAA

The South African Radio Astronomy Observatory (SARAO) is registered on the project I&AP database as a key stakeholder and was invited to comment on the project during the pre-application phase. During the Scoping Phase, SARAO responded with their findings of an assessment of the potential impact of the proposed project on the SKA radio telescopes. SARAO found that the project represents a low risk of interference to the nearest SKA radio telescope with a compliance surplus of 28.42 dBm/Hz. Accordingly, they had no objection to the proposed project. Therefore, RFI and EMI specialist studies will not be commissioned by the S&EIA project team as SARAO's assessment and findings is considered conclusive in respect of the RFI and EMI sensitive themes. Copies of the comments received from SARAO are included in Appendix E.5 of this EIA Report and captured and responses to as part of the Comments and Responses Train in Appendix E.7.

4.2.1.18 Development Facilitation Act (Act 67 of 1995)

The Development Facilitation Act (Act 67 of 1995) (DFA) sets out a number of key planning principles which have a bearing on assessing proposed developments in light of the national planning requirements. The planning principles most applicable to the study area include:

- Promoting the integration of the social, economic, institutional and physical aspects of land development;
- Promoting integrated land development in rural and urban areas in support of each other;
- Promoting the availability of residential and employment opportunities in close proximity to or integrated with each other;
- Optimising the use of existing resources including such resources relating to agriculture, land, minerals, bulk infrastructure, roads, transportation and social facilities;

- Contributing to the correction of the historically distorted spatial patterns of settlement in the Republic and to the optimum use of existing infrastructure in excess of current needs;
- Promoting the establishment of viable communities; and
- Promoting sustained protection of the environment.

4.2.1.19 Other Applicable Legislation

Other applicable national legislation that may apply to the proposed project include:

- Advertising on Roads and Ribbons Act (Act 21 of 1940);
- Electricity Act (Act 41 of 1987);
- Electricity Regulations Amendments (August 2009);
- Promotion of Administrative Justice Act (Act 2 of 2000);
- Civil Aviation Act (Act 13 of 2009) and Civil Aviation Regulations (CAR) of 1997;
- Civil Aviation Authority Act (Act 40 of 1998);
- White Paper on Renewable Energy (2003);
- Integrated Resource Plan for South Africa (2019);
- Occupational Health and Safety Act (Act 85 of 1993), as amended by Occupational Health and Safety Amendment (Act 181 of 1993)³;
- Road Safety Act (Act 93 of 1996);
- Fencing Act (Act 31 of 1963); and
- National Road Traffic Act (Act 93 of 1996).

4.2.2 Provincial Legislation

4.2.2.1 Western Cape Nature and Environmental Conservation Ordinance (No. 19 of 1974) and the Western Cape Nature Conservation Laws Amendment Act (Act No. 3 of 2000)

This Act should be given consideration following EA with particular respect to its Chapters IV (The protection of wild animals other than fish) and Chapter VI (The protection of flora). The requirement for permits when removing and relocating specific flora that may be encountered or alternatively addressing fauna that may be encountered around the sites would require due consideration.

The Western Cape Nature Conservation Laws Amendment Act (2000) provides for the amendment of various laws on nature conservation in order to transfer the administration of the provisions of those laws to the Western Cape Nature Conservation Board, which includes various regulations pertaining to wild plants and animals including avifauna.

Based on the Terrestrial Biodiversity and Species Impact Assessment (Appendix G.2 of this EIA Report), in terms of fauna, there are several listed mammals which occur in the area and which would potentially be impacted by the development. This includes the Riverine Rabbit, Black-footed Cat, Brown Hyena, Grey Rhebok and Mountain Reedbuck. The study states that there is no habitat within the DBF South SEF site for the Karoo Dwarf Tortoise with the result that impacts on this species as a result of the proposed project are not considered significant. In terms of the Riverine Rabbit, there is no habitat within the development footprint, but there would be some risk of

³ The proposed Battery Energy Storage Systems (BESS) must be designed, operated, maintained and decommissioned according to the requirements of Occupational Health and Safety Act (Act 85 of 1993).

increased disturbance and vehicle-related mortality along the access route to the site. The study recommends that an assessment of this impact is required. The Mountain Reedbuck and Grey Rhebuck have not yet been observed on the site. Refer to the Terrestrial Biodiversity and Species Impact Assessment (Appendix G.2 of this EIA Report) for additional information.

4.2.2.2 Draft Western Cape Biodiversity Bill (May 2019)

The purpose of the Draft Western Cape Biodiversity Bill, 2019, is to provide for the framework and institutions for nature conservation and the protection, management and sustainable use of biodiversity and ecosystems in the Province; and for matters incidental thereto. This law has not been promulgated however some aspects of its Chapter 7 (Protection of Ecosystems, Ecological Infrastructure and Species), in particular, may apply to the affected sites, once promulgated.

4.2.3 District and Local Planning Legislation

4.2.3.1 Environmental Management Framework

Research indicates that there is no Environmental Management Framework (EMF) for the Central Karoo District Municipality (CKSDM). The Screening Tool also notes that no intersections with EMF areas have been found.

4.2.3.2 Beaufort West Local Municipality Integrated Development Plan (IDP) (2017-2022)

The vision of the Beaufort West Local Municipality Integrated Development Plan (BWLM IDP) (2017-2022) is to be the economic gateway in the Central Karoo, where people are developed and live in harmony together.

Further unpacking of the vision indicates the provision of directives regarding the growth of the economy and ensuring financial sustainability among other areas in which development is required.

The five priority areas of the IDP are:

1. Service to the people – seeking to improve and maintain basic service delivery through infrastructure development;
2. Sustainable economic growth by leveraging competitive advantages of the region (The IDP identifies low economic growth as one of the main reasons for the lack of new labour entrants into the economy);
3. A well-run administration that is efficient, effective and has the right skills mix;
4. Ensure financial sustainability; and
5. Be a transparent organisation.

The Central Karoo region is attractive for renewable energy projects due to the significant solar and wind energy resources. Various renewable energy projects have been approved in the Central Karoo District Municipality (CKDM) area, but most have yet to be implemented. The Central Karoo District Municipality Strategic Development Framework (SDF) has identified considerable opportunities for expanding renewable energy projects specifically related to solar and wind power

generation in the Central Karoo District Municipality, which encourages IPPs to locate in the region and to create downstream business- and employment opportunities (CKDM, 2019⁴).

According to the Western Cape Provincial SDF (WCG, 2014⁵), renewable energy generation is also deemed one of the most promising economic sectors in the Central Karoo region that will add significant value to the regional Gross Domestic Product (GDPR), while having the potential to change the composition and character of towns throughout the municipal district (CKDM, 2017⁶).

Furthermore, the proposed project is also located within the Central Strategic Transmission Corridor that was gazetted in February 2018. This facilitates large scale transmission and distribution EGI, which would be needed to support the proposed project. Therefore, the proposed project is in line with the planning for the area.

The proposed project will create job opportunities and economic spin offs during the construction and operational phases (if EA is granted by the DFFE). Furthermore, the proposed project is aligned with one of the objectives of the Beaufort West IDP and the CKDM and Western Cape SDFs in that the proposed project will encourage sustainable economic growth through increased investment and employment opportunities.

4.2.3.3 Guidelines, Frameworks and Protocols

The following guidelines, frameworks and protocols are applicable to the proposed project:

- Guidelines published in terms of the NEMA EIA Regulations, in particular:
 - Guideline on Alternatives (DEA, 2014);
 - Guideline on Transitional Arrangements (Department of Environmental Affairs and Development Planning (DEA&DP), 2013);
 - Guideline on Alternatives (DEA&DP, 2013);
 - Guideline on Public Participation (DEA, 2012; DEA&DP, 2013; DEA, 2017);
 - National Noise Control Regulations (GN R154 of 1992) and SANS 10103:2008;
 - Guideline on Need and Desirability (DEA&DP, 2013; DEA, 2017);
- Information Document on Generic Terms of Reference for Environmental Assessment Practitioners (EAPs) and Project Schedules (March 2013);
- Integrated Environmental Management Information Series (Booklets 0 to 23) (Department of Environmental Affairs and Tourism (DEAT), 2002 – 2005);
- Guidelines for Involving Specialists in the EIA Processes Series (DEA&DP; CSIR and Tony Barbour, 2005 – 2007);
- BirdLife South Africa (BLSA) 2017 Guidelines for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa;
- Species Environmental Assessment 2020 Guideline: Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for EIAs in South Africa. South African National Biodiversity Institute (SANBI);
- United Nations Framework Convention on Climate Change (1997); and

⁴ Central Karoo District Municipality. (2019). Central Karoo District Municipality Spatial Development Framework.

⁵ Western Cape Government. (2014) The Western Cape Provincial Spatial Development Framework. Retrieved from <https://cer.org.za/wp-content/uploads/2015/07/Western-Cape-Provincial-SDF-2014.pdf>

⁶ Central Karoo District Municipality. (2017). Central Karoo District Municipality Integrated Development Plan 2017-2022.

- Kyoto Protocol (which South Africa acceded to in 2002).

4.2.4 International Finance Corporation Performance Standards

In order to promote responsible environmental stewardship and socially responsible development, the proposed project will as far as practicable incorporate the environmental and social policies of the International Finance Corporation (IFC). These policies provide a frame of reference for lending institutions to review environmental and social risks of projects, particularly those undertaken in developing countries.

Through the Equator Principles, the IFC's standards are now recognised as international best practice in project finance. The IFC screening process categorises projects into A, B or C in order to indicate relative degrees of environmental and social risk. The categories are:

- *Category A* - Projects expected to have significant adverse social and/or environmental impacts that are diverse, irreversible, or unprecedented;
- *Category B* - Projects expected to have limited adverse social and/or environmental impacts that can be readily addressed through mitigation measures; and
- *Category C* - Projects expected to have minimal or no adverse impacts, including certain financial intermediary projects.

Accordingly, projects such as the proposed DBF South SEF are categorised as Category B projects. The EIA Process for Category B projects examines the project's potential negative and positive environmental impacts. As required for Category B projects, a Scoping and EIA Process is being undertaken.

Other Acts, standards and/or guidelines which may also be applicable will be reviewed in more detail as part of the specialist studies to be conducted for the EIA Process.

4.3 Legal Context for this EIA

In terms of the NEMA and the 2014 NEMA EIA Regulations (as amended), a full Scoping and EIA Process is required for the proposed project. The need for the full Scoping and EIA Process is triggered by, amongst others, the inclusion of Activity 1 listed in GN R325 (Listing Notice 2):

- ***“The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facility or infrastructure is for photovoltaic installations and occurs (a) within an urban area; or (b) on existing infrastructure”.***

Note that the proposed project is not located within any of the 11 Renewable Energy Development Zones (REDZs) gazetted in GN 114 on 16 February 2018 and GN 144 on 26 February 2021. However, the proposed EGI project is located within the Central Strategic Transmission Corridor that was gazetted in GN 113 on 16 February 2018.

Therefore, a full Scoping and EIA Process is being undertaken for the proposed DBF South SEF, subjected to a 107 days decision-making timeframe.

All the listed activities forming part of this proposed development and therefore requiring EA were included in the Application Form for EA that was prepared and submitted to the DFFE with the DSR. However, during the 30-day review period on the DSR, various comments were raised by the DFFE Chief Directorate: Integrated Environmental Authorisations and the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) on the applicability of certain listed activities. Refer to Appendix E.5 for a copy of these comments from the DFFE and DEA&DP, as well as Appendix E.7 wherein the comments have been captured and responded to. Based on these comments, the applicability of certain listed activities were updated and as such an Amended Application Form for EA was submitted with the FSR. A summary is provided below describing the main updates made:

- Removal of Activity 27 of Listing Notice (LN) 1 as the development will require the clearance of more than 20 ha of indigenous vegetation, and therefore only Activity 15 of LN 2 is applicable;
- Addition of Activity 14 of LN 1 for the storage and handling of dangerous goods;
- Removal of Activity 9 of LN 2 as the proposed development and present application does not include infrastructure for the transmission or distribution of electricity with a capacity of 275 kV or more; and
- Removal of Activity 12.i.ii of LN 3 as per the indication of DEA&DP Directorate Development Facilitation that no bioregional plans exist for the Western Cape.

The updated listed activities triggered by the proposed project are indicated in Table 4.1. All updates have been carried through to the Amended Application for EA which was submitted to the DFFE with the FSR.

Table 4.1: Listed Activities in GN R327, GN R325, and GN R324 that will be potentially triggered by the proposed project

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.
Activity 11 (i)	The development of facilities or infrastructure for the transmission and distribution of electricity: (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is — (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	The project will entail the construction of an on-site substation hub and a 132 kV overhead transmission powerline to facilitate the connection between the proposed project and internal grid connections to the newly proposed 400 kV/132 kV GEED Collector Substation. Each on-site substation complex will include the following: • On-site Independent Power Producer (IPP) or Facility Substation. This will include the relevant section that will be maintained by the IPP (i.e, the high voltage infrastructure leading up to the Point of Connection (the Project Applicant's section of the proposed on-site substation complexes)), and/or • Switching Station and Collector Station, and/or • Battery Energy Storage System (BESS). The proposed project will be constructed across two farm portions (Doornboomfontein RE/89 and Doornboomfontein 1/89) located approximately 45 km northwest of Beaufort West, in the Beaufort West Local Municipality and the Central Karoo District Municipality in the Western Cape province. Therefore, the proposed project is situated outside of an urban area. <i>This activity would therefore be triggered.</i>

Activity 12 (ii) [(a) and (c)]	The development of: (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs: (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding: (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of commencement of the development and where indigenous vegetation will not be cleared.	The proposed project will entail the construction of various infrastructure and structures (such as the solar field, on-site substation complex, BESS), laydown area, internal roads, and various ancillary infrastructure such as Operation and Maintenance (O&M) building / centre, site office, workshop, staff lockers, bathrooms/ablutions, warehouse, guard house, etc.). Details of the infilling of, and excavations from, the affected watercourses/drainage features will be confirmed during the detailed engineering design phase. The Aquatic Biodiversity Assessment (Appendix G.3 of this EIA Report) notes that the only natural FEPA wetland areas within the study area are some seeps adjacent to the larger channel of the Leeu River near the development site that has been lost due to past agricultural activities. There is also a depression wetland in the north of the larger site. These wetlands are also mapped in the National Wetland Map version 5. Within the WCBSP, the watercourses are all mapped as aquatic ESAs. Within the terrestrial CBAs, the watercourses have also been mapped as aquatic CBAs. These comprise the upper Leeu River upstream of Doringboomsfontein Dam, the Leeu River where the seep wetlands occur near Modderdrift, the Frieslandkloof River within the kloof, in its upper reaches in the southern extent of the larger site, as well as the depression wetland in the northern extent of the larger site.
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		The infrastructure and structures will exceed a footprint of 100 m² and some may occur within small drainage features and 32 m of the watercourses. Additional detail will be provided during the EIA Phase. The proposed project will be constructed across two farm portions (Doornboomfontein RE/89 and Doornboomfontein 1/89) located approximately 45 km northwest of Beaufort West, in the Beaufort West Local Municipality and the Central Karoo District Municipality in the Western Cape province. Therefore, the proposed project is situated outside of an urban area. <i>This activity would therefore be triggered.</i>
Activity 14	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	The proposed renewable energy facility development will require storage and handling of dangerous goods, including fuel, cement and chemical storage onsite, that will be greater than 80m³ but not exceeding 500m³. <i>This activity would therefore be triggered.</i>
Activity 19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving-	The proposed project may entail the excavation, removal and moving of more than 10 m³ of soil, sand, pebbles or rock from nearby watercourses on site. The proposed project may also entail the infilling of more than 10 m³ of material into the nearby watercourses. The Aquatic Biodiversity Assessment (Appendix G.3 of this EIA Report) notes that the only natural FEPA wetland areas within the study area are some seeps adjacent to

	a) will occur behind a development setback; b) is for maintenance purposes undertaken in accordance with a maintenance management plan; c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	the larger channel of the Leeu River near the development site that has been lost due to past agricultural activities. There is also a depression wetland in the north of the larger site. These wetlands are also mapped in the National Wetland Map version 5. Within the WCBSP, the watercourses are all mapped as aquatic ESAs. Within the terrestrial CBAs, the watercourses have also been mapped as aquatic CBAs. These comprise the upper Leeu River upstream of Doringboomsfontein Dam, the Leeu River where the seep wetlands occur near Modderdrift, the Frieslandkloof River within the kloof, in its upper reaches in the southern extent of the larger site, as well as the depression wetland in the northern extent of the larger site. Details of the infilling of, and excavations from, the affected watercourses/drainage features will be confirmed during the detailed engineering design phase. <i>This activity would therefore be triggered.</i>
Activity 24 (ii)	The development of road with (ii) a road reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 m.	A temporary road corridor of up to 15 m will be impacted during the construction phase. This will be rehabilitated after the completion of construction activities to allow for a permanent 6 m wide road surface, with side drains on one or both sides where necessary. This will be confirmed and verified during detailed specialist assessments. <i>This activity would therefore be triggered.</i>
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:	The proposed project will be constructed across two farm portions (Doornboomfontein RE/89 and Doornboomfontein 1/89) located approximately 45 km northwest of Beaufort West, in the Beaufort West Local Municipality and the Central Karoo District Municipality in

	ii. will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	the Western Cape province. The farm portions have previously been utilised for agricultural activities. The proposed project, which is considered a commercial/industrial development, will have an estimated footprint in excess of 1 ha (development footprint of approximately 207 ha within the 1 135 Scoping Phase assessment area). The proposed project will also entail the construction of various infrastructure and structures (such as the solar field, on-site substation complex, BESS, laydown area, internal roads, and various ancillary infrastructure such as O&M building / centre, site office, workshop, staff lockers, bathrooms/ablutions, warehouse, guard house, etc.). This will constitute infrastructure with a physical footprint of more than 1 ha. <i>This activity would therefore be triggered.</i>
Activity 48 (i) (a) and (c)	The expansion of (i) infrastructure or structures where the physical footprint is expanded by 100 square metre or more, (a) within a watercourse and (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	The proposed project will require the upgrading of existing roads within the project area, as well as watercourse crossing upgrades, where such upgrades may take place within watercourses and within 32 m from the edge of these watercourses. The total footprint of the upgrades to be undertaken on the existing roads would be in excess of 100 m² within a watercourse, or within 32 m of a watercourse. This will be confirmed and verified during detailed specialist assessments. The Aquatic Biodiversity ImpactAssessment (Appendix G.3 of this EIA Report) notes that the only natural FEPA wetland areas within the study area are some seeps adjacent to the larger channel of the Leeu River near the

		development site that has been lost due to past agricultural activities. There is also a depression wetland in the north of the larger site. These wetlands are also mapped in the National Wetland Map version 5. Within the WCBSP, the watercourses are all mapped as aquatic ESAs. Within the terrestrial CBAs, the watercourses have also been mapped as aquatic CBAs. These comprise the upper Leeu River upstream of Doringboomsfontein Dam, the Leeu River where the seep wetlands occur near Modderdrift, the Frieslandkloof River within the kloof, in its upper reaches in the southern extent of the larger site, as well as the depression wetland in the northern extent of the larger site. <i>This activity would therefore be triggered.</i>
Activity 56 (ii)	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre- (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.	Existing roads will be used as far as practically achievable. The proposed projects will require the upgrading of existing roads within the project area, as well as watercourse crossing upgrades, where such upgrades may take place within watercourses and within 32 m from the edge of these watercourses. The total footprint of the upgrades to be undertaken on the existing roads would be in excess of 100 m² within a watercourse, or within 32 m of a watercourse. This will be confirmed and verified during detailed specialist assessments. The Traffic Specialist noted that the existing road network adjacent to the proposed developments is well established, consists of a combination of national roads, first, second and third-order roads, which provides accessibility to the proposed development from the local towns and major commercial centres within South Africa.

		<i>This activity would therefore be triggered.</i>
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.
Activity 1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs — (a) within an urban area; or (b) on existing infrastructure.	The proposed project is a Solar PV Facility (i.e., facility for the generation of electricity from a renewable resource) with an estimated capacity of up to 400 MW. The proposed project will be constructed across two farm portions (Doornboomfontein RE/89 and Doornboomfontein 1/89) located approximately 45 km northwest of Beaufort West, in the Beaufort West Local Municipality and the Central Karoo District Municipality in the Western Cape province. <i>This activity would therefore be triggered.</i>
Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for: (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The proposed Solar PV Facility will have an estimated footprint in excess of 20 ha (development footprint of approximately 207 ha within the 1 135 ha Scoping Phase assessment area). As a result, more than 20 ha of indigenous vegetation could be removed for the construction of the proposed Solar PV Facility. <i>This activity would therefore be triggered.</i>
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.
Activity 4 (i) (ii) and (aa)	The development of a road wider than 4 metres with a reserve less than 13,5 metres.	A 15 m road corridor will be temporarily impacted upon during construction and rehabilitated to 6 m wide after construction.

	i. Western Cape ii. Areas outside urban areas: (aa) areas containing indigenous vegetation	The proposed project will be constructed across two farm portions (Doornboomfontein RE/89 and Doornboomfontein 1/89) located approximately 45 km northwest of Beaufort West, in the Beaufort West Local Municipality and the Central Karoo District Municipality in the Western Cape province. Therefore, the proposed projects are situated outside of an urban area. The proposed project will take place outside of an urban area in the Western Cape, on sites that contain indigenous vegetation. The Terrestrial Biodiversity Impact Assessment indicates that the project study area contains Critical Biodiversity Areas (CBAs) 1 and 2. <i>This activity would therefore be triggered.</i>
Activity 12 (i) (v)	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. i. Western Cape v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.	The proposed project will have an estimated total development footprint of more than 207 ha. As a result, more than 300 m² of indigenous vegetation could be removed for the construction of the proposed SEF and associated infrastructure. As per the Karoo National Park's Management Plan (2017 -2027) and the 2016 National Protected Areas Expansion Strategy (NPAES) the proposed project falls in the Karoo National Park's expansion area and buffer area. The proposed project will take place outside of an urban area in the Western Cape, on a project site that contains CBAs and EASs in terms of the 2017 Western Cape Biodiversity Section Plan. <i>This activity would therefore be triggered.</i>

Activity 14 (ii) (a) and (c); (i)(i)(bb), and (ff)	The development of – (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs – (a) within a watercourse; (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; i. Western Cape i. Outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans	The proposed project will be constructed across two farm portions (Doornboomfontein RE/89 and Doornboomfontein 1/89) located approximately 45 km northwest of Beaufort West, in the Beaufort West Local Municipality and the Central Karoo District Municipality in the Western Cape province. The proposed project will entail the construction of various infrastructure and structures (such as the solar field, on-site substation complex, BES), laydown area, internal roads, and various ancillary infrastructure such as O&M building / centre, site office, workshop, staff lockers, bathrooms/ablutions, warehouse, guard house, etc.). The Aquatic Biodiversity Impact Assessment (Appendix G.3 of this EIA Report) notes that the only natural FEPA wetland areas within the study area are some seeps adjacent to the larger channel of the Leeu River near the development site that has been lost due to past agricultural activities. There is also a depression wetland in the north of the larger site. These wetlands are also mapped in the National Wetland Map version 5. Within the 2017 Western Cape Biodiversity Sector Plan (a systematic biodiversity plan), the watercourses are all mapped as aquatic ESAs. Within the terrestrial CBAs, the watercourses have also been mapped as aquatic CBAs. These comprise the upper Leeu River upstream of Doringboomsfontein Dam, the Leeu River where the seep wetlands occur near Modderdrift, the Frieslandkloof River within the kloof, in its upper reaches in the southern extent of the larger site, as
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		well as the depression wetland in the northern extent of the larger site. The infrastructure and structures will exceed a footprint of 10 m² and some may occur within small drainage features and 32 m of the watercourses. Additional detail will be provided during the EIA Phase. As per the Karoo National Park's Management Plan (2017-2027) the proposed project is located within the park's expansion area and buffer area. The proposed project will take place outside of an urban area in the Western Cape, on a site that contains ESAs and CBAs in terms of the 2017 WCBCP. <i>This activity would therefore be triggered.</i>
Activity 18 (i) (i) and (aa)	The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometer. i. Western Cape ii. All areas outside urban areas: (aa) Areas containing indigenous vegetation	Existing roads will be used as far as possible and will be upgraded where needed. There is a possibility that the existing roads will be widened by more than 4 m or lengthened by more than 1 km. The proposed projects will take place outside of an urban area in the Western Cape, on sites that may contain indigenous vegetation and contain ESAs and CBAs in terms of the 2017 WCBCP. <i>This activity would therefore be triggered.</i>
Activity 23 (ii) (i) (i) (bb) and (ff)	The expansion of:	The proposed project will be constructed across two farm portions (Doornboomfontein RE/89 and Doornboomfontein 1/89) located approximately 45 km

	(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; where such expansion occurs i. Western Cape i. Outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans	northwest of Beaufort West, in the Beaufort West Local Municipality and the Central Karoo District Municipality in the Western Cape province. Existing roads will be used as far as practically achievable. The proposed project study area can be accessed via various existing main roads and unnamed farm gravel roads. The potential access routes are discussed below: The proposed project site can be accessed via the following roads: - Divisional Road 2312 (DR02312); - Trunk Road 5801 (TR05801); and - Trunk Road 7301 (TR07301). Refer to the Traffic Impact Assessment (Appendix G.9 of the EIA Report) and Chapter 2 of the EIA Report for additional information on the route options per project. Some of the existing intersections along the above roads may need to be widened to accommodate the turning movement of the trucks. Exact specifications of the widening will be confirmed as the EIA progresses. Internal service roads will also be constructed within the footprint of the PV facility. The internal roads are expected to be composed of gravel or will be paved and will extend approximately 6 m wide. An up to 15 m wide road corridor may be temporarily impacted during construction and rehabilitated to allow for a permanent ~6 m road surface after construction. Details of this will be provided during the EIA Phase.
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		The widening of the roads constitutes the expansion of infrastructure where the physical footprint is expanded by 10 m² or more. Additional detail will be provided during the EIA Phase. The proposed expansion of existing infrastructure will occur within a National Protected Areas Expansion Strategy (NPAES) Focus Area associated with the Karoo National Park. Within the 2017 Western Cape Biodiversity Sector Plan (a systematic biodiversity plan), the watercourses are all mapped as aquatic ESAs. Within the terrestrial CBAs, the watercourses have also been mapped as aquatic CBAs. These comprise the upper Leeu River upstream of Doringboomsfontein Dam, the Leeu River where the seep wetlands occur near Modderdrift, the Frieslandkloof River within the kloof, in its upper reaches in the southern extent of the larger site, as well as the depression wetland in the northern extent of the larger site. <i>This activity would therefore be triggered.</i>
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4.4 Screening Tool

As noted above, GN 960 (dated 5 July 2019) stipulates the compulsory requirement (as from 4 October 2019) to submit a report generated by the Screening Tool, when submitting an Application for EA. The proposed project has accordingly been run through the Screening Tool, and the associated report generated and attached to the Application for EA.

Based on the selected classification, the Screening Tool provides a list of specialist assessments that should be undertaken as part of the Scoping and EIA Process, as well as identifies the sensitivities on site that need to be verified by either the EAP or the specialists, where relevant, as noted in the Assessment Protocols of 20 March 2020 (GN 320) and 30 October 2020 (GN 1150). The classifications that apply to the proposed project are:

1. **Utilities Infrastructure; Electricity; Generation; Renewable; Solar; PV.**
2. **Utilities Infrastructure; Electricity; Distribution and Transmission; Powerline**
3. **Utilities Infrastructure; Electricity; Distribution and Transmission; Substation**

The following list of Specialist Assessments have been identified by the Screening Tool for inclusion in the Scoping and EIA Processes (Table 4.2). **The Screening Tool Reports (Appendix J of this EIA Report) note that it is the responsibility of the EAP to confirm this list and to motivate in the S&EIA Report, the reason for not including any of the identified specialist assessments, where relevant.**

As discussed at the Pre-Application Meeting held on 26 January 2023, the DFFE noted that the Screening Tool must be used as a guidance in terms of what studies are required and not required, and that the EAP must confirm this. Hence, the EAP is recommending that certain studies are not required. Refer to the discussion below.

Table 4.2: List of Specialist Assessments identified by the Screening Tool for the proposed project

Specialist Assessment Required by the Screening Tool		Assessment undertaken in S&EIA Process	Type of Assessment undertaken in S&EIA Process	Appendix of EIA Report
1	Agricultural Impact Assessment	Yes	Protocol GN 320: Part B: Agriculture (Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Agricultural Resources by Onshore Wind and/or Solar PV Energy Generation Facilities where the Electricity Output is 20 MW or more): Compliance Statement	Appendix G.1
2	Landscape/Visual Impact Assessment	Yes	Protocol GN 320: Part A: Site Sensitivity Verification; and Appendix 6 of the 2014 NEMA EIA Regulations (as amended): Impact Assessment	Appendix G.5
3	Archaeological and Cultural Heritage Impact Assessment	Yes	Protocol GN 320: Part A: Site Sensitivity Verification; and Appendix 6 of the 2014 NEMA EIA Regulations (as amended): Impact Assessment	Appendix G.6
4	Palaeontology Impact Assessment	Yes	Protocol GN 320: Part A: Site Sensitivity Verification; and Appendix 6 of the 2014 NEMA EIA Regulations (as amended): Impact Assessment	Appendix G.7

Specialist Assessment Required by the Screening Tool		Assessment undertaken in S&EIA Process	Type of Assessment undertaken in S&EIA Process	Appendix of EIA Report
5	Terrestrial Biodiversity Impact Assessment	Yes	Protocol GN 320: Part B: Biodiversity (Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Terrestrial Biodiversity): Impact Assessment Note that the reporting for Terrestrial Biodiversity, Terrestrial Plant Species and Terrestrial Animal Species are combined in one report.	Appendix G.2
6	Aquatic Biodiversity Impact Assessment	Yes	Protocol GN 320: Part B: Biodiversity (Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Aquatic Biodiversity): Impact Assessment Note there is currently no Species Protocol applicable to Aquatic Plants and Animals.	Appendix G.3
7	Civil Aviation Assessment	Yes (Site Sensitivity Verification)	Protocol GN 320: Part B: Civil Aviation (Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Civil Aviation Installations): Site Sensitivity Verification or Compliance Statement The Screening Tool indicates that the proposed project area is of “low” sensitivity. This has been verified and confirmed on site. As per the protocols, a Site Sensitivity Verification is only required. This has been provided in Appendix G.13 of this EIA Report. The South African Civil Aviation Authority and Air Traffic Navigation Services (ATNS) are included on the Interested and Affected Party (I&AP) database, and will be provided with access to the Scoping and EIA Reports in order to seek comment during the Scoping and EIA Process.	Appendix G.13
8	Defence Assessment	Yes (Site Sensitivity Verification)	Protocol GN 320: Part B: Defence (Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Defence Installations): Site Sensitivity Verification or Compliance Statement The Screening Tool indicates that the proposed project area is of “low” sensitivity. This has been verified and confirmed on site. As per the protocols, a Site Sensitivity Verification is only required. This has been provided in Appendix G.14 of this EIA Report. The Department of Defence will be provided with access to the Scoping and EIA Reports in order to seek comment during the Scoping and EIA Process.	Appendix G.14

Specialist Assessment Required by the Screening Tool		Assessment undertaken in S&EIA Process	Type of Assessment undertaken in S&EIA Process	Appendix of EIA Report
9	Radio Frequency Interference (RFI) Assessment	No	Motivation not to undertake this specialist assessment is provided in Section 4.3.2 below.	Motivation not to undertake this specialist assessment is provided in Section 4.3.2 below. Confirmed by SARAO.
10	Geotechnical Assessment	Yes	Appendix 6 of the 2014 NEMA EIA Regulations (as amended): Impact Assessment There are no themes on the Screening Tool that currently relate to Geotechnical features that could be verified on site. Hence Part A of GN 320 (Site Sensitivity Verification) is not applicable in this regard.	Appendix G.12
11	Socio-Economic Assessment	Yes	Appendix 6 of the 2014 NEMA EIA Regulations (as amended): Impact Assessment There are no themes on the Screening Tool that currently relate to Socio-Economic features that could be verified on site. Hence Part A of GN 320 (Site Sensitivity Verification) is not applicable in this regard.	Appendix G.8
12	Plant Species Assessment	Yes	Protocol GN 1150: Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant Species: Impact Assessment Note that the reporting for Terrestrial Biodiversity, Terrestrial Plant Species and Terrestrial Animal Species are combined in one report.	Appendix G.2
13	Animal Species Assessment	Yes	Protocol GN 1150: Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species: Compliance Statement Note that the reporting for Terrestrial Biodiversity, Terrestrial Plant Species and Terrestrial Animal Species are combined in one report.	Appendix G.2

4.4.1 Additional Specialist Assessments

It must be noted that the Screening Tool did not identify the need for the following specialist assessments, however these studies have been commissioned as part of the Scoping and EIA Process to ensure that all potential impacts resulting from the proposed project are considered as best as possible:

- **Avifauna Impact Assessment:** This study is included in Appendix G.4 of this EIA Report. The Avifauna Impact Assessment was undertaken in compliance with GN 1150 (Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species: Impact Assessment);
- **Traffic Impact Assessment:** This study is included in Appendix G.9 of this EIA Report. The Traffic Impact Assessment is being undertaken in compliance with Appendix 6 of the 2014 NEMA EIA Regulations (as amended);
- **BESS High Level Safety, Health and Environment Risk Assessment:** This study is included in Appendix G.10 of this EIA Report. This is a technical report and does not need to fulfil the requirements of the 2014 NEMA EIA Regulations (as amended); and
- **Geohydrology Impact Assessment:** This study is included in Appendix G.11 of this EIA Report.

4.4.2 RFI Assessment

The Screening Tool identified the need for an RFI Assessment. However, an RFI Assessment is not being undertaken as part of the Scoping and EIA Process because the proposed project does not pose an EMI or RFI risk to the SKA, as the proposed project is located outside of the Northern Cape as well as the KCAAA. Refer to Figure 4.2 for the location of the proposed project in relation to the SKA and KCAAA. The proposed project site falls within an area of low sensitivity in terms of SKA sensitivity for the development of solar energy (Table 4.1).

Based on this, the EAP is of the opinion that an RFI Assessment is not warranted.

Furthermore, the SARAO was consulted to ascertain whether the proposed project will pose a risk of interference to the nearest SKA radio telescope. The SARAO confirmed that the project represents a low risk of interference to the nearest SKA radio telescope with a compliance surplus of 28.42 dBm/Hz. Accordingly, they had no objection to the proposed project. Therefore, RFI and EMI specialist studies will not be commissioned by the S&EIA project team as SARAO's assessment and findings is considered conclusive in respect of the RFI and EMI sensitive themes. Copies of the comments received from SARAO are included in Appendix E.5 of this EIA Report and captured and responses to as part of the Comments and Responses Report in Appendix E.7.

4.5 Overview of Approach to Preparing the EIA Report and EMPr

The specialist studies were undertaken based on compliance with relevant legislation and based on the ToR indicated in Section 4.9 of this chapter. The results of the specialist assessments and other relevant project information and research undertaken for this proposed project are integrated into this EIA Report. The Draft EIA Report was released for a 30-day I&AP and authority comment period from 11 August 2023 to 11 September 2023. I&APs registered on the project database were notified in writing of the release of the Draft EIA Report for comment.

Comments raised, through written correspondence (emails and letters) have been captured in a Comments and Responses Report and included as Appendix E Part 4 to the Final EIA Report that is being submitted to the DFFE for decision-making.

The EIA Report includes an EMPr that has been prepared in compliance with the relevant regulations (see Appendix H of this EIA Report). The content of an EMPr must either contain the information set out in Appendix 4 of the 2014 NEMA EIA Regulations (as amended) or must be a Generic EMPr relevant to an application as identified and gazetted by the Minister in a GN. As part of the 2016 EGI Strategic SEA, a Generic EMPr was compiled for the development and expansion of (a) overhead electricity transmission and distribution infrastructure; and (b) substation infrastructure for the transmission and distribution of electricity. On 2 March 2018, these two Generic EMPrs were gazetted in Government Gazette (GG) 41473, GN 162 and GN 163, for public comment for a period of 45 days. On 22 March 2019, these two Generic EMPrs were gazetted for implementation, in GG 42323, GN 435.

As noted in previous chapters, the DBF SEF S&EIA process includes the assessment of internal EGI which comprises 132 kV power lines and an on-site substation complex. Therefore, this EIA Report for the proposed project includes three EMPrs (Appendix H). This includes an EMPr to be compiled for the proposed SEF that complies with Appendix 4 of the 2014 NEMA EIA Regulations (as amended), as well as two EMPrs that comply with the requirements of the gazetted EMPrs for power line and substation infrastructure (Gazette 42323, GN 435), where relevant.

The EMPrs are based broadly on the environmental management philosophy presented in the ISO 14001 standard, which embodies an approach of continual improvement. Actions in the EMPr have been drawn primarily from the impact management actions in the specialist assessments for the construction and operational phases of the project. If the project components are decommissioned or re-developed this will need to be done in accordance with the relevant environmental standards and clean-up/remediation requirements applicable at the time. However, general management actions for the decommissioning phase have been provided.

4.6 Public Participation Process

4.6.1 Introduction to the PPP

This section provides an overview of the tasks that were undertaken in the Scoping and EIA Process, with a particular emphasis on providing a clear record of the PPP that has been followed.

Guideline 4 on “*Public Participation in support of the EIA Regulations*” published by the former Department of Environmental Affairs and Tourism (DEAT) in May 2006, states that public participation is one of the most important aspects of the Environmental Assessment Process. This stems from the requirement that people have a right to be informed about potential decisions that may affect them and that they must be afforded an opportunity to influence those decisions. Effective public participation also improves the ability of the Competent Authority to make informed decisions and results in improved decision-making as the view of all parties are considered.

An effective PPP could therefore result in stakeholders working together to produce better decisions than if they had worked independently. The DEAT guideline states the following in terms of PPP:

- *“Provides an opportunity for I&APs, EAPs and the Competent Authority to obtain clear, accurate and understandable information about the environmental impacts of the proposed activity or implications of a decision;*
 - *Provides I&APs with an opportunity to voice their support, concern and question regarding the project, application or decision;*
 - *Enables an applicant to incorporate the needs, preferences and values of affected parties into its application;*
 - *Provides opportunities for clearing up misunderstanding about technical issues, resolving disputes and reconciling conflicting interests;*
 - *Is an important aspect of securing transparency and accountability in decision-making; and*
 - *Contributes toward maintaining a health, vibrant democracy.”*

To the above, one can add the following universally recognised principles for public participation:

- Inclusive consultation that enables all sectors of society to participate in the consultation and assessment processes;
- Provision of accurate and easily accessible information in a language that is clear and sufficiently non-technical for I&APs to understand, and that is sufficient to enable meaningful participation;
- Active empowerment of grassroots people to understand concepts and information with a view to active and meaningful participation;
- Use of a variety of methods for information dissemination in order to improve accessibility, for example, by way of discussion, documents, meetings, workshops, focus group discussions, and the printed and broadcast media;
- Affording I&APs sufficient time to study material, to exchange information, and to make contributions at various stages during the assessment process;
- Provision of opportunities for I&APs to provide their inputs via a range of methods, for example, via briefing sessions, public meetings, written submissions or direct contact with members of the EIA team; and
- Public participation is a process and vehicle to provide sufficient and accessible information to I&APs in an objective manner to assist I&APs to identify issues of concern, to identify alternatives, to suggest opportunities to reduce potentially negative or enhance potentially positive impacts, and to verify that issues and/or inputs have been captured and addressed during the assessment process.

At the outset it is important to highlight two key aspects of public participation:

- There are practical and financial limitations to the involvement of all individuals within a PPP. Hence, the PPP aims to generate issues that are representative of societal sectors, not each individual and will be designed to be inclusive of a broad range of sectors relevant to the proposed project; and
- The PPP will aim to raise a diversity of perspectives and will not be designed to force consensus amongst I&APs. Indeed, diversity of opinion rather than consensus building is likely to enrich ultimate decision-making. Therefore, where possible, the PPP will aim to obtain an indication of trade-offs that all stakeholders (i.e., I&APs, technical specialists, the authorities and the development proponent) are willing to accept with regard to the ecological sustainability, social equity and economic growth associated with the project.

The Department of Environmental Affairs (2017), Public Participation guideline in terms of the NEMA EIA Regulations is also being considered during this Scoping and EIA Process. The Western Cape Department of Environmental Affairs & Development Planning (DEA&DP), (2013) Guideline on Public Participation, EIA Guideline and Information Document Series⁷, is also being consulted.

The key steps in the PPP for this Scoping and EIA Process are described below and are also illustrated in Figure 4.3. This approach is structured in line with the requirements of Chapter 6 (PPP) of the 2014 NEMA EIA Regulations (as amended, i.e. GN R326), as described below. Various mechanisms will be undertaken to provide notice to all potential and registered I&APs of the proposed project, as described below.

⁷ DEA&DP (2013) Guideline on Public Participation, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning (DEA&DP), March 2013.

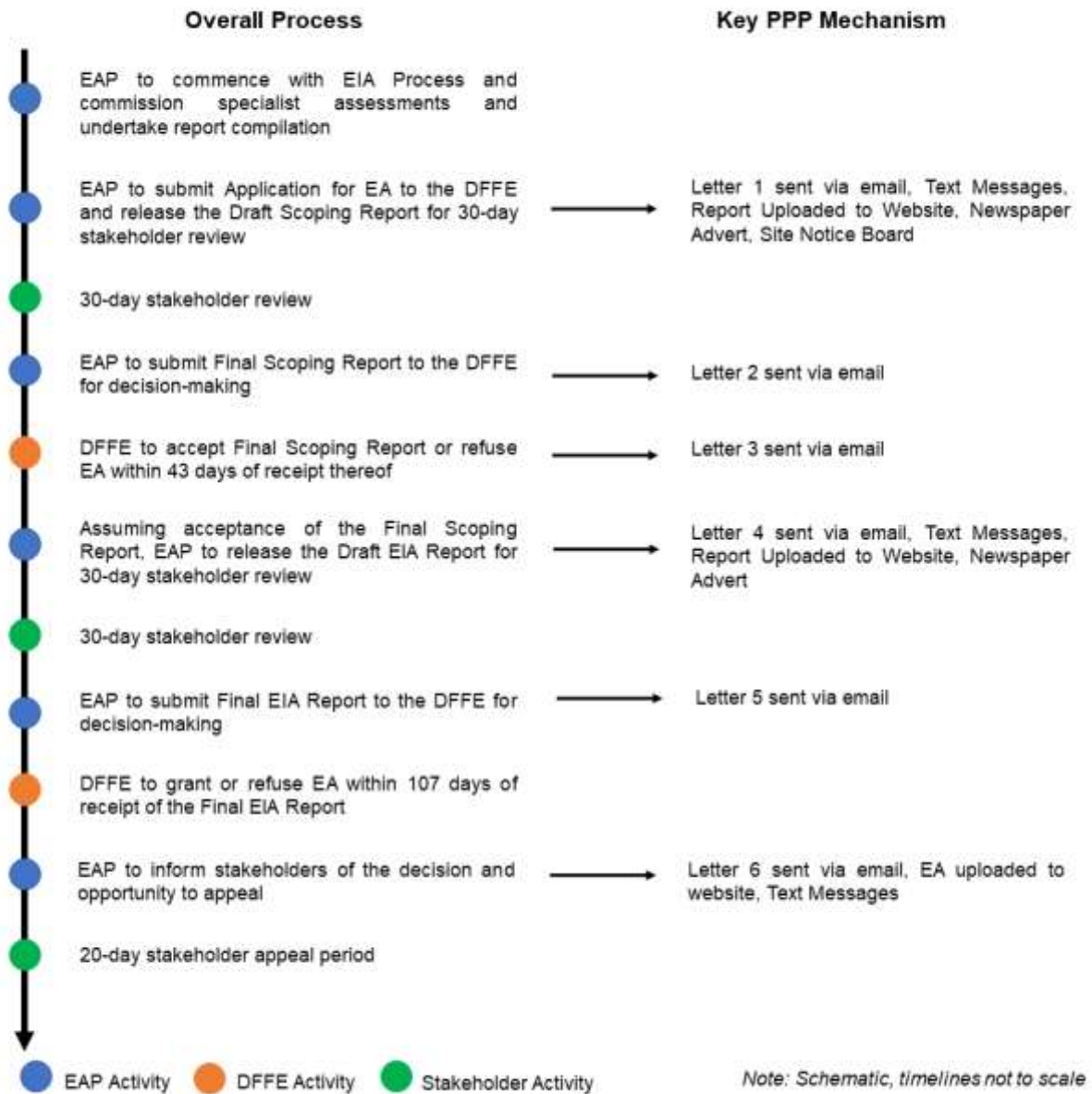


Figure 4.3: Overview of the Scoping and EIA Process and PPP

4.6.2 Pre-Application Consultation with the DFFE

A request for a Pre-Application Meeting was submitted to the DFFE on 26 January 2023 after which the EAP received a response from the DFFE on 27 January 2023 (Reference Number: 2023-01-0030). The DFFE later confirmed via email that a Pre-Application Meeting was scheduled for 7 February 2023. The Pre-Application Meeting was undertaken in order to discuss and agree on various aspects prior to release the Draft Scoping Report. The following points were discussed with the DFFE:

- Description of the proposed project;
- Discussion and confirmation of the specialist assessments and compliance statements to be undertaken;
- Discussion on the approach towards the specialist reporting;
- Discussion on the approach towards the BA and S&EIA reporting;
- Discussion on the proposed Public Participation Process to be undertaken;
- Discussion on the preliminary proposed project schedule and overall process for the EIAs and BA, including the applicable Listed Activities; and
- Discussion on the Cumulative Impact Assessment approach (i.e., assess cumulative impacts based on a 30 km buffer and based on Renewable Energy projects with a positive EA issued or which have submitted an EA Application at the start of these BA and EIA processes (i.e., January 2023))

Refer to Appendix F.1 of this EIA Report for a copy of the Pre-Application Meeting Request Form that was submitted to the DFFE; Appendix F.2 for a copy of the presentation delivered at the Pre-Application Meeting; Appendix F.3 for a copy of the Pre-Application Meeting Notes; Appendix F.4 for the submission of the Pre-Application Meeting Notes to the DFFE; and Appendix F.5 for a copy of correspondence from the DFFE with approval of the Pre-Application Meeting Notes. The Pre-Application Meeting Notes were submitted to the DFFE via email on 22 February 2023 and approved by the DFFE on 28 February 2023.

4.6.3 Landowner Written Consent

Regulation 39 (1) of the 2014 NEMA EIA Regulations (as amended) states that *“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”*.

Regulation 39 (2) of the 2014 NEMA EIA Regulations (as amended) further states that *“sub-regulation (1) does not apply in respect of: (a) linear activities; (b) activities constituting, or activities directly related to prospecting or exploration of a mineral and petroleum resource or extraction and primary processing of a mineral or petroleum resource; and (c) strategic integrated projects as contemplated in the Infrastructure Development Act, 2014”*.

The proposed project constitutes non-linear activities, and landowner consent is therefore required for the affected properties listed in Chapter 2 of this report. Written consent has been obtained from the respective landowners of the affected farm portions on which the non-linear infrastructure is proposed to be located. The written consent was included as an appendix to the Application for

EA, which was submitted to the DFFE, together with the DSR for comment. The consent was retained in the Amended Application Form for EA that was submitted to the DFFE with the FSR for consideration.

The proposed project also constitutes linear activities, i.e., the 33/132 kV power line to connect the on-site substation to the GEED Collector Substation, and landowner consent is therefore not required for the affected properties, namely Portion 1 of Farm Doornboomfontein Nr. 89.

4.6.4 Determination of Appropriate Consultation Measures, and I&AP Identification, Registration and the Creation of an Electronic Database

In order to accommodate the varying needs of I&APs and develop their capacity to participate in the process, information sharing forms an integral and ongoing component of the EIA Process to ensure effective public participation.

In line with Regulation 41 (2) (b) of the 2014 NEMA EIA Regulations (as amended) and prior to the commencement of the Scoping and EIA Process (and advertising the EA Processes in the local print media), an initial database of I&APs (including key stakeholders and Organs of State) was developed for the Scoping and EIA Process. This was undertaken based on research. Appendix D of this EIA Report includes a copy of the I&AP Database, which indicates key stakeholders and all I&APs that have been added to the project database.

In line with Regulation 41 (2) (b) of 2014 NEMA EIA Regulations (as amended), the database includes the details of the following:

- Landowners of the affected farm portions;
- Occupiers of the affected farm portions;
- Landowners of the neighbouring adjacent farm portions;
- The municipal councillor of the ward in which the proposed project will be undertaken;
- The municipality which has jurisdiction in the area (i.e. Beaufort West Local Municipality and the Central Karoo District Municipality);
- Relevant Organs of State that have jurisdiction in respect of any aspect of the activity (e.g. the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP), Department of Human Settlement, Water and Sanitation (DHSWS), DALRRD, DMRE, Eskom etc.); and
- Any other party as required by the Competent Authority.

In addition, the I&AP database includes the Competent Authority (i.e., DFFE); and potential and registered I&APs.

The above stakeholders, Organs of State and I&APs have accordingly received written notification of the commencement of the Scoping and EIA process, and were informed of the release of the DSR and Draft EIA Report, respectively, for comment.

While I&APs have been encouraged to register their interest in the project from the start of the process, following the public announcements, the identification and registration of I&APs is

ongoing for the duration of the study. Stakeholders from a variety of sectors, geographical locations and/or interest groups are expected to show an interest in the proposed project, for example:

- Provincial and Local Government Departments;
- Local interest groups, for example, Councillors and Rate Payers associations;
- Surrounding landowners;
- Farmer Organisations;
- Environmental Groups and NGOs; and
- Grassroots communities and structures.

As per Regulation 42 of the 2014 NEMA EIA Regulations (as amended), in terms of the electronic database, I&AP details will be captured and automatically updated as and when information is distributed to or received from I&APs. This ongoing record of communication is an important component of the PPP. It must be noted that while not required by the regulations, those I&APs proactively identified at the outset of the Scoping and EIA Process will remain on the project database throughout the process and will be kept informed of all opportunities to comment and will only be removed from the database by request.

In accordance with the Protection of Personal Information Act (Act 4 of 2013), the CSIR will conduct itself responsibly when collecting, processing, storing and sharing any personal information collected for the purposes of PPP in terms of the 2014 NEMA EIA Regulations (as amended). By registering as an I&AP and/or submitting information and comments, the stakeholder essentially consents to the collection, collation, processing, and storing of such information and the use and disclosure of such information for the aforementioned purpose⁸.

The above was explained to I&APs in the correspondence issued for the release of the DSR and will be maintained on all remaining correspondence sent throughout the EIA process. The stakeholders have also been given an opportunity to send an email to the EAP if they wish to opt out of communications on the proposed project.

Appendix D of this EIA Report includes a copy of the latest I&AP Database, which indicates interaction with I&APs and key stakeholders, as well as all I&APs that have been added to the project database thus far, including those that have submitted comments.

4.6.5 Site Notices

One specific mechanism of informing I&APs of the proposed projects includes the placement of site notice boards. Regulation 41 (2) (a) of the 2014 NEMA EIA Regulations (as amended) requires that a notice board providing information on the project and Scoping and EIA Process is fixed at a place that is conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of the site where the application will be undertaken or any alternative site.

Notice boards in the Afrikaans and English languages were placed at the key affected farm portions on which the proposed projects will be constructed, as well as at other strategic locations, such as well-known retail, public and/or government facilities in the wider region, as indicated in Table 4.3.

⁸ CSIR Privacy Notice. Website: <https://www.csir.co.za/csir-privacy-notice>

Table 4.3: Site Notice Board Placement for the Proposed Project

#	Locality/ Description	Coordinates
1	Entrance at the Central Karoo District Municipality offices, Beaufort West	S32° 20' 55.0" E22° 34' 57.6"
2	Entrance at the Beaufort West Local Municipality offices, Beaufort West	S32° 21' 00.7" E22° 35' 00.4"
3	Entrance at the Beaufort West Public Library, Beaufort West	S32° 21' 01.3" E22° 35' 00.4"
4	At the Fraserburg turn off from the R381 to the clusters	S32° 6' 40.9" E22° 26' 55.9"
5	Entrance gate to the southern cluster (DBF South SEF)	S32°6'44.71" E22°13'40.1"
6	Entrance gate to Matjiesfontein and Moddersdrift to the southern cluster (DBF South SEF)	S32°3'19.81" E22°21'15.33"

Refer to Appendix E.1 of this EIA Report for a copy of the content and proof of placement of the site notice boards. The site notice boards include the following, in compliance with Regulation 41 (3) of the 2014 NEMA EIA Regulations (as amended):

- The details of the proposed project that is subjected to public participation;
- Explanation that a Scoping and EIA procedure is applicable to the proposed project;
- The nature and location of the proposed project;
- Details on where further information on the proposed project can be obtained; and
- The manner in which and the person to whom representations in respect of the proposed projects can be made.

4.6.6 Scoping Phase Public Participation

In terms of Regulation 41 (6) of GN R326 the section below outlines the PPP undertaken for the Scoping Phase of this assessment in order to provide potential I&APs, Stakeholders and Organs of State access to information on the project and the opportunity to comment at the various stages of the assessment process.

4.6.6.1 Review of the Scoping Report

The Scoping Report for the proposed project was released to I&APs, Stakeholders and Organs of State for a 30-day comment period extending from 4 March to 3 April 2023. The section below summarises the PPP undertaken for the review of the DSR.

- **Database Development and Maintenance:** In line with Regulation 41 (2) (b) of GN R326, an initial database of potential I&APs was developed for the Scoping and EIA Process and will be updated throughout the process. Refer to Appendix D of this EIA Report for a copy of the latest I&AP database that includes all I&APs that have registered, commented on the DSR, and have been communicated with during the 30-day review period.
- **Site Notice Boards:** As noted in Section 4.6.5 above, notice boards have been placed for the proposed project. A copy of the content and proof of placement of the notice boards is included in Appendix E.1 of this EIA Report.

- **Advertisements to Register Interest:** In accordance with Regulation 41 (2) and (3) of the 2014 NEMA EIA Regulations (as amended), an advertisement was placed in Afrikaans, English and Xhosa in the local newspaper, “Die Courier” at the commencement of the 30-day comment period for the Scoping Report. A copy of the content of - and proof of placement of - of the newspaper advertisement is included in Appendix E.2 of this EIA Report.
- **Submission of the Application for EA and Scoping Report to the DFFE and DFFE Acknowledgement of Receipt:** The Application Form for EA and Scoping Report was submitted to the DFFE via the DFFE Novell S-Filer System on 1 March 2023 and proof of upload was emailed to the DFFE. Proof of submission of the Scoping Report for comment and Application for EA to the DFFE and proof of upload to the DFFE Novell S-Filer System is included in Appendix E.4 of this EIA Report. The DFFE acknowledged receipt of the Application for EA and DSR for DBF South SEF on 1 March 2023 (as included in Appendix E.5 of this EIA Report). DFFE assigned the following reference number to the proposed project: 14/12/16/3/3/2/2317
- **Letter 1 to I&APs (Release of the Scoping Report):** Written notification of the availability of the Scoping Report (i.e., Letter 1) was sent to all I&APs, stakeholders and Organs of State included on the project database via email, where email addresses are available. This letter was sent at the commencement of the 30-day review period on the DSR and included information on the proposed projects and notification of the release and availability of the reports. Letter 1 was written in English. Proof of email, as well as copies of the Letter 1, have been included in Appendix E.3 of this EIA Report.
- **Text Messaging:** SMS texts were sent to all I&APs on the database, where cell phone numbers are available, to inform them of the proposed projects and how to access the Scoping Report. The text messages were sent on 3 March 2023. Refer to Appendix E.3 of this EIA Report for proof of text message consultation.
- **Executive Summaries of the Scoping Report:** Executive Summaries of the Scoping Report were emailed to I&APs on the database and uploaded to the project website.
- **30-day Comment Period:** As noted above, potential I&APs, including authorities and Organs of State, were notified via Letter 1, of the 30-day comment and registration period within which to submit comments on the Scoping Report and/or to register on the I&AP database.
- **Broader Networks:** Attempts were made to contact ward councillor(s) to request the contact information of additional councillors, as well as that of the Rate Payers Association, with the aim of requesting that they send notifications of the projects as well as report availability and executive summaries via their local networks (such as WhatsApp groups, Neighbourhood Watch groups, other social media mechanisms, etc.). However, no feedback was obtained.
- **Availability of Information:** The Draft Scoping Report was made available for a 30-day comment period and was distributed (both electronically and physically) to ensure access to information on the project and to communicate the Plan of Study for the EIA Phase. The Scoping Report was uploaded to the project website (i.e., <https://www.csir.co.za/environmental-impact-assessment>) for I&APs to access it. As a supplementary mechanism, the Scoping Report was also uploaded to another alternative web-platforms (i.e., Google Drive: https://drive.google.com/drive/folders/1hGX_Z96HA7m4sG4DeAGrS9bmVVsQEaWr?usp=share_link). As noted in the DSR, if an I&AP could not access the report via the project website or Google Drive, and if additional information is required (other than what was provided in the Executive Summaries), then the I&AP could contact the EAP to make an electronic copy available (*where feasibly possible*).
- Upon request, the DSR was saved onto USB drives, which were hand delivered to the national Department of Agriculture, Land Reform and Rural Development (DALRRD) and the Western

Cape Department of Agriculture. Refer to Appendix E.3 of this EIA Report for proof of such correspondence.

- **Reminder / Follow Up Emails of the Comment Period Closure:** A number of reminder / follow up emails informing stakeholders of the comment period closure and to seek comments were sent to I&APs, stakeholders and Organs of State included on the project database, where email addresses are available. Refer to Appendix E.3 of this EIA for proof of such correspondence.
- **Comments Received:** A key component of the Scoping and EIA Process is documenting and responding to the comments received from I&APs and the authorities. Copies of all comments received during the 30-day review of the DSR are included in Appendix E.5 of this EIA Report, as well as in the Issues and Responses Train in Appendix E.7. Comments were received from the following stakeholders during the 30-day review of the DSR:
 - SARAO;
 - DFFE Chief Directorate: Integrated Environmental Authorisations (Competent Authority);
 - DFFE: Biodiversity Conservation / CBO: Biodiversity Mainstreaming and EIA Directorate;
 - DFFE: Protected Areas Planning and Management Effectiveness Directorate;
 - DALRRD;
 - Western Cape Department of Agriculture;
 - Western Cape Department of Transport and Public Works;
 - DEA&DP;
 - SANParks;
 - Heritage Western Cape;
 - Central Karoo District Municipality;
 - Beaufort West Local Municipality;
 - Eskom;
 - Telkom; and
 - Various private individuals / I&APs

4.6.6.2 Submission of the FSR to the DFFE and Acceptance of the Scoping Report

Following the 30-day commenting period of the Scoping Report and incorporation of the comments received into the report, the FSR was submitted to the DFFE on 17 April 2023 in line with Regulation 21 (1) of the 2014 NEMA EIA Regulations (as amended). The report was submitted electronically to the DFFE via the Novell S-File system, as recommended by the DFFE since June 2020. The Scoping Report was accepted by DFFE on 1 June 2023 in terms of Regulation 22(a) of the 2014 NEMA EIA Regulations (as amended).

In line with best practice, I&APs on the project database were notified via Letter 2 via email (where email addresses were available) of the submission and acceptance of the FSR, as well as the commencement of the EIA phase (see Appendix E of this EIA Report for proof).

This step marked the end of the PPP for the Scoping Phase. The PPP for the subsequent EIA Phase is presented below.

4.6.7 EIA Phase Public Participation (CURRENT STAGE)

The section below outlines the PPP for the EIA Phase of this assessment in order to provide potential I&APs, Stakeholders and Organs of State access to information on the project and the opportunity to comment.

4.6.7.1 Task 1 – I&AP Review of the EIA Report and EMPr

The first stage in the process entailed the release of this Draft EIA Report for a 30-day I&AP and stakeholder comment period extending from 11 August 2023 to 11 September 2023. Relevant stakeholders, Organs of State and I&APs were informed of the review period in the following manner:

- **Database Maintenance:** In line with Regulation 42 of GN R326, an initial database of potential I&APs (including key stakeholders and Organs of State) was developed for the Scoping and EIA processes and will be updated throughout the process. Appendix D of this EIA Report includes a copy of the I&AP database, which indicates interaction with I&APs, key stakeholders and all I&APs that have been added to the electronic project database, to date. While I&APs have been encouraged to register their interest in the project from the start of the process, following the public announcements, the identification and registration of I&APs is ongoing for the duration of the study. As a result, I&AP details will be captured and automatically updated as and when information is distributed to or received from I&APs. I&APs will only be removed or de-registered from the database, upon request. The updated database was used to provide written notification of the release of the Draft EIA Report for comment.
- **Protection of Personal Information:** In accordance with the Protection of Personal Information Act (Act 4 of 2013), the CSIR will conduct itself responsibly when collecting, processing, storing and sharing any personal information collected for the purposes of PPP in terms of the 2014 NEMA EIA Regulations (as amended). By registering as an I&AP and/or submitting information and comments, the stakeholder essentially consents to the collection, collation, processing, and storing of such information and the use and disclosure of such information for the aforementioned purpose⁹. The stakeholders will also be given an opportunity to send an email to the EAP if they wish to opt out of communications on the proposed project.
- **Advertisements to Register Interest:** An advertisement was placed in English, Afrikaans and isiXhosa in *Die Courier* local newspaper, at the commencement of the 30-day comment period for the Draft EIA Report. A copy of the content of the advertisement and proof of placement of the advertisement is included in Appendix E Part 3 of this EIA Report.
- **Letter 3¹⁰ to I&APs (Availability of the Draft EIA Report for public comment):** Written notification of the availability of the Draft EIA Report (i.e. Letter 3) was sent to all I&APs, Stakeholders and Organs of State included on the updated project database via email, where email addresses were available. This letter was sent at the commencement of the 30-day review period on the Draft EIA Report, and included information on the proposed projects and notification of the release and availability of the reports. Proof of email, as well as copies of the Letter 3, are included in Appendix E Part 3 to this Final EIA Report that is being submitted to the DFFE for decision-making.

⁹ CSIR Privacy Notice. Website: <https://www.csir.co.za/csir-privacy-notice>

¹⁰ Note that Letters 1 and 2 are addressed in Chapter 4.6.6 of this EIA Report and apply to the Scoping Phase.

- **Text Messaging:** SMS texts were sent to all I&APs – on the updated project database, where cell phone numbers are available – at the commencement of the EIA public participation period and a reminder SMS was sent prior to the closure of the commenting period, to inform them of the proposed project and how to access the Draft EIA Report.
- **30-day Comment Period:** As noted above, potential I&APs, including authorities and Organs of State, were notified via Letter 3, of the 30-day comment and registration period, extending from 11 August 2023 to 11 September 2023, within which to submit comments on the Draft EIA Reports and/or to register on the I&AP database. Proof of such notifications is included in Appendix E Part 3 of this Final EIA Report.
- **Executive Summaries:** The executive summary of the Draft EIA Report was also emailed to I&APs on the database, where email addresses were available, together with Letter 3, and uploaded to the project website and alternative web-platforms.
- **Availability of Information:** The Draft EIA Report was uploaded to the project website (i.e. <https://www.csir.co.za/environmental-impact-assessment>) for I&APs to access it. As a supplementary mechanism, the Draft EIA Report was also uploaded to another alternative web-platform (i.e., Google Drive: https://drive.google.com/drive/folders/1hGX_Z96HA7m4sG4DeAGrS9bmVVsQEaWr?usp=share_link). If an I&AP could not access the report via the project website or Google Drive, and if additional information is required (other than what was provided in the Executive Summaries), then the I&AP could contact the EAP to make an electronic copy available (*where feasibly possible*).
- The Draft EIA Report was saved onto USB flash drives, which were hand delivered to the national Department of Agriculture, Land Reform and Rural Development (DALRRD) and the Western Cape Department of Agriculture. Refer to Appendix E Part 3 of this EIA Report for proof of such correspondence.
- **Reminder / Follow Up Emails and/or SMSs of the Comment Period Closure:** A number of reminder / follow up emails and SMSs informing stakeholders of the comment period closure and to seek comments were sent to I&APs, stakeholders and Organs of State included on the project database, where email addresses or cellphone numbers were available. Refer to Appendix E Part 3 of this EIA for proof of such correspondence.
- **DFFE Site Inspection:** As requested by the DFFE in the Letter of Acceptance of the Scoping Report (refer to Appendix I of this EIA Report), the CSIR hosted a site inspection with the DFFE and the Project Developer on 15 September 2023. In attendance was the DFFE Case Officers for the DBF South SEF, Beau Valley SEF and Beau Valley WEF, as well as the DFFE Directorates for Biodiversity Conservation and the Directorate for Forestry. See Appendix E Part 3 for attendance register.

4.6.7.2 Task 2 – Comments and Responses Report

A key component of the EIA process is documenting and responding to the comments received from I&APs and the authorities. Copies of all written comments received during the review of the Draft EIA Report have been compiled into a Comments and Responses Report for inclusion as Appendix E Part 4 to the Final EIA Report that is being submitted to the DFFE for decision-making. The Comments and Responses Report indicates the nature of the comment, as well as when and who raised the comment. The comments received have been considered by the EIA team and appropriate responses provided by the relevant member of the EIA team, the Project Developer and/or specialists. The response provided indicate how the comment received has been dealt with

in the EIA Process and considered in the Final EIA Report, the project design or EMPs. Should the comment received fall beyond the scope of this EIA, clear reasoning is provided.

4.6.7.3 Task 3 – Compilation of the Final EIA Reports for Submission to DFFE

Following the 30-day commenting period on the Draft EIA Report and incorporation of the comments received into the reports, the Final EIA Report is being submitted to the DFFE for decision-making in line with Regulation 23 (1) (a) of the 2014 NEMA EIA Regulations (as amended). The report is being submitted electronically to the DFFE via the Novell S-Filer system, as recommended by the DFFE since June 2020.

In line with best practice, I&APs on the project database will be notified via **Letter 4** via email (where email addresses are available) of the submission of the Final EIA Report to the DFFE for decision-making. To ensure ongoing access to information, copies of the Final EIA Report that has been submitted for decision-making and the Comments and Response Report (detailing comments received during the EIA Phase and responses thereto) will be placed on the project website (i.e. <https://www.csir.co.za/environmental-impact-assessment>). As a supplementary mechanism, the Final EIA Report will also be uploaded to other alternative web-platforms such as Dropbox or Google Drive.

The Final EIA Report, which is being submitted for decision-making to the DFFE, includes proof of the PPP (Appendix E Part 3) that was undertaken to inform Organs of State, Stakeholders and I&APs of the availability of the Draft EIA Report for the 30-day comment period (as explained above).

The DFFE will have 107 days (from receipt of the Final EIA Report) to either grant or refuse EA (in line with Regulation 24 (1) of the 2014 NEMA EIA Regulations, as amended).

4.6.7.4 Task 4 – Environmental Authorisation (EA) and Appeal Process

Subsequent to the decision-making phase, if EA is granted by the DFFE for the proposed project, all registered I&APs, Organs of State and Stakeholders on the project database will receive notification of the issuing of the EA and the associated appeal period. The 2014 NEMA EIA Regulations (as amended) (i.e. Regulation 4 (1)) states that after the Competent Authority has reached a decision, it must inform the Project Applicant of the decision, in writing, within 5 days of such decision. Regulation 4 (2) of the 2014 NEMA EIA Regulations (as amended) stipulates that I&APs need to be informed of the EA and associated appeal period within 14 days of the date of the decision.

The distribution of the EA (should such authorisations be granted by the DFFE), as well as the notification of the appeal period, will include a letter (i.e. **Letter 5** (Release of EA and Notification of Opportunity to Appeal)) to be sent via email to all registered I&APs, Stakeholders and Organs of State on the project database, where email addresses are available. The letter will include information on the appeal period, as well as details regarding where to obtain a copy of the EA. The EA will be uploaded to the project website (i.e. <https://www.csir.co.za/environmental-impact-assessment>). SMS texts will also be sent to all I&APs on the database, where cell phone numbers are available, to inform them of the EA decision reached by the DFFE.

4.6.8 Authority Consultation during the EIA Phase

Authority consultation is integrated into the PPP, with meetings or discussions held on online platforms with the lead authorities, where necessary. It is proposed that the Competent Authority (DFFE) as well as other lead authorities will be consulted at various stages during the EIA Process, if required. At this stage, the following authorities have been identified for the purpose of this EIA Process (additional authorities might be added to this list as the EIA Process progresses):

- Air Traffic Navigation Services (ATNS)
- AgriSA;
- Birdlife South Africa;
- Cape Nature;
- Department of Transport;
- Department of Water and Sanitation;
- DFFE Integrated Environmental Authorisations Directorate;
- DFFE Biodiversity and Conservation Directorate;
- DFFE Protected Areas Directorate;
- Endangered Wildlife Trust;
- Eskom SOC Ltd;
- National Energy Regulator of South Africa (NERSA);
- Heritage Western Cape;
- Western Cape Department of Environmental Affairs and Development Planning (DEA&DP);
- Central Karoo District Municipality;
- Beaufort West Local Municipality;
- South African Civil Aviation Authority (CAA);
- South African Heritage Resources Agency (SAHRA)
- South African Local Government Association (SALGA) (Western Cape)
- South African National Parks (SANParks);
- South African National Roads Authority (SANRAL);
- South African Radio Astronomy Observatory (SARAO);
- South African Weather Services;
- Wildlife and Environmental Society of South Africa (WESSA); and
- World Wildlife Fund (WWF).

The authority consultation process for the EIA Phase is outlined in Table 4.4 below.

Table 4.4: Authority Communication Schedule

STAGE IN EIA PHASE	FORM OF CONSULTATION
During the EIA Process	As requested by the DFFE in the Letter of Acceptance of the Scoping Report (refer to Appendix I of this EIA Report), the CSIR hosted a site inspection with the DFFE and the Project Developer on 15 September 2023. In attendance was the DFFE Case Officers for the DBF South SEF, Beau Valley SEF and Beau Valley WEF, as well as the DFFE Directorates for Biodiversity Conservation and the Directorate for Forestry. See Appendix E Part 3 for attendance register.
During preparation of EIA Report	Communication (via email or online platforms (i.e. Microsoft Teams) with the DFFE on the outcome of Specialist Studies, if required.

On submission of the Draft EIA Report for comment	Online meetings with dedicated departments, if requested by the DFFE, with jurisdiction over particular aspects of the project (e.g. Local Authority).
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4.7 Schedule for the Scoping and EIA Processes

The proposed schedule for the Scoping and EIA Processes based on the legislated EIA timeframes, is presented in Table 4.4. It should be noted that this schedule could be revised during the EIA Processes, depending on factors such as the time required for decisions from authorities.

Table 4.5: Provisional Schedule for the proposed project

Key Milestones	Proposed Timeframe
Appointment of Specialists	December 2022 to January 2023
Project Initiation and Pre-Application Meeting with the Department of Forestry, Fisheries and the Environment (DFFE)	7 February 2023
Approval of Notes of the Pre-Application Meeting	28 February 2023
Specialist Inputs to the Draft Scoping Report (DSR)	January to February 2023
Prepare DSR and Plan of Study for EIA including specialist inputs	January to February 2023
Release DSR for 30-day comment period	4 March to 3 April 2023
Submit Final Scoping Report to the DFFE for Decision-Making	Mid-April 2023
DFFE to issue a Decision on the Final Scoping Report	End May 2023
Prepare Draft EIA Report	March to July 2023
Release Draft EIA Report for the for 30-day comment period	August 2023
Submit Final EIA Report to DFFE for Decision-Making	September 2023
DFFE Decision-Making on the Final EIA Report and issue of Decision (i.e. grant or refuse EA): 107 days	January 2024
EAP to Notify I&APs of Decisions (14 days)	Within 14 days of EA being issued

4.8 Terms of Reference for the Specialist Assessments

The specialist studies have been undertaken based on compliance with relevant legislation and based on the Terms of Reference indicated in the Plan of Study for the EIA, i.e. Chapter 7 of the FSR¹¹, which was accepted in June 2023. The Terms of Reference for the Specialist Assessments essentially consist of the generic assessment requirements and the specific issues identified for each discipline, as captured in the Plan of Study for EIA. The Terms of Reference did not require any update following the 30-day commenting period of the DSR. The results of the specialist assessments and other relevant project information and research undertaken for this proposed project have been integrated into this EIA Report.

The requirements for Specialist Assessments are specified in Appendix 6 of the 2014 NEMA EIA Regulations (as amended), and, where relevant, the Assessment Protocols that were published on 20 March 2020, in GG 43110, GN R320; and on 30 October 2020 in GG 43855, GN R1150. These protocols stipulate the procedures for the assessment and Minimum Reporting Criteria for identified environmental themes in terms of Sections 24 (5) (a) and (h) and Section 44 of the NEMA when applying for EA.

The Assessment Protocols in GN R320 include the following sections:

- **Part A:** This includes the Site Sensitivity Verification requirements where a Specialist Assessment is required but no Specific Assessment Protocol has been prescribed. This is applicable to the following specialist assessments for this project: Visual Impact Assessment; Heritage Impact Assessment; Palaeontology Assessment; Socio-Economic Assessment; Traffic Impact Assessment; Geohydrology Assessment; and Geotechnical Assessment. The current use of the land and the environmental sensitivity of the site under consideration identified by the Screening Tool, where determined, must be verified and confirmed by undertaking a Site Sensitivity Verification. A Site Sensitivity Verification must be compiled. Where there are no sensitivity layers on the Screening Tool for a particular Specialist Assessment, then this must be stated in the actual Specialist Assessment. For example, as of December 2022, there are no sensitivity layers on the Screening Tool for Socio-Economic, Traffic, Geohydrology, and Geotechnical features. These relevant Specialist Assessments must comply with Appendix 6 of the 2014 NEMA EIA Regulations (as amended).
- **Part B:** This includes the Site Sensitivity Verification requirements and the Assessment and Minimum Reporting Criteria where a Specialist Assessment is required, and a specific Assessment Protocol has been prescribed. The following prescribed protocols are relevant to this proposed project:
 - **Agriculture:** Site Sensitivity Verification Report required and specific Assessment Protocol to be followed. This applies to all onshore wind and/or solar PV energy activities requiring EA;
 - **Terrestrial Biodiversity:** Site Sensitivity Verification Report required and specific Assessment Protocol to be followed. This applies to all relevant activities requiring EA (based on the classification identified by the Screening Tool);

¹¹ CSIR, 2023. Scoping and Environmental Impact Assessment (EIA) Process for the proposed development of the Genesis DBF South Solar Energy Facility and associated infrastructure, near Beaufort West in the Western Cape Province. Scoping Report: CSIR/SPLA/SECO/ER/2023/0020/B.

- **Aquatic Biodiversity:** Site Sensitivity Verification Report required and specific Assessment Protocol to be followed. This applies to all relevant activities requiring EA (based on the classification identified by the Screening Tool);
- **Civil Aviation:** Site Sensitivity Verification Report required and specific Assessment Protocol to be followed. This applies to all relevant activities requiring EA (based on the classification identified by the Screening Tool); and
- **Defence:** Site Sensitivity Verification Report required and specific Assessment Protocol to be followed. This applies to all relevant activities requiring EA (based on the classification identified by the Screening Tool).

GN 1150 prescribes protocols in respect of specific environmental themes for the assessment of, as well as the minimum report content requirements on, the environmental impacts for activities requiring EA. GN 1150 includes a protocol for the specialist assessment and minimum report content requirements for environmental impacts on a) **terrestrial animal species** and b) **terrestrial plant species**. The requirements of these protocols apply from the date of publication (i.e. from 30 October 2020). **Therefore, these protocols are applicable to the project.**

As noted above, the specialist assessments will comply with Appendix 6 of the 2014 NEMA EIA Regulations (as amended), or the Assessment Protocols published in GN R320 on March 2020; or the Assessment Protocols published in GN R1150 on October 2020. The BESS Risk Assessment will serve as a technical report, and the aforementioned legislation will thus not be applicable.

4.8.1 Agricultural Compliance Statement

The Agricultural Compliance Statement must comply with the Assessment Protocols that were published on 20 March 2020, in GG 43110, GN R320. This specifically includes the Agriculture Protocol that applies to all onshore wind and/or solar PV energy activities requiring EA. This protocol replaces the requirements of Appendix 6 of the 2014 NEMA EIA Regulations (as amended).

The Agricultural Compliance Statement will include the following:

- Specification of development setbacks or buffers required (if any), and clear motivations for these recommendations;
- A map showing the proposed development footprint (including supporting infrastructure) with a 50m buffered development envelope, overlaid on the agricultural sensitivity map generated by the Screening Tool;
- Calculations of the physical development footprint area for each land parcel as well as the total physical development footprint area of the proposed development including supporting infrastructure;
- Confirmation that the development footprint is in line with the allowable development limits contained in GN R320;
- Identification of the direct, indirect and cumulative impacts associated with the proposed development, where possible, (although an assessment and rating of impacts is not strictly required for a Compliance Statement stipulated in GN R320);
- Cumulative impacts to be identified by considering other renewable energy projects within 30 km of the proposed projects;

- Confirmation that all reasonable measures have been taken through micro-siting to avoid or minimise fragmentation and disturbance of agricultural activities;
- A substantiated statement indicating the level of acceptability of the proposed development and a recommendation if the development should go ahead or not; as well as any conditions to which this statement is subjected;
- A description of assumptions, any uncertainties or gaps in knowledge or data, and limitations;
- The compliance statement must be applicable to the preferred site and proposed development footprint; confirm that the site is of “low” or “medium” sensitivity for agriculture; and indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site.
- A signed specialist statement of independence and details and relevant expertise as well as the South African Council for Natural Scientific Professions (SACNASP) registration number of the specialist, including a Curriculum Vitae;
- Where required, provide recommendations with regards to proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr, which will be appended to the Draft and Final EIA Reports; and
- Determine mitigation and/or management measures, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts.
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The scoping phase Agricultural Compliance Statement (Appendix G.1 of the EIA Report) already fulfilled all the above requirements for the EIA phase. The Agricultural specialist indicated in the scoping phase Agricultural Compliance Statement that all that remains is to amend the Compliance Statement in the EIA phase with:

- Updated maps with the final proposed layout following revisions based on scoping level input from the other specialists and their further assessment during the EIA phase;
- Completed the cumulative impact assessment calculations and allowable footprint calculations

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making; and
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMPr. If so, a list of the required specific impact management outcomes and actions must be provided.

4.8.2 Terrestrial Biodiversity and Species Impact Assessment

The Terrestrial Biodiversity Specialist is required to compile a Specialist Assessment in adherence to the following gazetted Environmental Assessment Protocols, which replace the requirements of Appendix 6 of the 2014 NEMA EIA Regulations (as amended):

- Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Terrestrial Biodiversity (GG 43110 / GN R320, 20 March 2020);

- Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species (GG 43855 / GN R1150, 30 October 2020); and
- Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant Species (GG 43855 / GN R1150, 30 October 2020).

Based on the findings of the site visit and the Site Sensitivity Verification undertaken by the specialist, and the Terrestrial Biodiversity and Species Scoping Level Specialist Assessment (included in Appendix G.2 of the Scoping Report), it was confirmed that a Terrestrial Biodiversity and Animal Species Assessment Report and Terrestrial Plant Species Compliance Assessment Report are required during the EIA Phase.

The Terrestrial Biodiversity Assessment, and Terrestrial Animal Species and Plant Species Compliance Statements, will be based on existing information, national and provincial databases, and professional experience and fieldwork conducted by the specialist, as considered necessary and in accordance with relevant legislated requirements. The Assessment Report and Compliance Statement must also be in adherence to any additional relevant legislation and guidelines that may be deemed necessary. One combined report will be provided to address the Terrestrial Biodiversity, Terrestrial Plant Species and Terrestrial Animal Species Protocols. Note that the Avifauna Assessment is undertaken separately, in compliance with the Terrestrial Animal Species (GG 43855 / GN R1150, 30 October 2020).

The Terrestrial Biodiversity Assessment will include the following:

- Contact details of the specialist, SACNASP registration number, field of expertise, relevant experience, and a Curriculum Vitae;
- A signed statement of independence by the specialist;
- Liaison with the South African National Biodiversity Institute (SANBI) to obtain information on any sensitive species flagged in the Screening Tool (where species names are obscured / only numbered);
- A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
- A description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;
- Description of the terrestrial ecology and ecosystem features of the project site, with focus on features that are to be potentially impacted by the proposed project. The description will include the major habitat forms within the study area, giving due consideration to terrestrial fauna and flora;
- A motivation must be provided if there were development footprints identified that were identified as having a “low” terrestrial biodiversity sensitivity and that were not considered appropriate;
- A motivation must be provided if there were any development footprints identified that were identified as having “low” or “medium” terrestrial plant species sensitivity and were not considered appropriate;
- Determination, description and mapping of the baseline environmental condition and sensitivity of the study area. Specification of development setbacks or buffers required, and clear motivations for these recommendations. Include a description of the extent of disturbance and transformation of the site;

- Provide review input on the preferred infrastructure layout following the sensitivity analysis and layout identification;
- A location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);
- Consideration of seasonal changes and long-term trends, such as due to climate change;
- Identification of any species of conservation concern (SCC) or protected species found on site or those suspected to occur on site (e.g. protected tree and provincially protected species);
- The online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;
- Assessment of local and regional biodiversity conservation planning relevant to the project area;
- Identification and assessment of the potential direct, indirect and cumulative impacts of the proposed developments on terrestrial biodiversity and species:
 - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects.
 - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter, and must include the degree to which impacts and risks can be mitigated; reversed; and can cause loss of irreplaceable resources.
- A substantiated statement indicating the acceptability of the proposed development and a recommendation if the development should go ahead or not; and any conditions to which this statement is subjected;
- A description of assumptions and limitations in the report and any uncertainties or gaps in knowledge or data;
- A statement of the timing and intensity of site inspection observations (linked to GN R320);
- A description of the mean density of observations/number of sample sites per unit area of site inspection observations, where possible, as noted in the Species Environmental Assessment Guideline;
- Identification of any additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof;
- Assessment of the project alternatives and identification of a preferred alternative with motivation for this selection;
- Provision of recommendations with regards to potential monitoring programmes; and
- Determine mitigation, impact management actions and outcomes, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMP, which will be appended to the Draft and Final EIA Reports.

The Terrestrial Animal Species and Plant Species Specialist Compliance Statements will be prepared by a specialist registered with SACNASP and will include the following:

- The compliance statement will be applicable to the study area; confirm that the study area, is of “low” sensitivity for terrestrial animal species; and indicate whether or not the proposed development will have any impact SCC.
- Contact details and relevant experience as well as the SACNASP registration number of the specialist, including a Curriculum Vitae;

- Signed statement of independence by the specialist;
- Statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
- A description of the methodology used to undertake the site survey and to prepare the compliance statement, including equipment and modelling used where relevant;
- The mean density of observations/number of samples sites per unit area, where possible, as noted in the Species Environmental Assessment Guideline;
- Where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMPr, which will be appended to the Draft and Final EIA Reports;
- A description of the assumptions made and any uncertainties or gaps in knowledge or data; and
- Any conditions to which the compliance statement is subjected.

The Terrestrial Biodiversity and Species specialist recommended in the scoping phase Terrestrial Biodiversity and Species Report (Appendix G.2) that the EIA phase study and report include the following activities and outcomes:

- Additional camera trapping on the site to characterise the faunal communities present to a greater degree and in particular greater clarity on the distribution of the Riverine Rabbit on the site as well as the presence of other fauna SCC such as Mountain Reedbuck and Grey Rhebok.
- The conditions on the site to date have been relatively dry with the result that vegetation surveys conducted to date are not likely to have captured the full suite of species present. Additional detailed vegetation surveys across the site will be conducted. Particular attention will also be paid to the presence of rare or specialised habitats on the site. To date, no species of high conservation concern have been observed and should the situation remain the same, the site sensitivity in terms of flora would be low and a compliance statement would be the appropriate level of study for vegetation in the EIA phase.
- Engage with EWT Dryland Programme around the Riverine Rabbit and the degree of conflict between the development and the Riverine Rabbit. Establish applicable mitigation measures that could be applied to further reduce the impact of the development on Riverine Rabbit.
- Verify the final footprint of the development in the field to ensure that it avoids the sensitive features of the site and to confirm site sensitivity from a terrestrial biodiversity perspective.
- Identify in the field and based on the Wind Farm layout any additional impacts that may occur as a result of the development that have not been identified thus far.
- Identify any additional mitigation and avoidance measures for inclusion in the EMPr that should be implemented to further reduce the impacts of the development on terrestrial biodiversity.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making; and
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

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4.8.3 Aquatic Biodiversity and Species Impact Assessment

The Aquatic Biodiversity Specialist is required to compile a Specialist Assessment in adherence to the gazetted Environmental Assessment Protocols, specifically the “Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Aquatic Biodiversity” (GG 43110 / GN R320, 20 March 2020). This protocol replaces the requirements of Appendix 6 of the 2014 NEMA EIA Regulations (as amended).

Based on the findings of the site visit and the Site Sensitivity Verification undertaken by the specialist, and the Aquatic Biodiversity and Species Scoping Level Specialist Assessment (included in Appendix G.3 of the Scoping Report), an Aquatic Biodiversity Specialist Assessment Report is required during the EIA Phase.

The Aquatic Biodiversity and Species Impact Assessment is to be based on existing information, national and provincial databases, and professional experience and fieldwork conducted by the Specialist, as considered necessary and in accordance with relevant legislated requirements (e.g. GN R320). The Impact Assessment Report must also be in adherence to any additional relevant legislation and guidelines that may be deemed necessary.

The Aquatic Biodiversity and Species Impact Assessment will include the following:

- Contact details of the specialist, SACNASP registration number, field of expertise, relevant experience, and a Curriculum Vitae;
- A signed statement of independence by the specialist;
- A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
- A description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;
- Description of the aquatic biodiversity and ecosystems of the project site, with focus on features that are to be potentially impacted by the proposed project. The description should include the aquatic ecosystem types, presence of aquatic species, the major habitat forms giving due consideration to the composition of aquatic species communities, their habitat, distribution and movement patterns within the study area;
- Describe the extent of disturbance and transformation of the site, as necessary;
- Indication of the historic ecological condition (reference) and the Present Ecological State (PES) of identified aquatic features (in- stream, riparian and floodplain habitat), and on site that are to be potentially impacted by the proposed project i.e. possible changes to the channel and flow regime (surface and groundwater); and comment on the recommended ecological condition of aquatic habitats to be achieved within the project area;
- A map (if possible) describing the ecosystem processes that operate in relation to the aquatic ecosystems on and immediately adjacent to the project site (e.g. movement of surface and subsurface water, recharge, discharge, sediment transport, etc.);
- Identify and delineate wetlands that may occur on the sites, using the relevant protocols established;
- An indication of the national and provincial priority status of the aquatic ecosystem, including a description of the criteria for the given status (i.e. if the site includes a wetland or a river freshwater ecosystem priority area or sub catchment, a strategic water source area, whether

or not they are free-flowing rivers, wetland clusters, a critical biodiversity or ecologically sensitive area);

- Consideration of seasonal changes and long-term trends, such as due to climate change;
- Identify any SCC or protected species on site;
- Compilation of a Risk Matrix (Appendix A to GN R309 of 2016) and determining whether an application for Water Use Authorisation (e.g. General Authorisation or Water Use License) is required and if so, determining the requirements thereof;
- Assessment of local and regional biodiversity conservation planning relevant to the project area;
- A motivation must be provided if there were development footprints identified that were identified as having a “low” aquatic biodiversity sensitivity and that were not considered appropriate;
- Provide review input on the preferred infrastructure layout following the sensitivity analysis and layout identification;
- Assessment of the project alternatives and identification of a preferred alternative with motivation for this selection;
- Determination, description and mapping of the baseline environmental condition and sensitivity of the study area. Specification of development setbacks or suitable construction and operational buffers for the aquatic ecosystem, using the accepted methodologies, and clear motivations for these recommendations including a description of the location of areas not suitable for development and to be avoided during construction and operation, where relevant;
- A section indicating how the Screening Tool was interrogated and whether classification of the site is accurate or not. If not, it must be motivated why the classification is not accurate;
- The threat status of the ecosystem and species as identified by the Screening Tool;
- Identification and assessment of the potential direct, indirect and cumulative impacts of the proposed developments on aquatic biodiversity and species:
 - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects.
 - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter, and must include the degree to which impacts and risks can be mitigated; reversed; and can cause loss of irreplaceable resources.
- A substantiated statement indicating the acceptability of the proposed development and a recommendation if the development should receive approval or not; and any conditions to which this statement is subjected;
- A description of assumptions and limitations in the report and any uncertainties or gaps in knowledge or data;
- Identification of any additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof;
- Provision of recommendations with regards to potential monitoring programmes; and
- Determine mitigation, impact management actions and outcomes, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMPr, which will be appended to the Draft and Final EIA Reports.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making; and
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

4.8.4 Avifauna Impact Assessment

The Avifauna Specialist is required to compile a Specialist Assessment in adherence to the protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species (GG 43855 / GN R1150, 30 October 2020). This protocol replaces the requirements of Appendix 6 of the 2014 NEMA EIA Regulations (as amended). The Avifauna Assessment will also be undertaken in terms of the following:

- Guidelines for the Implementation of the Terrestrial Flora and Terrestrial Fauna Species Protocols for EIAs in South Africa produced by the SANBI on behalf of the Department of Environment, Forestry and Fisheries (2020); and
- The BirdLife South Africa (BLSA) Guidelines for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa¹² to determine the level of survey effort that is required.

A pre-construction monitoring programme was conducted between December 2020 and August 2022 in accordance with the BLSA Birds and Solar Energy best practice guidelines (Jenkins et al. 2017).

Based on the findings of the site visit and the Site Sensitivity Verification undertaken by the specialist, and the Avifauna Scoping Level Specialist Assessment (included in Appendix G.4 of the Scoping Report), it was confirmed that a full assessment is required during the EIA Phase.

The Avifauna Specialist Assessment will be based on existing information, national and provincial databases, and professional experience and fieldwork conducted by the Specialist, as considered necessary and in accordance with relevant legislated requirements. The Assessment Report must also be in adherence to any additional relevant legislation and guidelines that may be deemed necessary.

The Avifauna Impact Assessment will include the following:

- Contact details of the specialist, SACNASP registration number, field of expertise, relevant experience, and a Curriculum Vitae;
- A signed statement of independence by the specialist;

¹² Jenkins, A.R., Ralston-Patton, Smit-Robinson, A.H. 2017. Guidelines for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa. BirdLife South Africa. BirdLife South Africa by Jenkins, A.R., Ralston-Patton, Smit- Robinson, A.H. 2017.

- A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
- A description of the methodology used to undertake the Site Sensitivity Verification, impact assessment and site inspection, including equipment and modelling used where relevant;
- A description of the mean density of observations/number of sample sites per unit area of site inspection observations, where possible, as noted in the Species Environmental Assessment Guideline;
- Details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;
- Finalisation of the findings and outcomes of the pre-construction avifaunal monitoring programme that was conducted over a period of six months in accordance with the BLSA guideline for Solar PV developments (i.e. Regime 2);
- Determination, description and mapping of the baseline environmental condition and sensitivity of the study area in terms of avifaunal features such as habitat use, roosting, feeding and nesting/breeding;
- Specification of development setbacks or buffers required, and provide clear motivations for these recommendations, including a description of the location of areas not suitable for development and to be avoided during construction and operation, where relevant;
- A motivation must be provided if there were any development footprints identified as having “low” or “medium” terrestrial animal species sensitivity and were not considered appropriate.
- Provide review input on the preferred infrastructure layout following the sensitivity analysis and layout identification;
- Assessment of the project alternatives and identification of a preferred alternative with motivation for this selection;
- Describe the affected environment from an avifaunal perspective, including consideration of the surrounding habitats and avifaunal features (e.g. Ramsar sites, Important Bird Areas, wetlands, migration routes, feeding, roosting and nesting areas, etc.);
- Describe and map bird habitats on the site, based on on-site monitoring, desk-top review, collation of available information, studies in the local area and previous experience. The assessment must also consider the maps generated by the Screening Tool;
- Identification and assessment of the potential direct, indirect and cumulative impacts of the proposed development on birds:
 - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects.
 - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter and must include the degree to which impacts and risks can be mitigated; reversed; and can cause loss of irreplaceable resources.
- A reasoned opinion, based on the findings of the specialist assessment, indicating the acceptability of the proposed development and a recommendation if the development should receive approval or not; and any conditions to which the opinion is subjected if relevant;
- A description of the assumptions made, any uncertainties or gaps in knowledge or data, and limitations in the report;
- A section indicating how the Screening Tool was interrogated and whether classification of the site is accurate or not. If not, it must be motivated why the classification is not accurate;
- Identification of any additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof;

- Recommendations for mitigation of impacts to acceptable levels (where possible) and potential monitoring programmes;
- Determine mitigation, impact management actions and outcomes, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMP, which will be appended to the Draft and Final EIA Reports.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making; and
- Review the Generic EMP for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMP (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

4.8.5 Visual Impact Assessment

The Visual Specialist is required to undertake a Specialist Assessment in adherence with “Part A - General Protocol for the Site Sensitivity Verification and Minimum Report Content Requirements where a Specialist Assessment is required but no specific Environmental Theme Protocol has been prescribed” (GG 43110 / GNR 320, 20 March 2020).

The Visual Impact Assessment (VIA) Report must be compiled in adherence to Appendix 6 of the 2014 NEMA EIA Regulations (as amended), as well as to any other additional relevant legislation and guidelines that may be deemed necessary, if applicable.

The Visual Impact Assessment must include the following:

- Determination, description and mapping of the baseline environmental condition and sensitivity of the study area. Specify set-backs or buffers, and provide clear reasons for these recommendations;
- Description of the visual character and visual absorption capacity of the local area. Any significant visual features or visual disturbances must be identified and mapped, as well as any sensitive visual receptors within the proposed project area or within viewsheds of the proposed project;
- Assessment of the preferred project layout following the Site Sensitivity Verification and layout identification;
- Viewshed for various elements of the proposed development must be calculated, defined and presented, and the varying sensitivities of these viewsheds must be highlighted;
- Mapping of visual sensitivity of the site taking into consideration visual receptors outside the site, and sensitivity to development on the site for potentially affected visual receptors of “very high” sensitivity;
- Provide review input on the preferred infrastructure layout following the sensitivity analysis and layout identification;

- Identification and assessment of the potential direct, indirect and cumulative impacts of the proposed development on the receiving environment from a visual perspective;
 - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects.
 - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter.
- Maps depicting viewsheds or line of sight across the sites should be generated and included in the VIA Report. These maps must indicate current viewsheds/visual landscape/obstructions, as well as expected visual impacts during the construction, operational and decommissioning phases of the proposed project, as relevant.
- A reasoned opinion indicating the acceptability of the proposed development and a recommendation if the development should go ahead or not;
- A description of assumptions and limitations in the report;
- A section indicating how the Screening Tool was interrogated and whether classification of the site is accurate or not. If not, it must be motivated why the classification is not accurate;
- Identification of any additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof;
- Specialist Declaration of Independence and Curriculum Vitae;
- Provide recommendations with regards to potential monitoring programmes; and
- Determine mitigation and/or management measures, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMPr, which will be appended to the Draft and Final EIA Reports.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making; and
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

4.8.6 Heritage Impact Assessment

The Heritage Specialist is required to undertake a Specialist Assessment in adherence to “Part A - General Protocol for the Site Sensitivity Verification and Minimum Report Content Requirements where a Specialist Assessment is required but no specific Environmental Theme Protocol has been prescribed” (GG 43110 / GNR 320, 20 March 2020).

The Heritage Impact Assessment (HIA) Report will be compiled in adherence to Appendix 6 of the 2014 NEMA EIA Regulations (as amended). The HIA must also comply with the requirements of SAHRA. The HIA must also be in adherence to any other additional relevant legislation and guidelines that may be deemed necessary, if applicable.

The Heritage Impact Assessment must include the following:

- Description and assessment of the heritage features of the sites and surrounding area. This is to be based on desktop reviews, fieldwork, available databases and findings from other heritage studies in the area, where relevant. Reference to the grade of heritage feature and any heritage status the feature may have been awarded will be included (where possible);
- Specification of development setbacks or buffers required, and clear motivations for these recommendations;
- Map the heritage sensitivity for the study area, clearly showing any “no-go” areas in terms of heritage (i.e. “very high” sensitivity).
- Provide review input on the preferred infrastructure layout following the sensitivity analysis and layout identification;
- Identify and assess the potential direct, indirect and cumulative impacts of the proposed developments on the full scope of heritage features, including archaeology and the cultural-historical landscape, as required by heritage legislation:
 - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects.
 - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter.
- Liaison with the relevant authorities (i.e. SAHRA) in order to obtain a letter of approval, comments or a Permit in terms of the National Heritage Resources Act (Act 25 of 1999), including Regulations issued thereunder, as necessary. This also includes meeting the reporting requirements of SAHRA.
- A reasoned opinion indicating the acceptability of the proposed development and a recommendation if the development should go ahead or not;
- A description of assumptions and limitations in the report;
- A section indicating how the Screening Tool was interrogated and whether classification of the site is accurate or not. If not, it must be motivated why the classification is not accurate;
- Identification of any additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof;
- Assessment of the project alternatives and identification of a preferred alternative with motivation for this selection;
- Specialist Declaration of Independence and Curriculum Vitae;
- Provide recommendations with regards to potential monitoring programmes; and
- Determine mitigation and/or management measures, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMP, which will be appended to the Draft and Final EIA Reports.

The Archaeology and Cultural Heritage specialist indicated that the scoping phase Heritage Report (Appendix G.6) is a high-level impact statement; therefore, it is required that the EIA phase study and report confirm the impact ratings based on the results of more detailed desktop study and further fieldwork.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making; and
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

4.8.7 Palaeontology Assessment

The appointed Palaeontologist is required to undertake a Site Sensitivity Verification in adherence to with “Part A - General Protocol for the Site Sensitivity Verification and Minimum Report Content Requirements where a Specialist Assessment is required but no specific Environmental Theme Protocol has been prescribed” (GG 43110 / GNR 320, 20 March 2020).

The Palaeontologist conducted a ten-day comprehensive site visit and field surveys in January 2023 to identify the level of sensitivity assigned to the project area, and to verify and confirm this sensitivity and land use as per the Screening Tool. The Palaeontology Site Sensitivity Verification was included in Appendix G.7 of the Scoping Report. According to the Screening Tool, the majority of the study area is of Very High palaeo-sensitivity. This provisional assessment has been contested by the specialist, based on a 10-day palaeontological site visit during which time no fossils were recovered from the DBF SEF site. It is concluded that the study area is of low palaeo-sensitivity in general. If any fossiliferous deposits are exposed by surface clearance or excavations during the construction phase of the development, the Chance Fossils Finds Protocol included in Appendix G.7 should be fully implemented. Provided that the Chance Fossil Finds Protocol is incorporated into the EMPr and fully implemented during the construction phase, the specialist has confirmed that there are no objections on palaeontological heritage grounds to authorisation of the proposed project, and that no further specialist palaeontological studies, reporting, monitoring or mitigation are recommended (pending the discovery of significant new fossil finds before or during construction).

4.8.8 Socio-Economic Impact Assessment

The Socio-Economic Specialist is required to undertake a Specialist Assessment in adherence to Appendix 6 of the 2014 NEMA EIA Regulations (as amended), as well as to any other additional relevant legislation and guidelines that may be deemed necessary, if applicable.

The Screening Tool does not include any sensitivity layers relating to socio-economic information (as of December 2022); therefore, a Site Sensitivity Verification is technically not possible. Inputs provided by the Socio-Economic Specialist are included as Appendix G.8 of the EIA Report.

The Socio-Economic Impact Assessment must include the following:

- Describe the socio-economic context of the study area, focusing on aspects that are potentially affected by the proposed project, and taking into consideration the current situation as well as the local trends, the local planning (Integrated Development Plans and Spatial Development Frameworks), and other developments in the area. The economic aspect of the assessment is

anticipated to include aspects such as direct employment figures, feedback on the Gross Domestic Product (GDP) etc., and is not expected to require a detailed economic analysis;

- Identify the potential social and economic impacts (including benefits) associated with the proposed project, including inter alia impacts associated with loss of farmland (grazing), contribution to economic growth and job creation, training and skills development opportunities, quality of life, local community income and influx of workers / job seekers;
- Consider social issues such as potential in-migration of job seekers, opportunities offered by training and skills development, phasing of employment over the duration of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), cumulative effects with other REIPPPP projects in the local area, implications for local planning and resource use;
- Apply a variety of appropriate options for sourcing information, such as review of analogous studies, available databases and social indicators, use of interviews with key stakeholders such as local communities, local landowners and government officials (local and regional), etc., where possible, to inform the assessment. Undertake the collection of both primary and secondary data;
- Evaluate the implications of the social investment programme associated with REIPPPP projects on the local socio-economic context;
- Identify and assess the potential direct, indirect and cumulative impacts of the proposed development on the receiving environment from a socio-economic perspective:
 - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects
 - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter.
- A reasoned opinion indicating the acceptability of the proposed development and a recommendation if the development should go ahead or not;
- A description of assumptions and limitations in the report;
- Identification of additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof, if any;
- Specialist Declaration of Independence and Curriculum Vitae;
- Provide recommendations with regards to potential monitoring programmes; and
- Determine mitigation and/or management measures, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMPr, which will be appended to the Draft and Final EIA Reports.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making.
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

4.8.9 Traffic Impact Assessment

The Traffic Specialist is required to undertake a Specialist Assessment in adherence to Appendix 6 of the 2014 NEMA EIA Regulations (as amended), as well as to any other additional relevant legislation and guidelines that may be deemed necessary, if applicable.

The Screening Tool does not include any sensitivity layers relating to traffic information (as of December 2022); therefore, a Site Sensitivity Verification is technically not possible. Inputs provided by the Traffic Specialist is included as Appendix G.9 of this EIA Report.

The Traffic Impact Assessment must include the following tasks:

- Undertake a site visit to gather relevant information in terms of access, road conditions etc. and provide feedback following the site visit confirming if there are any aspects that need to be considered in the layout planning;
- Describe the traffic and transportation context of the study area, focusing on aspects that are potentially affected by the proposed project;
- Determine and describe the baseline transport and traffic condition of the study area;
- Consider traffic issues such as impact on the road network, congestion etc.;
- Description of the identified traffic features including the surrounding road network and potential traffic disturbances of the local area;
- Assessment of the preferred project layout and how it relates to traffic impact;
- Determine the national and local haulage routes between port of entry/manufacture and site;
- Assessment of proposed internal roads and site access points;
- Assessment of freight requirements and permitting needed for abnormal loads;
- Identification and assessment of the potential direct, indirect and cumulative impacts of the proposed development on the receiving environment from a traffic perspective;
 - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects
 - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter.
- A description of assumptions and limitations in the report;
- A reasoned opinion indicating the acceptability of the proposed development and a recommendation if the development should go ahead or not;
- Identification of any additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof;
- Specialist Declaration of Independence and Curriculum Vitae;
- Provide recommendations with regards to potential monitoring programmes; and
- Determine mitigation and/or management measures, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMP, which will be appended to the Draft and Final EIA Reports.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making; and
- Review the Generic EMP for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-

specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

4.8.10 High Level Safety, Health, and Environment Risk Assessment for the Battery Energy Storage Systems

As indicated in the previous chapters, a High Level Safety, Health, and Environment Risk Assessment will be undertaken to study the risks associated with the proposed BESS. The Risk Assessment serves as a **technical report**, and thus Appendix 6 of the 2014 NEMA EIA Regulations (as amended) will thus **not** be applicable.

The ToR for the desktop assessment that will be completed during the EIA Phase of the project include:

- A description of the region and local features;
- A study of the battery technologies to be used;
- Identification of sensitive receptors in the area;
- Identifying the potential impacts on the health and safety of employees, contractors and public persons;
- Identification of relevant legislation and legal requirements; and
- Providing recommendations on possible preventative and mitigation measures for inclusion in the EMPr.

Refer to Appendix G.10 of this EIA Report for the High Level BESS Safety, Health, and Environment Risk Assessment, which describes the proposed methodology for the assessment during the EIA Phase.

4.8.11 Desktop Geohydrology Assessment

The Geohydrology Specialist is required to undertake a Specialist Assessment in adherence to Appendix 6 of the 2014 NEMA EIA Regulations (as amended), as well as to any other additional relevant legislation and guidelines that may be deemed necessary, if applicable.

The Screening Tool does not include any sensitivity layers relating to geohydrology information (as of December 2022); therefore, a Site Sensitivity Verification is technically not possible. Inputs provided by the Geohydrology Specialist is included as Appendix G.11 of this EIA Report.

The Geohydrology Assessment must include the following:

- Obtain data for the proposed REF site (i.e. obtain data from the National Groundwater Archive (and associated groundwater use databases) and internal GEOSS database (which includes information relevant to the site)). Obtain data from the local Department of Water and Sanitation (DWS) monitoring boreholes. Obtain relevant geological maps and geohydrological maps, as well as relevant groundwater reports;
- Analyse historical hydrocensus data in the region (GEOSS, 2023) using geohydrological and spatial analysis methods to address the project objectives;
- Determination, description and mapping of the baseline environmental condition and sensitivity of the study area relating to geohydrology (including hydrogeological characterisation of

aquifers (types, sensitivity, vulnerability), and groundwater (quality, quantity, use, potential for industrial or domestic use) in the area surrounding the proposed development;

- Specification of set-backs or buffers, and provide clear reasons for these recommendations;
- Provide review input on the preferred infrastructure layout following the sensitivity analysis and layout identification;
- Identify significant features or disturbances within the study area and define any environmental risks in terms of geohydrology and the proposed project infrastructure;
- Confirm what type of authorisation or licence is required to make use of the ground water;
- Identify and assess the potential direct, indirect and cumulative impacts of the proposed development on the receiving environment from a geohydrology perspective:
 - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects
 - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter.
- A reasoned opinion indicating the acceptability of the proposed development and a recommendation if the development should go ahead or not;
- A description of assumptions and limitations in the report;
- Identification of additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof, if any;
- Specialist Declaration of Independence and Curriculum Vitae;
- Provide recommendations with regards to potential monitoring programmes; and
- Determine mitigation and/or management measures, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMPr, which will be appended to the Draft and Final EIA Reports.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making.
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

4.8.12 Desktop Geotechnical Assessment

A Desktop Geotechnical Assessment will be undertaken in the EIA phase and will be included in the Draft and Final EIA Reports. The primary objective of the desktop assessment is to summarise the geology of the area, including the likely distribution of potential geotechnical challenges related to the underlying geology for the proposed project.

The study will comply with Appendix 6 of the 2014 NEMA EIA Regulations (as amended), as well as any other additional relevant legislation and guidelines that may be deemed necessary, if applicable.

The ToR for the desktop assessment that will be completed during the EIA Phase of the project include:

- Determine whether problem soils are likely to be encountered within the study area;
- Describe the geology and anticipated soil conditions;
- Include a general discussion of possible and likely engineering characteristics of the respective geological materials;
- Identify possible development constraints that may be present across the study area, e.g., topographical constraints, major discontinuities, or shallow groundwater conditions (permanent or non-permanent);
- Evaluation of the seismic potential of the area based on available published literature;
- Provide commentary on any potentially sensitive areas across the study area, such as ridges, outcrops and exposures.
- Provide broad recommendations that may be used to guide the geotechnical design and plan future investigations within the study area;
- Specification of set-backs or buffers, and provide clear reasons for these recommendations;
- Provide review input on the preferred infrastructure layout following the sensitivity analysis and layout identification;
- Identify and assess the potential direct, indirect and cumulative impacts of the proposed development on the receiving environment from a geotechnical perspective:
 - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects.
 - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter.
- A reasoned opinion indicating the acceptability of the proposed development and a recommendation if the development should go ahead or not;
- A description of assumptions and limitations in the report;
- Identification of additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof, if any;
- Specialist Declaration of Independence and Curriculum Vitae;
- Provide recommendations with regards to potential monitoring programmes; and
- Determine mitigation and/or management measures, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMP_r, which will be appended to the Draft and Final EIA Reports.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making.
- Review the Generic EMP_r for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMP_r (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

4.8.13 Civil Aviation

Civil Aviation Assessments are required to comply with the “Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Civil Aviation Installations” (GG 43110 / GN R320, 20 March 2020). As indicated in Chapter 3, Chapter 4, and Appendix G.13 of this EIA Report, the entire study area is classified as low sensitivity on the Screening Tool. Therefore, in line with GN R320, only a Site Sensitivity Verification is necessary to confirm the site as a low sensitivity. This has been verified and confirmed by means of a site visit. Therefore, there are no further requirements as per GN R320.

4.8.14 Defence

Defence Assessments are required to comply with the “Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Defence Installations” (GG 43110 / GN R320, 20 March 2020). As indicated in Chapter 3, Chapter 4, and Appendix G.14 of this EIA Report, the entire study area is classified as low sensitivity on the Screening Tool. Therefore, in line with GN R320, only a Site Sensitivity Verification is necessary to confirm the site as a low sensitivity. This has been verified and confirmed by means of a site visit. Therefore, there are no further requirements as per GN R320.

Scoping and Environmental Impact Assessment for the
proposed development of the Genesis DBF South Solar
Energy Facility and associated infrastructure near
Beaufort West in the Western Cape



FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER 5: Project Alternatives



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5. APPROACH TO THE ASSESSMENT OF ALTERNATIVES

This chapter discusses the alternatives that have been considered as part of the Environmental Impact Assessment (EIA) Phase. Sections 24(4) (b) (i) and 24(4A) of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) require an Environmental Assessment to include investigation and assessment of impacts associated with alternatives to the proposed project. In addition, Section 24O (1)(b)(iv) also requires that the Competent Authority, when considering an application for EA, takes into account “*where appropriate, any feasible and reasonable alternatives to the activity which is the subject of the application and any feasible and reasonable modifications or changes to the activity that may minimise harm to the environment*”.

Therefore, the assessment of alternatives should, as a minimum, include the following:

- The consideration of the no-go alternative as a baseline scenario;
- A comparison of the reasonable and feasible alternatives; and
- Providing a methodology for the elimination of an alternative.

The 2014 NEMA EIA Regulations (as amended) define “alternatives”, in relation to a proposed activity, “as different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:

- property on which or location where the activity is proposed to be undertaken;
- type of activity to be undertaken;
- design or layout of the activity;
- technology to be used in the activity;
- operational aspects of the activity; and
- includes the option of not implementing the activity”.

Appendix 3 of the 2014 NEMA EIA Regulations (as amended) provides the following objectives, *inter alia*, of the EIA Process in relation to alternatives:

- To identify the location of the development footprint within the approved site as contemplated in the accepted scoping report based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment; and
- To identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted scoping report based on the lowest level of environmental sensitivity identified during the assessment

The EIA Report is therefore required to provide a full description of the process followed to reach the proposed preferred activity, technology, site and location of the development footprint within the site, including details of all the alternatives considered and the outcome of the site selection matrix. The details presented in this chapter applies to the DBF South Solar Farm (hereafter referred to as the “DBF South SEF” or the “proposed project”).

5.1 Assessment of Alternatives

5.1.1 No-go Alternative

The no-go alternative assumes that the proposed project will not go ahead i.e. it is the option of not developing the proposed DBF South SEF and associated infrastructure. This alternative would result in no environmental impacts on the site or surrounding local area as a result of the proposed project. It provides the baseline against which other alternatives are compared. The following implications will occur if the “no-go” alternative is implemented (i.e. the proposed project does not proceed):

- No benefits will be derived from the implementation of an additional land-use;
- No additional power will be generated or supplied through means of renewable energy resources by the proposed project at this location;
- The “no go” alternative will not contribute to and assist the government in achieving its renewable energy target of 26 630 MW total installed capacity by 2030 (for Wind, Solar PV and Concentrated Solar Power (CSP)) (Integrated Resource Plan (IRP), 2019);
- Electricity generation will remain constant (i.e. no renewable energy generation will occur on the site for the proposed project) and as a result, the local economy in terms of surrounding communities and towns within the local municipality will not be diversified, while existing electricity generation sources nationally will age and degrade over time, with maintenance requirements potentially leading to outages;
- There will be lost opportunity for skills transfer and education/training of local communities;
- The positive socio-economic impacts likely to result from the project such as increased local spending and the creation of local employment opportunities will not be realised;
- There will be no opportunity for additional employment in an area, where job creation is identified as a key priority;
- The local economic benefits associated with the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) will not be realised, and socio-economic contribution payments into the local community fiscus will not be realised;
- The development of solar PV facilities instead of coal fired power stations can directly contribute to South Africa’s response to climate mitigation; and
- Wind and solar energy are the cheapest source of electricity in South Africa, as seen in the REIPPPP Bidding Window 5 Preferred Bidder announcement on 28 October 2021. The development of the proposed Solar PV Facilities can contribute to the competitive nature of the REIPPPP to drive prices down even further to ensure that South Africans have access to affordable yet clean electricity.

Converse to the above, the following benefits could occur if the “no-go” alternative is implemented:

- Only the agricultural land use (livestock farming) will remain;
- No vegetation or protected species (flora) will be removed or disturbed during the development of the proposed project;
- No aquatic resources will be impacted upon during the construction and operation of the proposed project;
- No destruction of habitat will occur;

- No change to the current landscape will occur (i.e. the visual character of the area will remain unchanged);
- No heritage features will be impacted on;
- No noise impacts associated with construction activities will occur;
- No avifaunal impacts will occur due to the establishment of the project;
- No additional traffic will be generated; and
- No additional water use will be required.

The no-go alternative has been considered further by the specialists in the EIA Phase. Refer to the Specialist Assessments captured in Appendix G of this EIA Report for feedback on the no-go alternative. It is important to note that none of the Specialist Assessments have identified any environmental fatal flaws, and no unacceptable residual impacts have been identified.

The no-go alternative means no addition of renewable energy, which means further reliance on fossil fuels that will continue to have a negative environmental impact. While the no-go alternative i.e. not developing the DBF South SEF will not result in any negative environmental impacts in the area, it will also not have any positive community development or socio-economic benefits. In addition, it will not assist government in addressing climate change, reaching its set targets for renewable energy, nor will it assist in supplying the increasing electricity demand within the country. **Hence, the no-go alternative is not the preferred alternative, nor is it a reasonable and feasible alternative to be considered in this EIA Process.**

5.1.2 Land-Use Alternatives

According to the Agricultural Compliance Statement, included in Appendix G.1 of the EIA Report, the arid climate is the limiting factor for land capability, regardless of the soil capability and terrain. Moisture availability is insufficient for crop production without irrigation and the potential agricultural land use of the study area is therefore limited to low carrying capacity grazing. The farm portions forming part of the study area are located in a sheep and cattle farming region. Grazing capacity of the study area is fairly low at 28 to 30 hectares (ha) per large stock unit.

The Agricultural Site Sensitivity Verification verifies that the proposed site is classified as low agricultural sensitivity with a predominant land capability value of 4 to 8, which is in line with the climate limitations that make the site unsuitable for dryland crop production. There is no scarcity of such agricultural land in South Africa and its conservation for agricultural production is not therefore a priority. The proposed project offers positive impact on agriculture by way of improved financial security for farming operations, as well as security benefits against stock theft and other crime.

Hence, the existing agricultural land use is not a preferred alternative.

5.1.3 Renewable Energy Alternatives

In terms of the type of activity, this relates to the generation of electricity from a renewable energy source, and in this particular case, from **solar** resources. As indicated in Chapter 1 of this EIA Report, the Project Developer, Genesis Eco-Energy Developments (Pty) Ltd, focuses on solar, wind and hybrid renewable energy developments and works with landowners, technology providers, regulators and investors to source and develop renewable energy projects. Therefore, the **generation of electricity from a renewable energy source** was the only activity considered by the Project Developer and Project Applicant, and thus considered in this EIA Report. **No other activity types were considered or deemed appropriate based on the expertise of the Project Applicant.**

Where the “activity” is the generation of electricity from a renewable energy source, possible alternatives that could potentially be considered include Biomass, Hydro Energy, Wind Energy and Solar Energy. The study area is attractive for renewable energy facilities (REFs) due to the significant solar and wind energy resources. As a result, the Project Developer is investigating and is proposing both solar and wind energy facilities as part of its package of projects in the area, consisting of two SEFs and seven WEFs. Biomass and Hydro energy facilities are deemed to be unsuitable technologies in the study area, and potential impacts of each, are discussed below.

5.1.3.1 Biomass Energy

The proposed project study area does not contain an abundant or sustainable supply of biomass. As indicated in Figure 5.1, the proposed project area has less than 5 000 t/a annual forestry residue, which is the lowest for this category. Therefore, the study area does not have any biomass energy potential.

Therefore, the implementation of a Biomass Energy Facility within the study area is not considered to be a reasonable and feasible alternative to be assessed as part of this Scoping and EIA Process.

5.1.3.2 Hydro Energy

The proposed project study area does not contain any large inland water bodies, which excludes the possibility of renewable energy from small- or large-scale hydro energy generation. In terms of macroscale hydropower potential (Figure 5.1), the study area falls within an area classified as “Not Suitable” (i.e. less than 1 000 kWh/year).

Therefore, the implementation of a Hydro Energy Facility within the study area is not considered to be a reasonable and feasible alternative to be assessed as part of this Scoping and EIA Process.

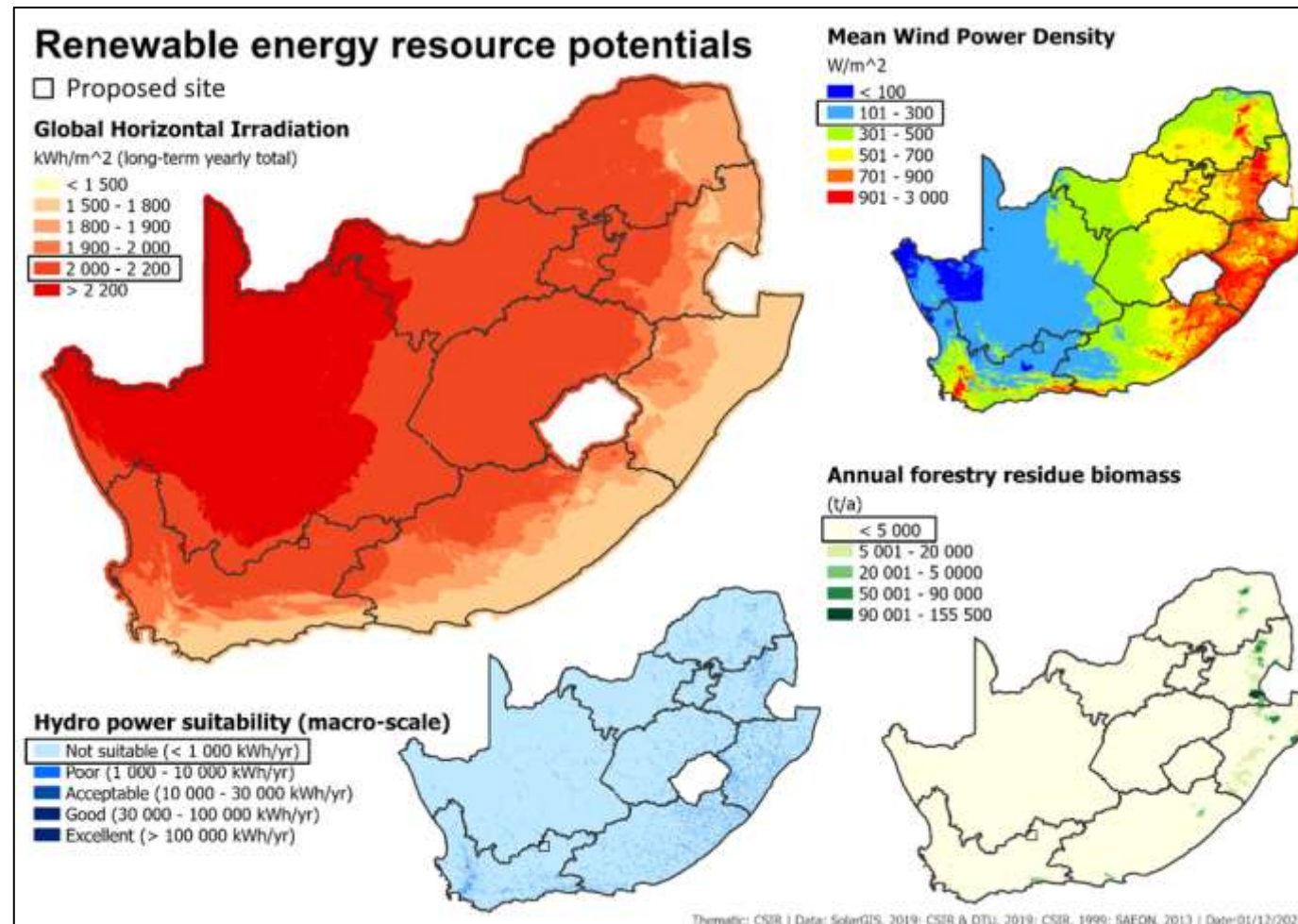


Figure 5.1: Solar Resource Availability / Global Horizontal Irradiation (kWh/m²); Annual Mean Wind Power Density (W/m²); Hydropower Potential (kWh/year); and Biomass Potential in terms of Annual Forestry Residue (t/a) for South Africa. The proposed project location is indicated by the black square.

5.1.3.3 Wind and Solar Energy

5.1.3.3.1 National Planning: IRP 2019

The 2019 IRP was published in Government Gazette (GG) 42784, Government Notice (GN) 1360 on 18 October 2019 for the period 2019 to 2030. As indicated in Figure 5.2 for the projection to 2030, coal makes up approximately 43 % of the total installed capacity, whereas Wind and Solar PV respectively make up 23 % and 10 % (Table 5, Page 42 of the IRP 2019 published in GG 42784).

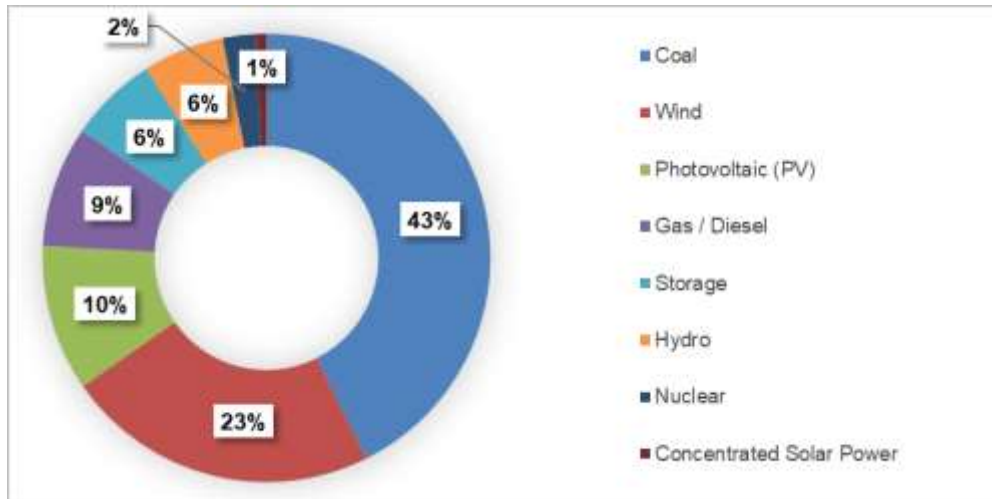


Figure 5.2: Total Installed Capacity for 2030 (% of MW) in the IRP of 2019.

The 2019 IRP proposes to secure 26 630 MW of renewable energy capacity by 2030 (for Wind, Solar PV and CSP). This amount excludes Hydropower and Storage. Of this total, 1 474 MW of Solar PV, 1 980 MW of Wind and 300 MW of CSP is already installed capacity. In addition, of the 26 630 MW, approximately 814 MW of Solar PV, 1 362 of Wind and 300 MW of CSP is committed or already contracted capacity. Furthermore, of the 26 630 MW total, 6 000 MW is allocated to Solar PV, and 14 400 MW is allocated to wind as new additional capacity. Refer to Figure 5.3 for additional information.

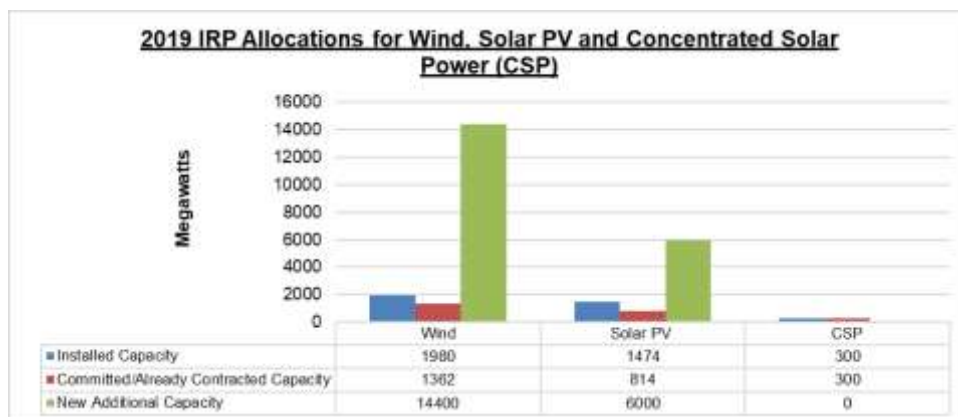


Figure 5.3: 2019 IRP Allocations for Wind, Solar and CSP in MW.

As part of the rollout of renewable energy in the country, the Department of Mineral Resources and Energy (DMRE) developed a bidding process for the procurement of a set amount (MW) of renewable energy in accordance with the IRP from Independent Power Producers (IPPs). The REIPPPP was launched in 2011 to implement the vision of the IRP and it included several bidding rounds (called “Bidding Windows”). To date, Bidding Windows 1, 2, 3, 3.5, 4, 5 and 6 have been announced.

On 18 August 2015, an additional procurement target of 6 300 MW to be generated from renewable energy sources was added to the REIPPPP for the years 2021 - 2025, as published in GN 733, GG 39111. Of this, the additional target allocated for solar PV was 2 200 MW and the additional target allocated for onshore wind was 3040 MW.

The preferred Bid Window 5 bidders amounted to approximately 1 608 MW and 975 MW which will be respectively procured from 12 wind projects and 13 Solar PV projects (DMRE, 2022a¹). In Bid Window 5, the preferred bidders provided an average tariff of 50 c/kWh for wind and of 43 c/kWh for solar PV. In Bid Window 6, the 5 Preferred Bidders, totalling 860 MW of solar PV, provided an average tariff of 49 c/kWh for solar PV (DMRE, 2022a²). This is a considerable reduction in tariff from Bid Window 4 in November 2015 where the tariff provided for wind and solar PV were both 78 c/kWh. This confirms the crucial role that renewable energy is playing in being the lowest cost energy alternative in South Africa, while supporting the decarbonisation of the power system and ensuring that electricity is cost-effective and sustainable.

According to the IPP Office, in a presentation made at the Bid Window 6 Bidders’ Conference on 7 July 2022 (IPP Office, 2022b³), as of March 2022 (excluding Bid Window 5 statistics), the DMRE had selected 92 Preferred Bidders, with a total combined electricity capacity of 6 323 MW procured, of which 5 826 MW is already operational from 87 IPPs.

On 7 July 2020, in GG 43509, GN R753, the Minister of Mineral Resources and Energy, in consultation with the National Energy Regulator of South Africa (NERSA), determined that new generation capacity needs to be procured to contribute towards energy security. Specifically, the gazette noted that 2000 MW needs to be procured from a range of energy source technologies in accordance with the short-term risk mitigation capacity allocated for the years 2019 to 2022 (under “other” in the allocation table contained in 2019 IRP). In line with this, the Risk Mitigation IPP Procurement Programme (RMIPPPP) was designed and launched in August 2020 by the DMRE in order to fulfil the GN R753 Ministerial Determination. Bids were submitted by various IPPs on 22 December 2020, and on 18 March 2021, the Minister of Mineral Resources and Energy, announced eight Preferred Bidders selected under the RMIPPPP, totalling 1 845 MW (DMRE,

¹ DMRE (2022a). Media Statement by the DMRE: Signing of an additional three project agreements under the 5th Bid Window of the Renewable Energy Independent Power Producer Programme (REIPPPP BID WINDOW 5), dated 10 November 2022. <https://ipp-projects.co.za/PressCentre> [online]. Accessed November 2022.

² DMRE (2022b). Media Statement by the DMRE: Signing of Preferred Bidder projects under the 5th Bid Window, and announcement of Preferred Bidders under the 6th Bid Window of the REIPPPP, dated 8 December 2022. <https://www.energy.gov.za/files/media/pr/2022/MediaStatement-REIPPPP-BW5-signing-08122022.pdf> [online]. Accessed February 2023.

³ IPP Office (2022b). Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) Bid Window 6 Bidders’ Conference dated 7 July 2022. <https://ipp-projects.co.za/PressCentre> [online]. Accessed August 2022.

2021b⁴). Three additional Preferred Bidder projects were also announced on 1 June 2021 under the RMIPPPP with a combined capacity of 150 MW, resulting in a total of approximately 1 995 MW to be procured under the RMIPPPP (DMRE, 2021c⁵).

As indicated in Chapter 2 of this EIA Report, the proposed project forms part of a package of 2 SEFs and 7 WEFs, which will each have a generation capacity that ranges from 140 MW to 400 MW, for a total of 2060 MW. It is intended for these projects to be bid under the future rounds of the REIPPPP or similar public or private electricity procurement processes, following the issuing of Environmental Authorisations (EAs), should such be granted.

5.1.3.3.2 Wind Energy

In order to ensure that a Wind Energy Facility is successful, a reliable wind resource is required. Wind resource is defined in terms of average wind speed and includes Weibull distribution (used to describe wind speed distributions); turbulence, wind direction, and pattern of wind direction (as depicted by a wind rose). These factors are all key considerations used in determining whether a site is suitable for the development of a Wind Energy Facility. A mean wind power density map has been created (CSIR, 2018), which is not related to any specific turbine type and demonstrates the wind resource of the country. The mean wind power density map shows that the project study area falls within an area of approximately 101 – 300 W/m² (Figure 5.1). Wind energy development is therefore a feasible alternative for the proposed site. However, as described in Chapter 2, the proposed DBF South SEF forms part of a **hybrid energy system** that is currently being proposed by the Project Developer. This hybrid energy cluster comprises wind and solar energy facilities which will complement one another, and it will harness both the favourable wind and solar energy resources characterising the study area.

The Avifauna Impact Assessment (Appendix G.4 of the EIA Report) notes ten suspected Verreaux's Eagle nest within the vicinity of the study area, located south of the proposed project site. The Avifauna Specialist has recommended a 1 km all infrastructure (wind turbines and solar PV) exclusion zone around these nests to prevent the displacement of the breeding pairs during the construction phase due to disturbance. In addition, the 1 km buffer area will reduce the risk of injury to juvenile birds due to collision with turbines and solar panels, when they start flying and practicing their hunting technique around the nests. Beyond the 1 km buffer, solar PV project development is acceptable. For a proposed wind development, the buffer around these nests would be greater. According to the Avifauna Specialist, the turbine exclusion buffer for Verreaux's Eagle nests is generally a 3.7 km, high sensitivity, buffer; and a 5.2 km medium sensitivity buffer wherein mitigation is required. The proposed DBF South SEF, located beyond the 1 km all infrastructure exclusion zone but within the 3.7 km turbine exclusion zone, is complemented by proposed WEF projects located beyond the 3.7 km turbine exclusion zone. Therefore, **the proposed complement of REFs derives efficient utility from the study area and its wind and solar energy resources, while ensuring that impacts on sensitive avifauna species (i.e. Verreaux's Eagle) are mitigated.**

⁴ DMRE (2021b). Media Statement: To Announce Preferred Bidders for the Risk Mitigation IPP Procurement Programme (RMIPPPP). <https://www.dmr.gov.za/news-room/post/1894/media-statement-to-announce-preferred-bidders-for-the-risk-mitigation-ipp-procurement-programme-rmipppp> [online]. Accessed November 2021.

⁵ DMRE (2021c). Media Statement: Department of Mineral Resources and Energy Announces Three Additional Preferred Bidders Appointed under the Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP). <https://www.ipp-rm.co.za/> [online]. Accessed November 2021.

5.1.3.3.3 Solar Energy

In terms of the suitability of solar energy development at this location, the proposed project study area falls within the **second highest** Global Horizontal Irradiation⁶ (GHI) category, relevant to PV installations (Figure 5.1). As indicated in Figure 5.1, the study area has a GHI of 2 000 kWh/m² to 2 200 kWh/m² in terms of the long-term yearly total.

Therefore, this area is deemed as one of the most suitable for the construction and operation of solar energy facilities as opposed to other areas and provinces within South Africa. For example, coastal regions within the Eastern Cape and Western Cape mainly have a lower GHI (shown in the lighter orange shades in Figure 5.1), which is not completely feasible as site alternatives for the proposed project. As indicated in the earlier discussion on the outcomes of Bid Window 5 and Bid Window 6 in October 2021 and December 2022, respectively, solar PV is currently the least cost energy generation option for South Africa. These factors substantiate that use of solar resources in the area is extremely viable and support the development of Solar PV within the proposed project study area.

Therefore, the implementation of a solar energy facility within the proposed site is more favourable and feasible than wind energy, biomass and hydropower development, especially from a project economic and energy generation viability and location compatibility perspective. Therefore, the proposed DBF South SEF is the most feasible and preferred Renewable Energy Alternative.

Finally, since the alternative renewable energy generation activities considered were deemed to be unreasonable and unfeasible for the study area, no other Renewable Energy alternatives were further assessed as part of the current Scoping and EIA Processes.

5.1.3.4 Summary of the Renewable Energy Alternatives

Table 5.1 presents a summary and an evaluation matrix for the possible renewable energy alternatives with regards to resource suitability and availability, and potential risks and impacts.

⁶ Global Horizontal Irradiance is the total amount of shortwave radiation received from above by a surface horizontal to the ground.

Table 5.1: Summary of Evaluation of Potential Risks and Impacts for Renewable Energy Alternatives

Type of Renewable Energy Alternative	Are suitable resources available at the proposed project site?	Main Potential Impacts and Risks	Is this the preferred Alternative?
Biomass Energy	No – not suitable i.e. less than 5 000 t/a annual forestry residue.	- Significant Waste Generation with the potential need for a Waste Management Licence; and - Air Emissions with the potential need for an Atmospheric Emissions Licence.	No
Hydro Energy	No – “Not Suitable” (i.e. less than 1 000 kWh/year)	- Significant impacts on aquatic biodiversity and hydrology of the affected river system; - Water Use Licence would be required for the establishment of an in-stream hydropower development; and - Long lead times would be required for the various permits needed for such a development.	No
Wind Energy	Yes, 101 – 300 W/m². Forms part of the hybrid (PV and Wind) energy cluster proposed by the Project Developer.	- Visual impacts as a result of construction activities and turbines during operation; - Noise generation as a result of construction activities and turbines during operation; - Bird and bat collisions during the operational phase; - More restrictive buffers due to presence of Verreaux’s Eagle in the wider study area (which were recorded during the site monitoring); and - Impacts on avifauna, aquatic ecology and terrestrial ecology.	No (But forms part of the hybrid (PV and Wind) energy cluster proposed by the Project Developer)
Solar Energy	Yes – 2 000 - 2 200 kWh/m²	- Visual impacts as a result of construction activities and the PV panels during operation; - Noise generation as a result of construction activities; - Loss of agricultural land (i.e. grazing); - Impacts on heritage resources (i.e. archaeology and palaeontology); - Impacts on the water balance as a result of water required for panel cleaning; and - Impacts on avifauna, aquatic ecology and terrestrial ecology.	Yes

5.1.4 Site Alternatives

As per the requirements listed within Appendix 2 – [(1) (d)] and [(2) (1) (g) (ix)] of the 2014 NEMA EIA Regulations (as amended), a site selection matrix should be provided to show how the preferred site was determined through a site selection process. Within this context, it is understood that the “site” referred to in the Regulations are the farms or land portions earmarked for the development of the proposed project. This is essentially the proposed project study area, which consists of farm portions indicated in Table 5.2.

Table 5.2: Farm portions forming the study area of the DBF South SEF

FARM PORTION	SG CODE	SRUDY AREA	FOOTPRINT	
			SEF	OHPL
Doornboomfontyn Farm RE/89	C00900000000008900000	X	X	X
Hartebeeste Vleis Berg Farm RE/213	C009000000000021300000	X		
Doornboomfontyn Farm 1/89	C00900000000008900001	X		X

The preferred site (i.e. study area) was strategically selected by the Project Developer based on various factors and detailed research, as noted below:

- As an initial step, the Project Developer undertook internal research, exploration work, and a desktop feasibility analysis (based on the grid connection options, solar resource and land availability) in order to identify the preferred site.
- The Project Developer then consulted the National Department of Forestry, Fisheries and the Environment (DFFE) Screening Tool and other available datasets, such as the Western Cape Critical Biodiversity Area (CBA) map, and the South African National Biodiversity Institute (SANBI) Biodiversity GIS (BGIS) system, as well as the Endangered Wildlife Trust (EWT) No-Go Screening Tool, in order to identify desktop environmental sensitivities and to determine if there are any fatal flaws and concerns. The findings indicated that the study area is generally developable.
- The Project Developer then consulted with the owners of the farm portions forming the study area to obtain consent to develop the proposed project, and to also identify any areas where development must be excluded based on the requirements of the landowners. These landowner exclusion zones were then acknowledged and implemented, which influenced the site selection process.
- The study area falls inside the Central Strategic Transmission Corridor that was gazetted in GN 113 of 16 February 2018, which allows for streamlining of the Environmental Assessment for Electrical Grid Infrastructure (EGI) development within the corridor, whereby a Basic Assessment and 57 days decision-making can be followed, instead of a full Scoping and EIA with 107 days decision-making. In addition, the EGI Standard was published on 27 July 2022, in GG 47095; GN 2313, which allows for the exclusion from an Environmental Assessment for EGI development within the gazetted corridors in low and medium sensitivity areas. Should the EGI Standard apply, then the development for the EGI components of the project would only be subjected to a registration process with a decision-making of 30 days. This expedited timeframe was considered by the Project Developer, and therefore obtaining a site within any of the gazetted Strategic Transmission Corridors was focused on.
- A key priority for the Project Developer was to find a site which has favourable wind and solar resources for the development of a hybrid renewable energy system comprising of WEFs and SEFs. The mean wind power density map shows that the project study area falls within an area of approximately 101 – 300 W/m² (Figure 5.1). In terms of the suitability of solar energy development at this location, the proposed project study area falls within the second highest GHI category of 2 000 kWh/m² to 2 200 kWh/m² in terms of the long-term yearly total. The site proposed for the DBF South SEF and adjacent farm portions therefore meets the requirements for the hybrid REF.
- The Project Developer also considered the availability of main transmission grid capacity to facilitate the evacuation of the energy generated by the proposed REFs into the national

electrical transmission grid. Through consultation with Eskom, the Project Developer is determining opportunities to connect to the national grid via a 400 kV power line and associated EGI. A separate environmental assessment process will be undertaken for the development of the 400 kV power line and associated EGI. This is considered a significant site selection consideration for the Project Developer, as grid connection is an essential factor.

- It was also important for the site to be located outside of the Karoo Central Astronomy Advantage Area (KCAAA) distance sensitivity zones so that there are no unacceptable impacts on the Square Kilometre Array (SKA), which could potentially be a fatal flaw or require significant investment in Radio Frequency Interference and Electromagnetic Control studies to be undertaken.

At a local level, the affected farm portions for the development of the proposed project were selected based on a combination of the factors listed above. Furthermore, from an impact and risk assessment perspective, the implementation of the proposed project as the **preferred site** will most likely result in fewer risks in comparison to its implementation at alternative sites within the Western Cape (i.e. regions with similar solar radiation and wind resource levels), based on the following points:

- There is no guarantee that the current land use of alternative sites will be flexible in terms of development potential, for example, the agricultural potential at the alternative sites might be higher and of greater significance.
- There is no guarantee of the willingness of other landowners to allow the implementation of a REF on their land and if the landowners strongly object, then the project will not be feasible.
- There is no guarantee that other sites will be located close to existing or proposed EGI to enable connection to the national grid. The further away a project is from the grid, the higher the potential for significant environmental and economic impacts associated with the length of the transmission power line.

5.1.4.1 Site Specific Considerations

As indicated above, the preferred site for the proposed project extends over the farm portions indicated in Table 5.2.

On a site specific level, the preferred site was deemed suitable due to all the site selection factors (such as land availability, environmental sensitivities, irradiation levels, distance to the national grid, site accessibility, topography, current land use and landowner willingness) being favourable. The site selection criteria considered by the Project Developer are discussed in detail below in Table 5.3.

Table 5.3: Site selection factors and suitability of the preferred site for the development of the proposed project

FACTOR	SUITABILITY OF THE PREFERRED SITE
Land Availability	The farm portions comprising the preferred site are of a suitable size for the proposed project. The land available for the development of all the proposed projects is approximately 37 652 ha in extent. Although this total area was assessed by the specialists during the site verifications and Scoping Phase and will be further assessed during the EIA Phase, the permanent development footprint of the proposed DBF South SEF and its associated infrastructure will amount to up to 500 ha, which will be contained within the 1 135 ha study area. Informed by the sensitivities identified by the specialists, the EIA phase proposed PV area (207 ha) recommended for approval in Chapter 7 avoids the no-go sensitivities identified by the specialists.
Environmental Sensitivity	Although the preferred site for the proposed project does contain environmental features that need to be avoided due to very high or high environmental sensitivity, as described in Chapter 3 and Appendix G of this EIA Report, following these exclusions sufficient suitable land is still available to ensure the development feasibility of the project (see Section 5.1.5 below).
Irradiation Levels	The availability of the solar resource is the main driver of project viability. The project site was identified by the Project Developer through a desktop analysis based on the estimation of the solar energy resource, and other factors. This viable solar resource ensures the best value for money is gained from the project, allowing for competitive pricing and maximum generation potential, with the resulting direct and indirect benefits for the South African economy. The study area has a GHI of 2 000 to 2 200 kWh/m ² in terms of the long-term yearly total.
Distance to and availability of the Grid	GEED consulted with Eskom to formulate connection options for the GEED Renewable Energy Cluster projects. Following the inputs and recommendations from Eskom, two power evacuation options were proposed. These options take into consideration the status of the RedCap power lines, as well as the lack of clarity surrounding Eskom's future plans for the area. Through consultation with Eskom, the Project Developer has determined that one of two 400 kV grid connection opportunities exist which includes: - Option 1: Power evacuated via 400 kV OHPL from GEED collector sub-station (SS) to the proposed Nuweveld Main Transmission Substation (MTS) - Option 2: Power evacuated from GEED collector SS via 400 kV Loop-in Loop-out (LIL) extension of Eskom proposed 400 kV OHPL between proposed Nuweveld MTS and the existing Eskom Droërvier MTS. - Option 3: Power evacuated via 400 kV OHPL from GEED collector sub-station (SS) to the future proposed Eskom Klipkraal Main Transmission Substation (MTS) A separate environmental assessment process will be undertaken for the development of the 400 kV power line, GEED collector substation and associated EGL.
Site Accessibility	The proposed project site can be accessed via the following roads: ▪ Divisional Road 2312 (DR02312); ▪ Trunk Road 5801 (TR05801); and ▪ Trunk Road 7301 (TR07301). Refer to the Traffic Impact Assessment (Appendix G.9 of the EIA Report) and Chapter 2 of the EIA Report for additional information on the route options per project. Some of the existing intersections along the above roads may need to be widened to accommodate the turning movement of the trucks. Internal service roads will also be constructed within the footprint of the PV facility. The internal roads are expected to be composed of gravel or will be paved and will extend approximately 6 m wide. An up to 15 m wide road corridor may be temporarily impacted

FACTOR	SUITABILITY OF THE PREFERRED SITE
	during construction and rehabilitated to allow for a permanent ~6 m road surface after construction.
Topography	The proposed site lies on the plateau, north of the Great Escarpment. The proposed development site itself is located at an average elevation of 1 750 m a.s.l, comprising a wide flat area surrounded by hills and drained by small watercourses. The overall terrain morphological description of the southern portion of the study area is steep slopes of koppies, butts, mesas, while the northern portion is a more dissected landscape associated with the tributaries of the upper catchment of the Leeu River. The site is mostly underlain by flat lying mudstones and sandstones of the Permian-aged Teekloof Formation of the Beaufort Group, which have been intruded by Jurassic-aged horizontal dolerite lopoliths and subvertical dolerite dykes. These rocks are in-turn overlain by quaternary-aged partially calcretised alluvium deposits.
Current Land Use	Agriculture (mainly low-density livestock grazing)
Landowner Willingness	All affected landowners have signed letters of consent for the use of the land for the proposed project (should an EA be granted). This is considered an important aspect of the proposed project in terms of its viability (i.e. this will limit potential appeals during the decision-making process, as the landowner is willing and supportive of the proposed project being undertaken on the affected farm portions).

Furthermore, the proposed project forms part of a large cluster of 9 REF projects (2 SEFs and 7 WEFs). The main determining points for the Project Developer was to find suitable, developable land in one contiguous block to (i) optimize design, (ii) minimize construction and operational costs, and (iii) minimize sprawling development and limit the impact footprints. In addition, the proximity to the proposed Nuweveld MTS, the existing Eskom Droërvier MTS and the future proposed Eskom Klipkraal MTS, as well as existing Eskom 400 kV power lines, was also a major determinant for identifying suitable sites for the proposed development.

In order to submit a bid in terms of the REIPPPP, the proponent is required to have obtained an EA in terms of the EIA Regulations as well as several additional authorisations or consents. It is important to note that the National Department of Environmental Affairs (DEA) in discussion with the Department of Energy (DoE) (now respectively operating as the DFFE and DMRE), was mandated by MinMec to commission a Strategic Environmental Assessment (SEA) to identify the areas in South Africa that are of strategic importance for Wind and Solar PV development. The Phase 1 Wind and Solar PV SEA⁷ was completed in 2015, and was in support of the Strategic Infrastructure Plan (SIP) 8, which focuses on the promotion of green energy in South Africa. Similarly, the Phase 2 Wind and Solar SEA was commissioned in 2017 and completed in 2019. The SEA aimed to identify strategic geographical areas best suited for the roll-out of large-scale wind and solar PV energy projects, referred to as Renewable Energy Development Zones (REDZs). Through the identification of the REDZs, the key objective of the SEA was to enable strategic planning for the development of large-scale wind and solar PV energy facilities in a manner that avoids or minimises significant negative impact on the environment while being commercially attractive and yielding the highest possible social and economic benefit to the country – for example through strategic investment to lower the cost and reduce timeframes of grid access. Following the completion of the Phase 1 Wind and Solar SEA, eight REDZs were gazetted in February 2018 in GN 114 by the Minister of Environmental Affairs. In addition, following the

⁷ More information on the SEA can be accessed at <https://redzs.csir.co.za>

completion of the Phase 2 Wind and Solar SEA, three REDZs were gazetted in February 2021 in GN 144 by the Minister of Forestry, Fisheries and the Environment.

The proposed projects are located approximately between 0 and 6 km away from the Beaufort West REDZ, i.e. either directly adjacent or in close vicinity to the REDZ. While the proposed project is not located within the REDZ, it still indeed supports the development of a large-scale renewable energy project at the proposed location. The proposed project is linked to the national planning vision for Renewable Energy development in South Africa.

Given the site selection requirements associated with holistic hybrid energy clusters and the suitability of the land available on the **preferred site, no other site alternatives were considered as part of this Scoping and EIA Process. Therefore, the site is deemed feasible and selected as the preferred site.**

5.1.5 Development Footprint within the Preferred Site

The strategic process followed to reach the preferred site and to consider various development footprints (or location alternatives) within the preferred site are discussed in this section. The approach followed is to use environmental and social constraints to avoid sensitive features, thus applying mitigation hierarchy thinking. This approach replaces the need to rank alternative sites and locations, as it leads to the selection of the least sensitive development footprint.

Once the preferred site was identified, the Project Developer then determined the **Original Scoping Phase PV Assessment Area** based on the high-level environmental screening. Following this, the Environmental Assessment Practitioner (CSIR) and Specialists were appointed by the Project Developer to undertake the Scoping and EIA Processes for the DBF South SEF and the complement of REFs forming part of the GEED renewable energy cluster.

The specialists then undertook the Scoping Level Specialist Assessments (included in Appendix G of the Scoping Report), and site sensitivity verifications, where necessary. The specialists assessed the full extent of the study area for the DBF South SEF (i.e. approximately 6 931 ha). The preferred site for proposed PV area was approximately **1 135 hectares (ha)**. The Scoping Level Specialist Assessments resulted in the determination and verification of environmental sensitivities present on the preferred site. Based on the above, combined environmental feature and sensitivity maps were produced during the Scoping Phase.. These maps show the identified environmental features and sensitivities such as terrestrial biodiversity, aquatic features, avifauna, heritage, visual, and geohydrological features present within the study area. At the end of Scoping, the no-go or very highly sensitive environmental features found within the preferred site were avoided by the location, layout and design of the proposed project. Following the exclusion of the required areas, sufficient developable area is still available on site which does not compromise the current ecological integrity of the site.

Following the identification of sensitivities by the specialists during the Scoping Phase, the Project Developer took such sensitivities, and other considerations, into account and formulated an approximately 500 ha Revised Scoping Development Area which was considered in the EIA phase. Informed by the EIA-level specialist assessments and the proposed specialist mitigation measures, the final PV design and PV footprint that is proposed in the EIA phase has been reduced to 207

ha (see Chapter 7). The development footprint is where the actual PV solar arrays are proposed to be located. The buildable areas are the full extent to be approved for development, and the development footprint detailed in the layouts is based on the current proposal.

Accordingly, the layout or location of the development footprint of the proposed project has been refined in the EIA Phase. The EIA Phase layout and **Buildable Areas / development footprints** are thus a culmination of extensive technical, economic and environmental planning. The refinement and evolution of the layout is illustrated in Figure 5.4

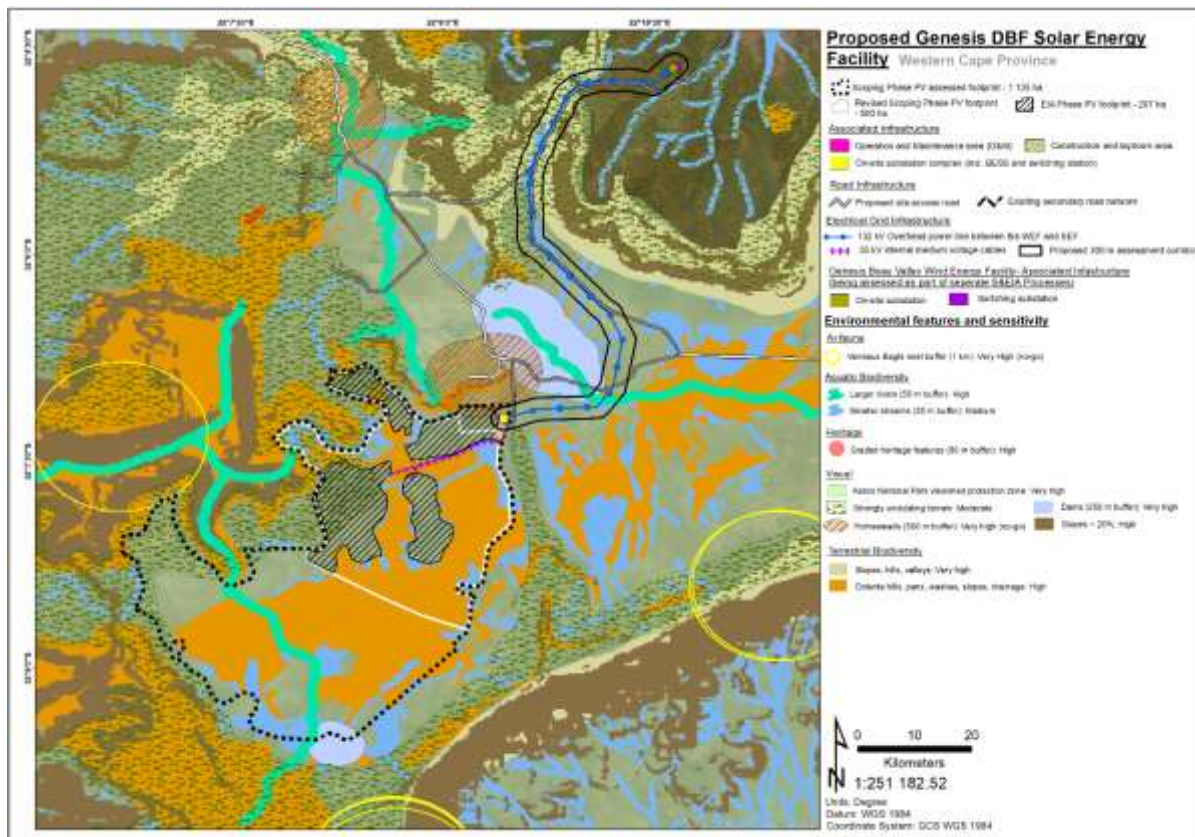


Figure 5.4: Revised site layout recommended by the EAP superimposed on the combined specialist environmental sensitivities and features identified during the EIA process.

It must be re-iterated that a strategic site, location and development footprint identification process has been followed, where the selection is informed by the environmental constraints identified through screening. This is based on the mitigation hierarchy approach of firstly trying to avoid impacts through careful siting. Therefore, it must be noted that different site, location or development footprint alternatives are not ranked, but rather a strategic process is followed where sensitive features are screened out in order to reach the preferred location or development footprint within the study area.

5.1.6 Technology Alternatives

The following technology alternatives are being considered as part of this Scoping and EIA Process.

5.1.6.1 Solar Panel Types

Only the PV solar panel technology type will be considered in this Scoping and EIA Process. More specifically, the project developer proposes to utilise bifacial panels as the preferred PV panel technology which has an up to 30% higher yield than monofacial panels (alternative). It should be noted that both PV panel types were investigated in the EIA process. The final selection of PV panel type is to be made in the pre-construction detailed engineering design and planning phase.

Due to the scarcity of water in the proposed project area and the large volume of water required for CSP, this technology is not deemed feasible or sustainable and will not be considered in this Scoping and EIA Process. This is the main difference between PV and CSP technology that led to the selection of PV as the preferred solar panel technology.

Furthermore, CSP technology requires a larger development footprint to obtain the same energy output as PV technology, and it requires active solar tracking to be effective. As described above, in terms of the 2019 IRP, 300 MW capacity is already installed for CSP; and an additional 300 MW has been allocated, whilst there is no new additional capacity allocated for this technology. Solar PV is allocated an additional new capacity of 6 000 MW in terms of the 2019 IRP. This means that the need and desirability of CSP is not as evident and justified compared to PV.

5.1.6.2 PV Mounting System

Solar panels can be mounted in various ways to ensure maximum exposure of the PV panels to sunlight. The main mounting systems that will be considered as part of the Scoping and EIA Process and design are Single Axis Tracking structures (aligned north-south); Dual Axis Tracking (aligned east-west and north-south); Fixed Tilt Mounting Structure; Mono-facial Solar Modules and Bifacial Solar Modules.

Note that the mounting options will not be weighed against each other in order to identify the most preferred alternative at the end of the EIA Phase. Instead, the specialists will assess all of the above mounting systems and if acceptable, all will be put forward for approval in the EA (should it be granted). Regardless of the mounting system, the maximum height of the PV panel structure will be assessed by the specialists and will not be exceeded.

5.1.6.3 Battery Energy Storage Systems

As indicated in Chapter 2 of this EIA Report, Lithium-Ion Battery Energy Storage Systems (BESS) and Redox Flow BESS are being considered for the proposed project. For Redox Flow BESS, various chemical compositions may be considered during the EIA Phase, such as Vanadium. Refer to Appendix G.10 of this EIA Report for a High-Level Safety, Health and Environment Risk Assessment Report, which provides high level information on the safety, health and environmental risks of the BESS technologies being considered. Table 5.4 provides high level advantages and disadvantages of the two technologies.

Table 5.4: Advantages and disadvantages associated with the BESS technologies being considered for the proposed project (Sources: Parsons, 2017⁸; Zhang *et al.*, 2016⁹)

BESS technologies being considered	Advantages	Disadvantages
<u>Solid State BESS:</u> <u>(1) Lithium-ion and</u> <u>(2) Sodium-ion</u>	- Sealed/containised systems i.e. pre-assembled off site and delivered to site for placement (i.e. carries less potential risk to the environment in terms of spillages). Hence, they are easier to install and will not likely need many permanent staff. - Reduced risk of spillage as storage of large quantities of electrolyte is not required.	- Explosions and fires can occur as well as the possibility of generating noxious smoke under these circumstances. This can occur as result of electrolytes mixing when a breach occurs due to: - improper maintenance near operating temperature, - thermal expansion, or - freeze thaw cycles. - Over the long term, these BESS may be more difficult to repurpose / dispose of and may present cumulative long term environmental impacts.
<u>(3) Redox Flow Batteries (RFB)</u>	- RFBs are self-discharging systems therefore generally require little maintenance. However, RFBs are more difficult to install, i.e. form brick and mortar structures, and will potentially require many permanent staff. - High economic efficiency, for example, Vanadium has a high economic value and can be recycled.	Risk of spillage tends to be higher for RFB as opposed to sealed solid-state BESS as the storage tanks of RFB, may be subjected to leaks or spills during the replacement or blending of the electrolyte, or during transport of the battery to and from site.

Note that all three of these technologies were assessed during the EIA Process, and a motivation is included in Chapter 7 of the EIA Report to authorise both Lithium-Ion and Sodium-Ion technology types since both were found to be acceptable and preferred during the EIA Phase.

5.2 Concluding Statement of Preferred Alternatives

As per Appendix 3, Section 3 (1) (h) (x) of the 2014 NEMA EIA Regulations (as amended), and based on Section 5.1 above, the following alternatives were taken forward into the EIA Phase for further assessment. This serves as a concluding statement indicating the preferred alternative development footprint within the study area as presented in the accepted scoping report:

- No-Go Alternative:**

- The no-go alternative assumes that the proposed project will not go ahead i.e. it is the option of not constructing the proposed DBF South SEF. This alternative would result in no environmental impacts (positive and negative) on the preferred site or surrounding local area, as a result of the proposed project. It will provide a baseline

⁸ Parsons, 2017. US Trade and Development Agency. South Africa Energy Storage Technology and Market Assessment. Order Number: TDA-IE201511210. USTDA Activity Number: 2015-11032A. Parsons Job Number: 640368.

⁹ Zhang, X., Tang, Y., Zhang, F., and Lee, C. S., (2016). A novel aluminum–graphite dual-ion battery. *Advanced energy materials*, 6(11), p.1502588.

against which other alternatives will be compared and considered during the EIA Phase. The no-go alternative will be assessed in detail by all the specialists on the project team. **At this EIA Phase, the no-go alternative is not preferred.**

- **Land-Use Alternative:**

- The current land-use is agriculture, specifically low density small stock grazing. There is no cultivation in the area. The study area has low agricultural sensitivity and was **not deemed feasible for further assessment during the EIA Phase**. The proposed project offers some positive impact on agriculture by way of improved financial security for farming operations, as well as wider, societal benefits. The development of the proposed project at the preferred site is more favourable than the agricultural land-use alternative.

- **Type of Activity Alternative:**

- This relates to the generation of electricity from a renewable energy source, and in this particular case, from solar resources. The **generation of electricity from a renewable energy source was the only activity considered** by the Applicant, and thus considered in this Scoping and EIA Process. **No other activity types were considered or deemed appropriate** based on the expertise of the Applicant.

- **Renewable Energy Alternatives:**

- The Project Developer is undertaking Scoping and EIA processes for a holistic renewable energy cluster consisting of both wind and solar energy REFs. In terms of the suitability of solar energy development at this location, the proposed project study area falls within the second highest GHI category of 2 000 kWh/m² to 2 200 kWh/m² in terms of the long-term yearly total. The mean wind power density map shows that the project study area falls within an area of approximately 101 – 300 W/m² (Figure 5.1). Local conditions are, therefore, favourable to the complement of renewable energy developments proposed by the Project Developer. Based on the findings of the Avifauna Scoping Level Assessment, the specific site proposed for the DBF South SEF falls within the 1 km to 3.7 km turbine exclusion buffer from Verreux's Eagle nests, therefore the proposed site is best suited to Solar PV development.
- In addition, **Hydro Power and Biomass Energy** are deemed **unsuitable**. These will not be further assessed in the EIA phase.

- **Preferred Site and Development Footprint within the site:**

- The preferred site for the proposed DBF South SEF comprises the following farm portions, which serves as the study area for this Scoping and EIA Process:
 - Remaining extent of Doornboomfontyn Farm Nr. 89
 - Remaining extent of Hartebeeste Vleis Berg Farm Nr. 213
 - Portion 1 of Doornboomfontyn Farm Nr. 89
- A screening and site verification exercise of the study area was undertaken by the specialist team during this Scoping Phase. This led to the identification of the Original Scoping Phase Assessment Area (1 135 ha) within the preferred site. The findings of the Scoping Level Specialist Assessments were used to determine the Revised Scoping Assessment Area for the PV array (500 ha). Informed by the sensitivities identified by the specialists, the EIA phase proposed PV area (207 ha) recommended for approval in Chapter 7 avoids the no-go sensitivities identified by the specialists.

- **Technology Alternatives**

- Only the PV solar panel type will be considered in this Scoping and EIA Process, along with various mounting options that will be considered in the design.
- The following types of BESS technologies will be assessed in the EIA Phase and the preferred alternative will thereafter be selected or both alternatives will be put forward for approval in the EA (should it be granted):
 - Lithium-ion or Sodium-ion BESS; and
 - RFB.

5.3 Summary of Legislative Requirements for the Assessment of Alternatives

As noted in Chapter 1 of this EIA Report, the 2014 NEMA EIA Regulations (as amended) have certain requirements in terms of the selection of the **proposed preferred activity, site and location of the development footprint within the site**. Table 5.5 below indicates the requirements of the 2014 NEMA EIA Regulations (as amended) in terms of the process leading to the preferred activity, site and development footprint location alternatives. Table 5.5 also includes a response from the EAP showing how the requirements of the 2014 NEMA EIA Regulations (as amended) have been addressed in this report.

Table 5.5: Requirements for the consideration of Alternatives based on the 2014 NEMA EIA Regulations (as amended)

	Section of the EIA Regulations	Requirements for an EIA Report in terms of Appendix 3 of the 2014 NEMA EIA Regulations (as amended)	Response from EAP
1	Appendix 3 – 3 – 1 – h – (i)	3 (1) A scoping report must contain the information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact assessment process, and must include: (h) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including: (i) details of all the alternatives considered;	Refer to Sections 5.1, 5.2, and 5.3 (i.e. this section) of this chapter which provides a description of the process that led to the identification of the preferred alternatives and which alternatives were taken further into the EIA Phase for assessment.
2	Appendix 3 – 3 – 1 – h – (ii)	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Refer to Chapter 4 of this EIA Report and Appendix E (Part 1), which details the process followed in terms of Public Participation and includes the supporting documentation.
3	Appendix 3 – 3 – 1 – h – (iii)	(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Refer to Appendix E (Part 2) of this EIA Report for the Comments and Responses Report, which includes the issues raised by Interested and Affected Parties (I&APs) during the 30-day comment period on the Draft Scoping Report, as well as responses. Refer to Appendix E (Part 3) of this EIA Report for the Comments and Responses Report, which includes the issues raised by I&APs during the 30-day comment period on the Draft EIA Report, as well as responses. In addition, the specialist studies are included in Appendix G to this EIA Report, which also discusses the issues raised during the Scoping Phase, where relevant and required.
4	Appendix 3 – 3 – 1 – h – (iv)	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Refer to Chapter 3 and Appendix G of this EIA Report for a description of the environmental sensitivities associated with the preferred site. Section 5.1.4 and 5.1.5 of this chapter also provides information on environmental attributes that were considered in the selection of the preferred site for the proposed project.
5	Appendix 3 – 3 – 1 – h – (v)	(v) the impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts: (aa) can be reversed;	In terms of the no-go alternative, this is not considered as the preferred alternative, as discussed in Section 5.1.1 of this chapter. The impacts and risks of both adopting and not adopting the no-go alternative have been discussed in this section. Furthermore, this has been unpacked by the relevant specialists in the EIA Phase.

	Section of the EIA Regulations	Requirements for an EIA Report in terms of Appendix 3 of the 2014 NEMA EIA Regulations (as amended)	Response from EAP
		(bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Feedback on the impacts and risks that informed the identification of the preferred activity (i.e. generation of energy from solar resources) is provided in Section 5.1.3 and Section 5.1.4 above. Such feedback relating to the preferred site and location of the development footprint within the site is captured in Chapter 6 of this EIA Report. Chapter 6 chapter includes the specialists' assessment of impacts and risks of the proposed project at the preferred site, and it includes a description and assessment of the nature, significance, consequence, extent, duration and probability of the identified impacts for the preferred alternatives, as well as an assessment of the reversibility and irreplaceability of the potential identified impacts, as well as the degree to which the identified impacts can be avoided, managed or mitigated. Furthermore, various technologies for the BESS will be assessed in terms of impacts and risks in the EIA Phase. The preferred alternative will be selected or both alternatives will be put forward for approval in the EA (should it be granted).
6	Appendix 3 – 3 – 1 – h – (vi)	(vi) the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Refer to Chapter 6 of this EIA Report as well as the Specialist Assessments for the impact assessment methodology that was used in the assessment of impacts.
7	Appendix 3 – 3 – 1 – h – (vii)	(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Feedback on the impacts and risks that informed the identification of the preferred activity (i.e. generation of energy from solar resources) is provided in Section 5.1.3 and Section 5.1.4 above. Such feedback relating to the preferred site is captured in Chapter 6 of this EIA Report. This chapter includes an assessment of impacts and risks of the proposed project at the preferred site.
8	Appendix 3 – 3 – 1 – h – (viii)	(viii) the possible mitigation measures that could be applied and level of residual risk;	
9	Appendix 3 – 3 – 1 – h – (ix)	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	Where no further alternatives were considered, a motivation has been provided in this chapter.
10	Appendix 3 – 3 – 1 – h – (x)	(xi) a concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report	Refer to Section 5.2 of this chapter for a concluding statement.

Scoping and Environmental Impact Assessment for the proposed development of the Genesis DBF South Solar Energy Facility and associated infrastructure near Beaufort West in the Western Cape



FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER 6: Impact Assessment and Sensitivity Analysis



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6. IMPACT ASSESSMENT AND SENSITIVITY ANALYSIS

6.1 Approach to the Impact Assessment Methodology and Specialist Assessments

This section outlines the assessment methodology and legal context for specialist assessments, as recommended by the then Department of Environmental Affairs (DEA) 2006 Guideline on Assessment of Impacts, and the International Finance Corporation's (2012) Environmental and Social Performance Standards, as well as the World Bank's (2016) Environmental and Social Framework.

6.1.1 Impact Assessment Methodology

The Impact Assessment Methodology has been aligned with the requirements for EIA Reports as stipulated in Appendix 3 (3) (1) (j) of the 2014 NEMA EIA Regulations (as amended) which states the following:

"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 an assessment of each identified potentially significant impact and risk, including-

- (i) cumulative impacts;
- (ii) the nature, significance and consequences of the impact and risk;
- (iii) the extent and duration of the impact and risk;
- (iv) the probability of the impact and risk occurring;
- (v) the degree to which the impact and risk can be reversed;
- (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and
- (vii) the degree to which the impact and risk can be mitigated".

The identification of potential impacts includes impacts that may occur during the construction, operational and decommissioning phases of the development. The assessment of impacts includes direct, indirect as well as cumulative impacts. In order to identify potential impacts (both positive and negative) it is important that the nature of the proposed project is well understood so that the impacts associated with the project can be assessed. The process of identification and assessment of impacts will include:

- Determining the current environmental conditions in sufficient detail so that there is a baseline against which impacts can be identified and measured;
- Determining future changes to the environment that will occur if the activity does not proceed;
- Develop an understanding of the activity in sufficient detail to understand its consequences; and
- The identification of significant impacts, which are likely to occur if the activity is undertaken.

The following principles underpin the application of this methodology:

- Transparent and repeatable process - specialists are to describe the thresholds and limits they apply in their assessment, wherever possible.
- Adapt parameters to context (where justified) – the methodology proposes some thresholds (e.g. for spatial extent, in Step 3 below), however, if the nature of the impact requires a different definition of the categories of spatial extent, then this can be provided and described by the specialist.
- Combination of a quantitative and qualitative assessment – where possible, specialists are to provide quantitative assessments (e.g. areas of habitat affected, number of jobs), however, it is recognised that not all impacts can be quantified, and then qualitative assessments are to be provided.

As per the then Department of Environmental Affairs and Tourism (DEAT) Guideline 5: Assessment of Alternatives and Impacts, the following methodology is applied to the prediction and assessment of impacts and risks. Potential impacts and risks will be rated in terms of direct, indirect and cumulative impacts:

- **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.
- **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place as a result of the activity.
- **Cumulative impacts** are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

In addition to the above, the Impact Assessment Methodology includes the following aspects:

- **Step 1: Nature of impact/risk** - this reviews the type of effect that a proposed activity will have on the environment and includes “what will be affected and how?” The term environment has a broad interpretation that includes both the natural (biophysical) environment and the socio-economic environment. The term socio-ecological system is also used to describe the natural and socio-economic environment and the interactions amongst these components.
- **Step 2: Status** - Whether the impact/risk on the overall environment (social, biophysical and economic) will be:
 - Positive - environment overall will benefit from the impact/risk;
 - Negative - environment overall will be adversely affected by the impact/risk; or
 - Neutral - environment overall will not be affected.
 - Note: The significance of a negative impact may be called a risk, and the significance of a positive impact may be called an opportunity.

- **Step 3:** Qualitative determination of the consequence of the impact/risk by identifying the a) spatial extent; b) duration; c) reversibility; and d) irreplaceability.
 - **A) Spatial extent** – The size of the area that will be affected by the impact/risk:
 - Site specific;
 - Local (<10 km from site);
 - Regional (<100 km of site / within the district municipality);
 - National; or
 - International (e.g. Greenhouse Gas emissions or migrant birds).
 - **B) Duration** – The timeframe during which the impact/risk will be experienced:
 - Very short term (instantaneous);
 - Short term (less than 1 year);
 - Medium term (1 to 10 years);
 - Long term (the impact will cease after the operational life of the activity (i.e. the impact or risk will occur for the project duration)); or
 - Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient (i.e. the impact will occur beyond the project decommissioning)).
 - **C) Reversibility** of the Impacts - the extent to which the impacts/risks are reversible assuming that the project has reached the end of its life cycle (decommissioning phase):
 - High reversibility of impacts (impact is highly reversible at end of project life i.e. this is the most favourable assessment for the environment);
 - Moderate reversibility of impacts;
 - Low reversibility of impacts; or
 - Impacts are non-reversible (impact is permanent, i.e. this is the least favourable assessment for the environment).
 - **D) Irreplaceability** of Receiving Environment/Resource Loss caused by impacts/risks – the degree to which the impact causes irreplaceable loss of resources assuming that the project has reached the end of its life cycle (decommissioning phase):
 - High irreplaceability of resources (project will destroy unique resources that cannot be replaced, i.e. this is the least favourable assessment for the environment);
 - Moderate irreplaceability of resources;
 - Low irreplaceability of resources; or
 - Resources are replaceable (the affected resource is easy to replace/rehabilitate, i.e. this is the most favourable assessment for the environment).

These criteria are then combined in a qualitative manner to determine the **consequence**. The consequence terms ranging from slight to extreme (as described below) will be calibrated per Specialist Study, where required, so that there is transparency and consistency in the way a risk/impact is measured.

- **Consequence** – The anticipated consequence of the risk/impact is generally defined as follows:

- Extreme (extreme alteration of natural or socio-economic systems, patterns or processes, i.e. where environmental or socio-economic functions and processes are altered such that they permanently cease);
 - Severe (severe alteration of natural or socio-economic systems, patterns or processes, i.e. where environmental or socio-economic functions and processes are altered such that they temporarily or permanently cease);
 - Substantial (substantial alteration of natural or socio-economic systems, patterns or processes, i.e. where environmental or socio-economic functions and processes are altered such that they temporarily or permanently cease);
 - Moderate (notable alteration of natural or socio-economic systems, patterns or processes, i.e. where the natural or socio-economic environment continues to function but in a modified manner; or
 - Slight (negligible and transient alteration of natural or socio-economic systems, patterns or processes, i.e. where natural systems/environmental or socio-economic functions, patterns, or processes are not affected in a measurable manner, or if affected, that effect is transient and the system recovers).
- **Step 4:** The **probability** of the impact/risk must be rated using the criteria below:
- **Probability** – The probability of the impact/risk occurring:
 - Extremely unlikely (little to no chance of occurring);
 - Very unlikely (<30% chance of occurring);
 - Unlikely (30-50% chance of occurring)
 - Likely (51 – 90% chance of occurring); or
 - Very Likely (>90% chance of occurring regardless of prevention measures).
- **Step 5:** Determination of the **significance** of the identified impact/risk using both the **consequence** and **probability** (qualitatively as shown in Figure 6.1). The approach incorporates internationally recognised methods from the Intergovernmental Panel on Climate Change (IPCC) (2014) assessment of the effects of climate change and is based on an interpretation of existing information in relation to the proposed activity, to generate an integrated picture of the risks related to a specified activity in a given location, with and without mitigation. Risk is assessed for each significant stressor (e.g. physical disturbance), on each different type of receiving entity (e.g. the municipal capacity, a sensitive wetland), qualitatively (very low, low, moderate, high, very high) against a predefined set of criteria. Significance definitions and rankings are provided below:

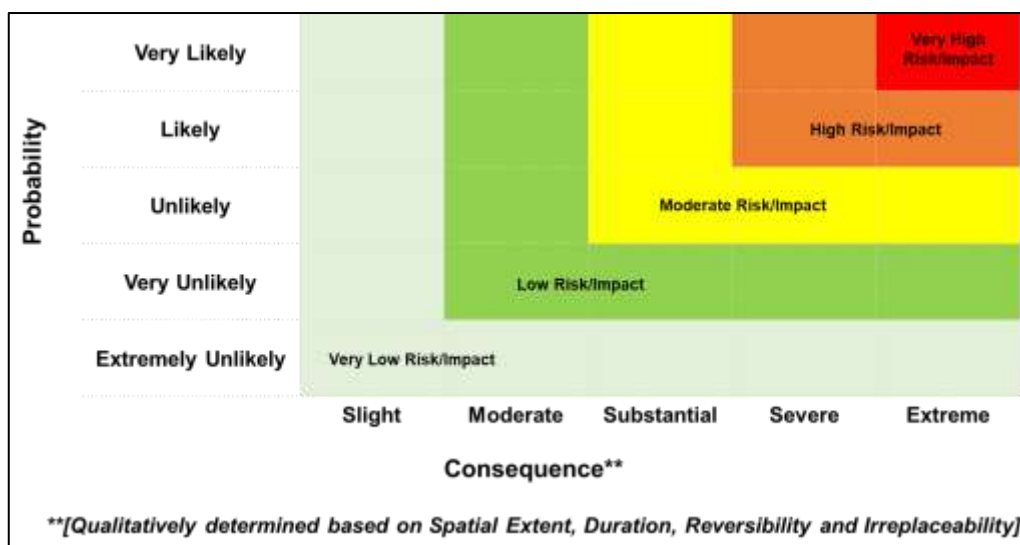


Figure 6.1: Guide to assessing risk/impact significance as a result of consequence and probability

- **Significance** – Will the impact cause a notable alteration of the environment?
 - Very low (the risk/impact may result in very minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);
 - Low (the risk/impact may result in minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);
 - Moderate (the risk/impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated);
 - High (the risk/impact will result in major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making); and
 - Very high (the risk/impact will result in very major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making (i.e. the project cannot be authorised unless major changes to the engineering design are carried out to reduce the significance rating)).

With the implementation of mitigation measures, the residual impacts/risks are ranked as follows in terms of significance:

- Very low = 5;
 - Low = 4;
 - Moderate = 3;
 - High = 2; and
 - Very high = 1.
- **Step 6:** Determine the **Confidence Level** – The degree of confidence in predictions based on available information and specialist knowledge:
 - Low;
 - Medium; or

- High.

Other aspects to be taken into consideration in the assessment of impact significance are:

- Impacts are to be evaluated for the construction, operational and decommissioning phases of the development. The assessment of impacts for the decommissioning phase will be brief, as there is limited understanding at this stage of what this might entail. The relevant rehabilitation guidelines and legal requirements applicable at the time will need to be applied;
- Impacts will be evaluated with and without mitigation in order to determine the effectiveness of mitigation measures on reducing the significance of a particular impact;
- The impact evaluation will, where possible, take into consideration the cumulative effects associated with this and other Wind and Solar PV projects which are either developed or in the process of being developed in the local area (i.e. within 30 km from the proposed DBF SEF). Refer to Section 7.5.2 for a description of the cumulative impact assessment methodology; and
- The impact assessment will attempt to quantify the magnitude of potential impacts (direct, indirect and cumulative effects) and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact.

Impacts will then be collated into the EMPr and these will include the following:

- Quantifiable standards for measuring and monitoring mitigatory measures and enhancements will be set. This will include a programme for monitoring and reviewing the recommendations to ensure their ongoing effectiveness;
- Identifying negative impacts and prescribing mitigation measures to avoid or reduce negative impacts. Where no mitigatory measures are possible this will be stated; and
- Positive impacts will be identified and augmentation measures will be identified to potentially enhance positive impacts where possible.

Table 6.1 below will be used by the specialists for the rating of impacts, and repeated for the Construction, Operational and Decommissioning Phases.

Table 6.1: Example of Table for Assessment of Impacts/Risks

<i>Impact</i>	<i>Impact Criteria</i>	<i>Significance and Ranking (Pre-Mitigation)</i>	<i>Potential mitigation measures</i>	<i>Significance and Ranking (Post-Mitigation)</i>	<i>Confidence Level</i>
CONSTRUCTION PHASE					
<i>Habitat and species loss as a result of clearance of vegetation for the PV Facility</i>	Status	<i>Negative</i>	<i>Plant search and rescue (EMPr)</i>	<i>Low (4)</i>	<i>Medium</i>
	Spatial Extent	<i>Site Specific</i>			
	Duration	<i>Long-term</i>			
	Consequence	<i>Substantial</i>			
	Probability	<i>Very likely</i>			
	Reversibility	<i>Moderate</i>			
	Irreplaceability	<i>Moderate</i>			

6.1.2 Cumulative Impact Assessment Methodology

The cumulative impact assessment will include other renewable energy projects (i.e. Wind and Solar PV) projects within a 30 km radius that are in different stages of planning and/or development

(e.g. have received an EA, BA/EIA in progress at the commencement of this Scoping and EIA Process, or has been constructed); including the 7 proposed REFs comprising the GEED Southern and Middle Renewable Energy Clusters. The information has been sourced from the National DFFE Renewable Energy EIA Application (REEA) database; as well as from the South African Heritage Resources Information System (SAHRIS). Table 6.2 provides more details, whilst Figure 6.2 provides an illustration of the projects that will be considered in the cumulative impact assessment. All withdrawn or lapsed projects will not be considered.

Table 6.2: Proposed renewable energy projects, located within 30 km of the proposed DBF SEF, that will be considered in the Cumulative Impact Assessment (in addition to the GEED Renewable Energy Cluster and EGI Projects) (Source: DFFE REEA, Quarter 3, 2022; and SAHRIS)

CSIR NO.	DFFE REFERENCE	TECHNOLOGY	MW	STATUS	PROJECT TITLE	ASSESSMENT PROCESS	APPLICANT	EAP (firm)
1	14/12/16/3/3/2/2044	Onshore Wind	280	EA Awarded	Nuweveld East Wind Farm	S&EIA	Red Cape Nuweveld East (Pty) Ltd	Zutari (Pty) Ltd
	14/12/16/3/3/2/2044/AM1							
2	14/12/16/3/3/1/2604	Onshore Wind	420	EA Awarded	Hoogland Wind Farm (03)	BA	Red Cap Hoogland 3 (Pty) Ltd	SLR South Africa Consulting (Pty) Ltd
3	14/12/16/3/3/1/2605	Onshore Wind	420	EA Awarded	Hoogland Wind Farm (04)		Red Cap Hoogland 4 (Pty) Ltd	SLR South Africa Consulting (Pty) Ltd
Renewable Energy Facilities comprising the GEED Middle Cluster								
4	To Be Allocated (TBA)	Onshore Wind	190	Pre-application	Genesis Aloe Wind Farm	S&EIA	Genesis Aloe Wind Farm (Pty) Ltd	CSIR
5	TBA	Onshore Wind	260	Pre-application	Genesis Gazania Wind	S&EIA	Genesis Gazania Wind Farm (Pty) Ltd	CSIR
6	TBA	Onshore Wind	310	Pre-application	Genesis Elegia Wind Farm	S&EIA	Genesis Elegia Wind Farm (Pty) Ltd	CSIR
Renewable Energy Facilities comprising the GEED Southern Cluster								
7	TBA	Onshore Wind	150	Pre-application	Genesis Beau Valley Wind Farm	S&EIA	Genesis Beau Valley Wind Farm (Pty) Ltd	CSIR
	14/12/16/3/3/2/2349	Solar PV	200	EIA Phase	Genesis Beau Valley Solar Farm	S&EIA	Genesis Beau Valley Solar Farm (Pty) Ltd	CSIR
8	TBA	Onshore Wind	200	Pre-application	Genesis DBF South Wind Farm	S&EIA	Genesis DBF South Wind Farm (Pty) Ltd	CSIR
	14/12/16/3/3/2/2317	Solar PV	400	EIA Phase	Genesis DBF South Solar Farm	S&EIA	Genesis DBF South Solar Farm (Pty) Ltd	CSIR

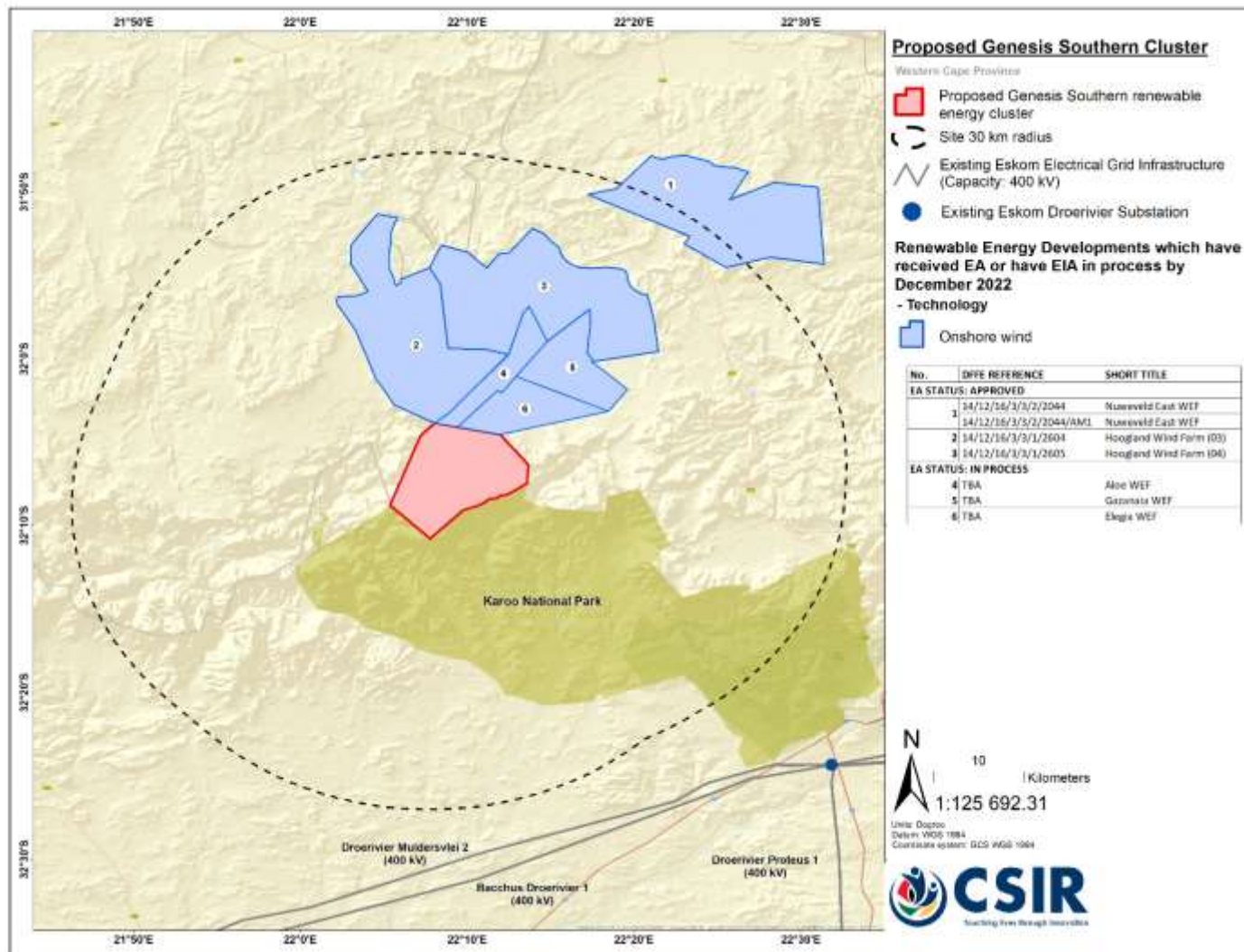


Figure 6.2: Renewable Energy projects within the 30 km radius considered for the Cumulative Impact Assessment (Source: DFFE REEA Quarter 3, 2022; and SAHRIS).

6.2 Assessments of Environmental Risks and Impacts

The purpose of this chapter is to present a synthesis of the key issues, potential impacts (direct, indirect and cumulative, where applicable), and mitigation measures that have been identified by specialists as part of the EIA Process for the proposed Genesis DBF South SEF (hereafter referred to as the “Solar Facility” or “proposed project”). The specialist impact assessments comply with Appendix 6 of the 2014 NEMA EIA Regulations (as amended), or the Assessment Protocols published in Government Notice (GN) R320 on March 2020; or the Assessment Protocols published in GN R1150 on October 2020 (see Table 6.3). However, the Battery Energy Storage System (BESS) High Level Safety, Health and Environment Risk Assessment serves as a technical report and the aforementioned legislation will thus not be applicable. Refer to Chapter 6.1 of this EIA Report which includes the methodology for the assessment of impacts; and Chapter 4.8 includes the Terms of Reference for the specialist assessments that inform this EIA Report.

Table 6.3: Specialist assessments undertaken and the applicable legislation

Applicable Legislation →	Appendix 6 of the 2014 NEMA EIA Regulations (as amended)	Assessment Protocols in GN R320 (March 2020)	Assessment Protocols in GN R1150 (October 2020)	Technical Input	Desktop Assessment
Specialist Assessment ↓					
Agriculture and Soils Compliance Statement		✓			
Terrestrial Biodiversity, Terrestrial Plant Species, and Terrestrial Animal Species Assessment		✓	✓		
Aquatic Biodiversity		✓			
Avifauna Assessment			✓		
Visual Impact Assessment	✓	✓			
Heritage Impact Assessment (Archaeology and Cultural Landscape)	✓	✓			
Palaeontology Site Sensitivity Verification Report	✓	✓			
Socio-Economic Assessment	✓				
Traffic Impact Assessment	✓				
Battery Energy Storage System High Level Safety, Health and Environment Risk Assessment				✓	
Geohydrology Assessment					✓
Geotechnical Assessment					✓

Refer to Appendix G of this EIA report for the full specialist studies undertaken (including the Terms of Reference for each study). All proposed mitigation measures, as relevant, have been carried over into the EMPr, included in Appendix H of this report.

Unless otherwise stated, the impact assessments below, including identified potential impacts and mitigation measures, apply to the development of the proposed solar facility and associated infrastructure components as discussed in Chapter 2 of this EIA Report.

6.2.1 Soils and Agricultural Potential

The specialist has confirmed that the agricultural sensitivity within the study area is largely low and medium sensitivity and therefore an Agricultural Compliance Statement is needed. As noted in the Agricultural Compliance Statement (Appendix G.1 of this EIA Report), formally rating potential agricultural impacts is not required by the Assessment Protocol of GN 320, however it is required to indicate whether the proposed development will have an unacceptable impact on the agricultural production capability of the site.

6.2.1.1 Impact Assessment

The following potential **direct and negative impacts** were identified:

- Occupation of land - Agricultural land directly occupied by the development infrastructure will become restricted for agricultural use, with consequent potential loss of agricultural productivity for the duration of the project lifetime.
- Soil erosion and degradation – Erosion can occur as a result of the alteration of the land surface run-off characteristics, predominantly through the establishment of hard surface areas including roads. Loss of topsoil can result from poor topsoil management during construction related excavations. Soil erosion and loss of topsoil are completely preventable. The stormwater management that will be an inherent part of the engineering on site and standard, best-practice erosion control and topsoil management measures recommended and included in the Environmental Management Programme (EMPr) (Appendix H of this EIA Report), are likely to be effective in preventing soil erosion and loss of topsoil.

One **indirect positive impact** was identified:

- Increased financial security for farming operations via reliable and predictable income will be generated by the farming enterprises through the lease of the land to the energy facility. This is likely to increase their cash flow and financial security and could improve farming operations and productivity through increased investment into farming.

The potential **cumulative agricultural impact** of importance is a regional loss (including by degradation) of future agricultural production potential. Cumulative impact of loss of future agricultural production potential is low.

Mitigation measures to prevent soil degradation are all inherent in the project design and/or are standard, best-practice for construction sites.

- A system of storm water management, which will prevent erosion, will be an inherent part of the road engineering on site. Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there.
- Any excavations done during the construction phase, in areas that will be re-vegetated at the end of the construction phase, must separate the upper 20 cm of topsoil from the rest of the excavation spoils and store it in a separate stockpile. When the excavation is back-

filled, the topsoil must be back-filled last, so that it is at the surface. Topsoil should only be stripped in areas that are excavated. Across the majority of the site, including construction lay down areas, it will be much more effective for rehabilitation, to retain the topsoil in place. If levelling requires significant cutting, topsoil should be temporarily stockpiled and then re-spread after cutting, so that there is a covering of topsoil over the entire surface.

6.2.1.2 Concluding Statement

The agricultural impact of the proposed project is regarded as being of low significance and is acceptable from an agricultural assessment. The extent to which any of these impacts is likely to affect levels of agricultural production is insignificant. The conclusion of the agricultural assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions, other than the recommended mitigation.

Due to the generally low agricultural potential of the site, and the consequent low agricultural impact, there are no restrictions relating to agriculture (other than recommended mitigation), which could preclude authorisation of the proposed development and therefore, from an agricultural impact point of view, the development should proceed to the EIA Phase and should receive approval.

6.2.2 Terrestrial Biodiversity and Species

The impact assessment below is based on the EIA-level inputs provided by the Terrestrial Specialist, and which are included in Appendix G.2 of this EIA Report. Appendix G.2 includes the following associated reports:

- Terrestrial Biodiversity Assessment
- Flora (Plant Species) Compliance Statement
- Terrestrial Biodiversity Site Sensitivity Verification report
- Karoo Dwarf Tortoise Species Assessment

6.2.2.1 Impact Assessment

The following potential impacts on Terrestrial Biodiversity and Species were identified that are likely to be associated with the proposed development:

- **Impact 1. Impacts on CBAs, ESAs and broad-scale ecological processes**
There are fairly extensive CBAs and ESAs within the development footprint, that would be impacted or lost to the development footprint. During operation, the levels of disturbance at the site would be significantly reduced as compared to the construction phase, but there may still be some disturbance related to operational and maintained activities. As such, the assessment considers the direct habitat loss associated with the development as well as disturbance due to noise or maintenance activities.
- **Impact 2. Impacts on NPAES Focus Areas and expansion potential of the KNP**
The development of the DBF SEF would result in up to 500 ha of habitat loss within the PAES Focus Area associated with the Karoo National Park. In addition, the presence of the facility would decrease the future value of the area for conservation expansion and may constrain the future expansion of the National Park into this area. Note that the final PV development footprint recommended for approval has been reduced to 207 ha (see Chapter 5 and Chapter 7).
- **Impact 3. Impact on the Karoo Dwarf Tortoise**
During construction, the increased levels of traffic within as well as to and from the site would likely increase collision risk with tortoises. Furthermore, the construction activities would result in some habitat loss and degradation within areas of suitable habitat. During operation, impacts would likely be reduced, but occasional anthropogenic disturbance associated with maintenance activities along the grid route would potentially impact the Karoo Dwarf Tortoise. In addition, any overhead power lines within the facility could increase the abundance of corvids within the site, resulting in increased Karoo Dwarf Tortoise predation.

Cumulative Impacts:

The development of the DBF SEF infrastructure would result in habitat loss and an increase in overall cumulative impacts on fauna and flora in the area. The contribution of the DBF SEF at 500 ha is considered relatively high as it is equivalent to the total habitat loss associated with all existing developments in the area. Note that the final PV development footprint recommended for approval has been reduced to 207 ha (see Chapter 5 and Chapter 7).

Although the area currently experiences a relatively low level of impact, there are numerous renewable developments authorised or currently being planned in the area and it is likely that cumulative impacts will increase into the future. The affected vegetation types are however all still largely intact and the development would not significantly increase cumulative impacts on these vegetation types at the national scale.

Refer to Appendix G.2 of this EIA Report for detailed information on the potential impacts identified and mitigation measures recommended. The table below provides a summary of the EIA Level impact assessment for this study.

Table 6.4: Impact assessment of the potential Terrestrial Biodiversity and Species risks and impacts of the proposed project

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
IMPACTS						
CONSTRUCTION PHASE						
Impacts on CBAs, ESAs and ecological processes within the site	Status	Negative	Moderate	- Minimise the development footprint as far as possible. - Locate temporary-use areas such as construction camps and lay-down areas in low sensitivity or previously disturbed areas. - Avoid mapped No-Go areas in the placement of pylons, switching stations and access tracks. - Minimise the development footprint in areas mapped as high sensitivity (i.e. near watercourses and other ecologically significant features). - Clearly demarcate riparian areas near to the development footprint as No-Go areas with appropriate signage and barriers. - Appropriate design of roads and other infrastructure to minimise faunal impacts and allow fauna to pass over, through or underneath these features as appropriate. - The fencing around the PV areas, switching stations and other fenced infrastructure should not have any electrified strands within 30cm of the ground as this may result in tortoises being electrocuted. Alternatively, guard wires or mesh can be placed outside of the fence to prevent tortoises from accessing the electrified fence. - Monitoring of construction activities to ensure that the development footprint within ESAs and CBAs is restricted to the authorised development footprint.	Moderate	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Low				
	Probability	Probable				
	Reversibility	Recoverable				
	Irreplaceability	Yes (pre-mitigation) No (post-mitigation)				
Impact on habitat loss within NPAES Focus Areas	Status	Negative	Moderate	- Minimise the development footprint as far as possible. - Investigate options in collaboration with SANParks as to ways in the potential impact of the development on the NPAES can be reduced and mitigated.	Moderate	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Low				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Probability	Highly Probable				
	Reversibility	Recoverable				
	Irreplaceability	Yes (pre-mitigation)				
		No (post-mitigation)				
OPERATIONAL PHASE						
Impact on ecological processes within the site	Status	Negative	Moderate	- All service vehicles on site should adhere to a low speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h. - If any fauna get into the PV footprint area as it likely, these should either be tolerated or if they pose a danger to personnel or equipment, they should be captured and removed from the site using the appropriate traps and capture methods by suitably qualified personnel. - Service staff should remain within the PV footprint areas and power line service road route and should not be allowed to wander into the veld. - No fauna including tortoises should be disturbed or removed from the veld. - A log should be kept detailing and fauna-related incidences or mortalities that occur on site, including roadkill, electrocutions etc. These should be reviewed annually by the Environmental Officer and used to inform operational management and mitigation measures.	Moderate	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Low				
	Probability	Probable				
	Reversibility	Recoverable				
	Irreplaceability	Yes (pre-mitigation)				
	No (post-mitigation)					
Impact on Karoo Dwarf Tortoises at the site during operation due to operational activities (vehicles/disturbance)	Status	Negative	Low	Crow nests along any overhead lines within the site, identified during annual surveys and located within 1km of suitable Karoo Dwarf Tortoise habitat should be removed following consultation with an avifaunal specialist.	Low	High
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Low				
	Probability	Low				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
as well as predation by crows.	Reversibility	High		- Apply additional mitigation in consultation with a terrestrial ecologist to prevent roadkill mortalities and / or discourage predation of Karoo Dwarf Tortoise by crows if monitoring demonstrates these aspects to be the cause of persistent impacts on this species. - Conduct annual surveys along any overhead lines within the site to census crow nesting sites, and log tortoise carcasses observed along the powerline and especially under any crow nests if present.		
	Irreplaceability	Low				
CUMULATIVE IMPACTS						
Cumulative habitat loss and impact on broad-scale ecological processes	Status	Negative	Moderate	- Avoid mapped No-Go areas in the placement of PV areas, pylons, switching stations and access tracks. - Minimise the development footprint in areas mapped as high sensitivity (i.e. near watercourses and other ecologically significant features). - Clearly demarcate riparian areas near to the development footprint as No-Go areas with appropriate signage and barriers.	Low	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Low				
	Probability	Probable				
	Reversibility	Recoverable				
	Irreplaceability	No				

6.2.2.2 Concluding Statement

While there are no impacts associated with the development of the DBF SEF on terrestrial biodiversity that are considered high after mitigation and which would be considered a fatal flaw, impacts on CBAs, NPAES Focus Areas and cumulative impacts are considered low to moderate after mitigation. A stewardship or conservation programme should be considered to address these moderate residual impacts. As such, the developer should consider investigating ways in which these impacts could potentially be mitigated or reduced in collaboration with SANParks. Provided and subject to such an agreement being reached, then there would be no reasons to oppose the development from proceeding.

6.2.3 Aquatic Biodiversity

The impact assessment below is based on the Aquatic Biodiversity Impact Assessment included in Appendix G.2 of this EIA Report.

6.2.3.1 Impact Assessment

The following potential impacts on Aquatic Biodiversity and Species were identified that are likely to be associated with the proposed development:

Construction Phase:

- **Decrease in habitat integrity.** Disturbance and loss of aquatic habitats within the watercourses and wetlands with the associated impacts on sensitive aquatic biota. During construction, activities within watercourses and wetlands could result in the disturbance or destruction of sensitive habitats and any listed and or protected plant or animal species.
- **Decrease in aquatic ecosystem integrity (removal of aquatic vegetation).** The removal of indigenous riparian and instream vegetation will reduce the ecological integrity and functionality of the watercourses. Construction works, in particular, could result in the loss of aquatic vegetation that provides ecosystem services within the site and in particular reduces the risk of erosion of the wide wash areas within the site.
- **Stress on a water resource.** Demand for water for construction could place stress on the existing available water resources. During construction, more water is required than during the operational phase to suppress dust and used in concrete batching.
- **Decrease in aquatic ecosystem integrity (alien vegetation infestation).** Alien vegetation infestation within the aquatic features due to disturbance. The current presence of alien vegetation on the site is limited.
- **Decrease in water quality.** Increased sedimentation and risks of contamination of surface water runoff during construction. During construction, the earthworks near watercourses will expose and mobilise soil as well as construction materials and chemicals that may end up in the water resources. Any spills during transport or while works are conducted in proximity to a watercourse also have the potential to affect the surrounding biota.

Operational Phase:

- **Decrease in aquatic ecosystem integrity (ongoing disturbance).** Ongoing disturbance of aquatic features and associated vegetation along access roads or adjacent to infrastructure that needs to be maintained.
- **Decrease in aquatic ecosystem integrity (disturbance of cover vegetation and soil).** Modified runoff characteristics from hardened surfaces have the potential to result in the erosion of hillslopes and watercourses. Limited hardening of surfaces will take place as a result of the proposed projects. Much of this is related to the increased road network and also serves to concentrate and convey runoff with its associated erosion.
- **Modified hydraulics in the watercourses** as a result of the PV modules within the wash area as well as any structures associated with the proposed road crossings through the watercourses. Development within the wash areas will alter the flow through these sensitive areas and increase the potential for erosion. Any new structures within the watercourses associated with the proposed projects mustn't impede flow, or fragment the aquatic habitats, in the watercourses. Given the episodic flow in the watercourses, the structures at the road crossings should consist of nothing more than low water crossings that will not impede water or sediment movement. Areas identified as being of high sensitivity should be avoided by the projects, with the exception being that existing roads may be widened at these features. Stormwater management of access roads on steeper slopes, in particular, needs to be addressed to prevent erosion of the slopes and adjacent watercourses.
- Water supply (and possibly sanitation services) is required for the operation of the facility. The water requirements during operation are much lower and could potentially be provided from groundwater without any aquatic ecosystem impacts (the water requirements for the operational phase is about 30 000 m³ per annum). The availability of groundwater for these projects should be considered in a geohydrological assessment. Boreholes should not be sited within or immediately adjacent to watercourses where they would potentially be impacting the subsurface flow in the watercourses. The baseflow in the watercourse is important in maintaining aquatic vegetation and some aquatic biota. The larger flows in the watercourses are unlikely to be impacted by the proposed projects.

Decommissioning Phase:

- **Increased disturbance of aquatic habitat** due to the increased activity on the site.
- **Increased sedimentation and risks of contamination of surface water runoff.**

Cumulative Impacts:

The **cumulative impact** of the project activities, together with the existing activities in the area, could have the potential to reduce the integrity of the watercourses if not properly mitigated and managed. Construction of the PV modules and associated infrastructure within the wider wash

areas with their mosaic of depression wetlands would likely result in cumulative impacts reducing the integrity of the associated aquatic ecosystems.

Refer to the Aquatic Biodiversity Impact Assessment in Appendix G.3 of this EIA Report for detailed information on the potential impacts identified and mitigation measures recommended. The table below provides a summary of the impact assessment for this study.

Table 6.5: Assessment of the potential Aquatic Biodiversity risks and impacts of the proposed project

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
DIRECT IMPACTS						
CONSTRUCTION PHASE						
Disturbance of aquatic habitat and the associated impact on sensitive aquatic biota	Status	Negative	Moderate	Place PV modules and associated infrastructure outside of aquatic features and recommended development setbacks to minimise works within aquatic ecosystems (i.e. recommended buffer of at least 35 m for the smaller drainage features; and a 50m setback from the larger rivers)	Low	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Low				
	Irreplaceability	Moderate				
Removal of indigenous aquatic vegetation and associated loss of aquatic ecological integrity and functionality	Status	Negative	Moderate	- Implement development setbacks to minimise works within aquatic ecosystems (i.e. recommended buffer of at least 35 m for the smaller drainage features; and a 50m setback from the larger rivers). - Clearing of indigenous vegetation should not take place within the aquatic features and the recommended buffers. - Rehabilitate disturbed aquatic habitats by revegetating with suitable local indigenous vegetation.	Low	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Low				
	Irreplaceability	Moderate				
Water supply for construction and associated stress on available water resources	Status	Negative	Very Low	Water use for construction should be minimised as much as possible. The water should be obtained from an existing water allocation or other viable water sources for construction purposes.	Very Low	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Extremely Unlikely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Road crossing structures may impede flow in the aquatic features	Status	Negative	Very Low	The road crossing structures should be designed to not impede flow in watercourses - low water crossing is preferred.	Very Low	High
	Spatial Extent	Site specific				
	Duration	Long term				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Consequence	Slight		Use existing crossings, as best as possible and where allowable. The existing road infrastructure should be utilised as far as possible to access new infrastructure to minimise the overall disturbance. It is recommended that any new linear type of infrastructure crossings over watercourses be placed where there are existing structures or road crossings within the watercourse corridors.		
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
Alien vegetation infestation may occur within the aquatic features due to disturbance	Status	Negative	Low	- Avoid disturbing aquatic habitats. - Construction materials brought onto the site should be free of alien plant seed. - Sources of alien seed should be prevented from being brought onto the site with imported materials. - Rehabilitate disturbed aquatic habitats once construction works are complete. - Undertake monitoring for the growth of alien vegetation during the post-construction phase.	Very Low	High
	Spatial Extent	Site specific				
	Duration	Medium or long term				
	Consequence	Moderate				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
Increased sedimentation and risks of contamination of surface water runoff may result from construction works	Status	Negative	Low	- Any works within aquatic features should be undertaken in the dry season where possible. - Sediment traps should be used where necessary. - Construction sites and laydown areas should be located within the assessed buildable areas. - Good housekeeping and site management measures must be implemented at the laydown areas and the construction site as per the project Environmental Management Programme (EMPr) and monitored by the appointed Environmental Control Officer (ECO).	Very Low	High
	Spatial Extent	Local				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	Low				
	Irreplaceability	Moderate				
OPERATIONAL PHASE						
Ongoing disturbance of aquatic features and associated vegetation along access roads or adjacent to the	Status	Negative	Low	The medium sensitivity aquatic habitats should be avoided in the layout design, with only low sensitivity habitats being disturbed during construction.	Very Low	High
	Spatial Extent	Site specific				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
infrastructure that needs to be maintained	Reversibility	Moderate		▪ Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areas do not become infested with invasive alien plants. ▪ Disturbance of aquatic habitats would only result in a negligible alteration to aquatic ecosystems and processes.		
	Irreplaceability	Moderate to Low				
Modified runoff characteristics from hardened surfaces at the substation and along access roads has the potential to result in erosion of adjacent watercourses	Status	Negative	Low	▪ Develop a stormwater management plan for the proposed development that addresses the stormwater runoff from the developed areas. ▪ Stormwater run-off infrastructure must be designed to mitigate both the flow and water quality impacts of any stormwater leaving the developed areas. The runoff should rather be dissipated over a broad area covered by natural vegetation or managed using appropriate shaping of the road with berms or channels and swales adjacent to hardened surfaces where necessary. ▪ Should any erosion features develop, they should be stabilised immediately.	Very Low	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				
Water supply and water quality impacts (e.g. contamination from sewage) as a result of the operation of the site	Status	Negative	Very Low	▪ A sustainable water supply should be sought. Sewage generated within the site should be discharged to a conservancy tank that is properly serviced and regularly evacuated to nearby wastewater treatment works.	Very Low	High
	Spatial Extent	Site specific				
	Duration	Long term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	Low				
	Irreplaceability	Low				
DECOMMISSIONING PHASE						
Increased disturbance of aquatic habitat due to the increased activity on the site	Status	Negative	Low	▪ Minimise works within aquatic ecosystems. If the project layout avoided these areas, the decommissioning works would also be able to avoid aquatic habitats on the property. ▪ Rehabilitate and revegetate disturbed areas, where required. ▪ Mitigation and follow-up monitoring of residual impacts (alien vegetation growth and erosion) may be required.	Very Low	High
	Spatial Extent	Local				
	Duration	Short term				
	Consequence	Slight to moderate				
	Probability	Likely				
	Reversibility	Moderate				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Irreplaceability	Moderate to Low		The road network should be returned to that resembling pre-construction, with all additional roads removed where possible.		
Increased sedimentation and risks of contamination of surface water runoff	Status	Negative	Low	- Decommissioning activities within aquatic features should be undertaken in the dry season where possible - Sediment traps should be used where necessary. - Laydown areas should be placed within approved PV footprint and layout. - Good housekeeping measures should be implemented as per the project EMPr and monitored by the appointed ECO. This should specifically address on-site stormwater management and prevention of pollution during decommissioning. Any stormwater that does arise within the decommissioning site must be handled appropriately to trap sediments and pollutants.	Very Low	High
	Spatial Extent	Local				
	Duration	Short term				
	Consequence	Slight to moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate to Low				
CUMULATIVE IMPACTS						
CONSTRUCTION PHASE						
Increased disturbance of aquatic habitat due to the increased activity in the wider area	Status	Negative	Low	- Minimise works within aquatic ecosystems as far as possible. - Construct in the dry season where possible. - Rehabilitate disturbed areas. - Rationalise infrastructure as far as possible by sharing the infrastructure or using existing disturbed areas. - Manage stormwater impacts.	Very Low	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
OPERATIONAL PHASE						
Degradation of ecological condition of aquatic ecosystems	Status	Negative	Low	- Monitor and manage for impacts such as alien vegetation growth and erosion. - Limit disturbance and rehabilitate disturbed areas. - Ensure there is sufficient stormwater management to prevent erosion of watercourses. - Ensure road crossing structures are properly designed prevent blockage in the watercourses or erosion.	Very Low	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Ranking (Post-mitigation)	Confidence Level
				Limit and monitor water use.		
DECOMMISSIONING PHASE						
Increased disturbance of aquatic habitat due to the increased activity in the wider area	Status	Negative	Low	- Decommissioning works near aquatic features should preferably be undertaken in the dry season where possible. - Minimise disturbance and rehabilitate.	Very Low	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

6.2.3.2 Concluding Statement

The risk assessment determined that the proposed PV development poses a moderate risk of impacting aquatic habitat, water flow and water quality if the facilities are placed within the area mapped as being the wash area containing the mosaic of depression wetlands. With the findings of the risk assessment, the water use activities associated with the proposed project would need to be authorised with a water use licence for Section 21(c) and (i) water uses. Should the location of the facilities be located outside of the mapped aquatic features and buffers, the risk would be reduced to low such that the water use activities associated with the proposed project could potentially be authorised through the general authorisations for Section 21(c) and (i) water uses. In Chapter 7, the undertaking of the Water Use Licence Application and obtaining of approval from the DWS/ Breede Olifants Catchment Management Agency will be recommended to be conditioned in the EA, should it be granted.

Based on the findings of this specialist assessment, there is no reason, from a freshwater perspective, why the proposed development (with the implementation of the above-mentioned mitigation measures and, in particular, locating the PV facilities outside of the mapped aquatic features and recommended buffers) should not be authorised.

6.2.4 Avifaunal Impacts

The impact assessment below is based on the Avifauna Impact Assessment included in Appendix G.4 of this EIA Report.

6.2.4.1 Impact Assessment

The following potential impacts on Avifauna were identified that are likely to be associated with the proposed development:

Construction Phase:

- **Displacement due to disturbance and habitat transformation associated with the construction of the solar PV plant and associated infrastructure.** The noise and movement associated with the construction activities at the proposed PV plant will be a source of disturbance which would lead to the displacement of avifauna from the area.

Operational Phase:

- **Displacement due to habitat transformation associated with the presence of the solar PV plant and associated infrastructure.** This impact relates to total or partial displacement of avifauna due to habitat transformation.
- **Collisions with the solar panels.** This impact relates to the bird mortalities as a result of potential collisions with the solar panels.

- **Entrapment in perimeter fences.** This impact pertains to the entrapment of medium and large terrestrial birds between the perimeter fences, leading to mortality.
- **Electrocutions on the internal 33kV powerlines (if above ground) and in the onsite substation complex.** Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap (clearance) between live components and/or live and earthed components.
- **Collisions with the internal 33kV powerlines (if above ground) and the 132kV grid connection.**

Decommissioning Phase:

- **Displacement due to disturbance associated with the decommissioning of the solar PV plant and associated infrastructure.** The noise and movement associated with the potential decommissioning activities will be a source of disturbance which would lead to the displacement of avifauna from the area.

Cumulative Impacts:

- **Construction and Decommissioning Phases:**
 - Displacement due to disturbance and habitat transformation associated with the construction and decommissioning of the solar PV plants and associated infrastructure.
- **Operational Phase:**
 - Total or partial displacement of avifauna due to habitat transformation associated with the presence of the solar PV plants and associated infrastructure.
 - Bird mortality and injury as a result of collisions with the solar panels.
 - Entrapment of medium and large terrestrial birds between the perimeter fences, leading to mortality; and
 - Electrocution of priority species on the 33kV overhead lines (if above ground) and the onsite substation complexes.

Refer to the Avifauna Impact Assessment in Appendix G.4 of this EIA Report for detailed information on the potential impacts identified and mitigation measures recommended. The table below provides a summary of the impact assessment for this study.

Table 6.6: Assessment of the potential Avifauna risks and impacts of the proposed project

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
DIRECT IMPACTS						
CONSTRUCTION PHASE						
Displacement due to disturbance associated with the construction of the solar PV plant and associated infrastructure	Status	Negative	Moderate	- Activity should as far as possible be restricted to the footprint of the infrastructure. - Measures to control noise and dust should be applied according to best practice in the industry at the time. - Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum as far as practical. - Access to the rest of the property must be restricted. - The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint is concerned. - A 1 km all infrastructure exclusion zone around the Verreaux's Eagle nests (at -32° 7'18.77"S, 22° 6'39.32"E and at 32°10'18.71"S, 22° 8'41.47"E) is recommended prevent disturbance of the breeding pair.	Low	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	High				
	Irreplaceability	Low				
OPERATIONAL PHASE						
Total or partial displacement of avifauna due to habitat transformation associated with the presence of the solar PV plant and associated infrastructure.	Status	Negative	High	- The recommendations of the botanical specialist must be strictly implemented, especially as far as limiting the vegetation clearance to what is absolutely necessary, and rehabilitation of transformed areas are concerned. - Where possible, surface water (dams and drainage lines) must be buffered according to the freshwater specialists' recommendations to ensure unhindered access of priority species to the water. No PV panels should be constructed in this zone.	Moderate	Medium
	Spatial Extent	Site specific				
	Duration	Long term				
	Consequence	Severe				
	Probability	Very likely				
	Reversibility	High				
	Irreplaceability	Low				
Bird mortality and injury as a result of collisions with the solar panels.	Status	Negative	Very Low	No mitigation is required due to the very low significance	Very Low	Medium
	Spatial Extent	Site specific				
	Duration	Long term				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
Entrapment of medium and large terrestrial birds between the perimeter fences, leading to mortality.	Status	Negative	Low	▪ A single perimeter fence should be used.	Very Low	High
	Spatial Extent	Site specific				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Low				
Electrocution of priority species in the onsite substation complex and on the 33kV internal powerlines (if above ground).	Status	Negative	Moderate	▪ The hardware within the proposed substation yards is too complex to warrant any mitigation for electrocution at this stage. It is recommended that if on-going impacts are recorded once operational, site-specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red List priority species are unlikely to frequent the substation and be electrocuted. ▪ In instances where the medium voltage cables cannot be buried due to technical constraints, a bird-friendly pole design must be used for the overhead lines. The avifaunal specialist must approve the pole design.	Very Low	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Severe				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
Collision mortality of powerline sensitive species due to the 132kV grid connections.	Status	Negative	High	▪ Bird Flight Diverters must be fitted to all overhead lines according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines).	Moderate	Medium
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Severe				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Low				
DECOMMISSIONING PHASE						
The noise and movement associated	Status	Negative	Moderate	▪ Activity should as far as possible be restricted to the footprint of the infrastructure.	Low	High
	Spatial Extent	Site specific				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
with the activities at the Study Area will be a source of disturbance which would lead to the displacement of avifauna from the area.	Duration	Short term		- Measures to control noise and dust should be applied according to best practice in the industry at the time. - Maximum use should be made of existing access roads during the decommissioning phase and the construction of new roads should be kept to a minimum as far as practical. - The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the activity footprint is concerned.		
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	High				
	Irreplaceability	Low				
CUMULATIVE IMPACTS						
CONSTRUCTION PHASE						
Displacement due to disturbance associated with the construction of the solar PV plant and associated infrastructure	Status	Negative	Moderate	- Activity should as far as possible be restricted to the footprint of the infrastructure. - Measures to control noise and dust should be applied according to best practice in the industry at the time. - Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum as far as practical. - Access to the rest of the property must be restricted. - The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint is concerned. - Appropriate buffer zones must be implemented around Species of Conservation Concern (SCC) nests.	Low	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	High				
	Irreplaceability	Low				
OPERATIONAL PHASE						
Habitat transformation, collisions with the solar panels, entrapment in fences, and electrocution on the 33kV overhead lines (if above ground) and in onsite substation complexes	Status	Negative	High	- The recommendations of the botanical specialist must be strictly implemented, especially as far as limiting the vegetation clearance to what is absolutely necessary, and rehabilitation of transformed areas are concerned. - Where possible, solar panel-free buffers must be maintained around the pans, dams and water troughs. - A single perimeter fence should be used. - The hardware within the proposed substation yards is too complex to warrant any mitigation for electrocution at this stage.	Moderate	High
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Severe				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Low				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Ranking (Post-mitigation)	Confidence Level
				It is recommended that if on-going impacts are recorded once operational, site-specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red List priority species are unlikely to frequent the substation and be electrocuted. In instances where the medium voltage cables cannot be buried due to technical constraints, a bird-friendly pole design must be used for the overhead lines. The avifaunal specialist must approve the pole design.		
DECOMMISSIONING PHASE						
The noise and movement associated with the activities at the Study Area will be a source of disturbance which would lead to the displacement of avifauna from the area	Status	Negative	Moderate	- Activity should as far as possible be restricted to the footprint of the infrastructure. - Measures to control noise and dust should be applied according to best practice in the industry at the time. - Maximum use should be made of existing access roads and the construction of new roads during the decommissioning phase should be kept to a minimum as far as practical. - The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the activity footprint is concerned.	Low	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	High				
	Irreplaceability	Low				

6.2.4.2 Concluding Statement

The proposed project will have a range of potential pre-mitigation impacts on priority avifauna ranging from low to high significance, which is expected to be reduced to medium and low significance with the appropriate mitigation. No fatal flaws were discovered during the investigations. The project is supported, and it is therefore recommended that the activity is authorised, with the understanding that all mitigation measures recommended in above will be strictly implemented.

6.2.5 Visual Impacts

The impact assessment below is based on the Visual Impact Assessment included in Appendix G.5 of this EIA Report.

6.2.5.1 Impact Assessment

The following potential impacts on Avifauna were identified that are likely to be associated with the proposed development:

Construction Phase (direct impacts):

- Potential visual impact of construction activities on sensitive visual receptors in close proximity (within 1 km) to the proposed PV facility .

Operational Phase (direct impacts):

- Potential visual impact on sensitive visual receptors located within a 1km radius of the PV Facility
- Potential visual impact on sensitive visual receptors within the 1 – 3km radius
- Potential visual impact on sensitive visual receptors within the 3 – 6km radius
- Potential visual impact on sensitive visual receptors within the greater area (beyond 6km radius)
- Potential visual impact of operational, safety and security lighting of the facility at night
- Potential visual impact of solar glint and glare as a visual distraction and possible air/road travel hazard
- Potential visual impact of solar glint and glare on static ground-based receptors (residents of homesteads) in close proximity (within 1km) to the PV facility
- Visual impact of the ancillary infrastructure on observers in close proximity to the structures.

Operational Phase (indirect impacts):

- The potential impact on the sense of place of the region.

Decommissioning Phase (direct impacts):

- Visual impact of construction activities on sensitive visual receptors in close proximity (within 1km) to the proposed facility.

Cumulative Impacts:

- The potential cumulative visual impact of PV facilities on the visual quality of the landscape.

Refer to the Visual Impact Assessment in Appendix G.5 of this EIA Report for detailed information on the potential impacts identified. The table below provides a summary of the impact assessment for this study.

Table 6.7: Assessment of the potential Visual impacts of the proposed project

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
DIRECT IMPACTS						
CONSTRUCTION PHASE						
Visual impact of construction activities on sensitive visual receptors in close proximity to the proposed PV facility	Status	Negative	High	Planning: - Retain and maintain natural vegetation in all areas outside of the development footprint, but within the project site. Construction: - Ensure that vegetation is not unnecessarily removed during the construction period. - Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) where possible. - Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. - Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at licensed waste facilities. - Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent). - Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts. - Rehabilitate all disturbed areas immediately after the completion of construction works.	Moderate	High
	Spatial Extent	Very short distance				
	Duration	Short term				
	Consequence	Very high				
	Probability	Definite				
	Reversibility	Reversible				
	Irreplaceability	No				
OPERATIONAL PHASE (direct impacts)						
Visual impact on observers (residents at Doringboomfontein homestead) in close	Status	Negative	High	Planning: Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.	Moderate	High
	Spatial Extent	Very short distance				
	Duration	Long term				
	Consequence	Very high				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
proximity (i.e. within 1km) to the PV facility	Probability	Highly probable		- Consult adjacent landowners (if present) in order to inform them of the development and to identify any (valid) visual impact concerns. Operations: - Maintain the general appearance of the facility as a whole. - Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint, where possible. - Investigate the potential to screen affected receptor sites (if applicable and located within 1km of the facility) with planted vegetation cover.		
	Reversibility	Reversible				
	Irreplaceability	No				
Visual impact on observers travelling along the roads within a 1 – 3km radius of the facility	Status	Negative	Moderate	Planning: - Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. Operations: - Maintain the general appearance of the facility as a whole. - Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint, where possible. - Investigate the potential to screen affected receptor sites (if applicable and located within 1km of the facility) with planted vegetation cover.	Low	High
	Spatial Extent	Short distance				
	Duration	Long term				
	Consequence	High				
	Probability	Probable				
	Reversibility	Reversible				
	Irreplaceability	No				
Visual impact on observers travelling along the roads within a 3 – 6km radius of the facility	Status	Negative	Moderate	Planning: - Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. Operations: - Maintain the general appearance of the facility as a whole. - Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint, where possible.	Low	High
	Spatial Extent	Medium distance				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Probable				
	Reversibility	Reversible				
	Irreplaceability	No				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
				Investigate the potential to screen affected receptor sites (if applicable and located within 1km of the facility) with planted vegetation cover.		
Visual impact on observers travelling along the roads, residents at homesteads and protected areas beyond the 6km radius of the facility	Status	Negative	Low	Planning: - Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. Operations: - Maintain the general appearance of the facility as a whole. - Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint, where possible. - Investigate the potential to screen affected receptor sites (if applicable and located within 1km of the facility) with planted vegetation cover.	Low	High
	Spatial Extent	Long distance				
	Duration	Long term				
	Consequence	Low				
	Probability	Improbable				
	Reversibility	Reversible				
	Irreplaceability	No				
Visual impact of lighting at night on sensitive visual receptors.	Status	Negative	High	Planning & operation: - Shield the sources of light by physical barriers (walls, vegetation, or the structure itself). - Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights. - Make use of minimum lumen or wattage in fixtures. - Make use of down-lighters, or shielded fixtures. - Make use of Low-Pressure Sodium lighting or other types of low impact lighting. - Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.	Moderate	High
	Spatial Extent	Short/Medium				
	Duration	Long term				
	Consequence	High				
	Probability	High				
	Reversibility	Reversible				
	Irreplaceability	No				
The visual impact of solar glint and glare as a visual distraction and possible road travel hazard	Status	Negative	Low	There are no major roads within a 1km radius of the proposed PV facility. This approximate distance is recommended as a threshold within which the visual impact of glint and glare (if there is visual line of sight from the road) may influence road users	Low	High
	Spatial Extent	Very short distance				
	Duration	Long term				
	Consequence	Minor				
	Probability	Very unlikely				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Reversibility	Reversible				
	Irreplaceability	No				
The visual impact of solar glint and glare on residents of homesteads in closer proximity (within 1km) to the PV facility	Status	Negative	Moderate	Planning & operation: - Use anti-reflective panels and dull polishing on structures, where possible and industry standard. - If specific sensitive visual receptors are identified during operation, investigate screening at the receptor site, where possible.	Low	High
	Spatial Extent	Very short distance				
	Duration	Long term				
	Consequence	High				
	Probability	Probable				
	Reversibility	Reversible				
	Irreplaceability	No				
Visual impact of the ancillary infrastructure on observers in close proximity to the structures.	Status	Negative	Moderate	Planning: - Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. Operations: - Maintain the general appearance of the facility as a whole. - Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint, where possible. - Investigate the potential to screen affected receptor sites (if applicable and located within 1km of the facility) with planted vegetation cover.	Low	High
	Spatial Extent	Very short distance				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Probable				
	Reversibility	Reversible				
	Irreplaceability	No				
OPERATIONAL PHASE (indirect impacts)						
The potential impact on the sense of place of the region.	Status	Negative	Moderate	Planning: - Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. Operations: - Maintain the general appearance of the facility as a whole.	Moderate	High
	Spatial Extent	Long distance				
	Duration	Long term				
	Consequence	High				
	Probability	Probable				
	Reversibility	Reversible				
	Irreplaceability	No				
DECOMMISSIONING PHASE						

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
Visual impact of construction activities on sensitive visual receptors in close proximity (within 1km) to the proposed facility.	Status	Negative	High	Decommissioning: - Remove infrastructure not required for the post-decommissioning use of the site. - Rehabilitate all areas as per the rehabilitation plan undertaken. Consult an ecologist regarding rehabilitation specifications. - Monitor rehabilitated areas post-decommissioning and implement remedial actions as required.	Moderate	High
	Spatial Extent	Very short distance				
	Duration	Very short term				
	Consequence	High				
	Probability	Definite				
	Reversibility	Reversible				
	Irreplaceability	No				
CUMULATIVE IMPACTS						
The potential cumulative visual impact of PV facilities on the visual quality of the landscape	Status	Negative	Moderate	Implement mitigation measures recommended above	Moderate	High
	Spatial Extent	Medium distance				
	Duration	Long term				
	Consequence	High				
	Probability	Probable				
	Reversibility	Reversible				
	Irreplaceability	No				

6.2.5.2 Concluding Statement

Overall, the significance of the visual impacts is expected to range from moderate to low, as a result of the very low occurrence of sensitive visual receptors. If mitigation is undertaken as recommended, it is concluded that the significance of most of the anticipated visual impacts will remain at or be managed to acceptable levels. As such, the DBF South Solar PV facility would be considered to be acceptable from a visual impact perspective and can therefore be authorised.

6.2.6 Heritage (including Archaeology and Cultural Landscape)

The impact assessment below is based on the Heritage Impact Assessment included in Appendix G.6 of this EIA Report.

6.2.6.1 Impact Assessment

The following potential impacts on Heritage Resources (Archaeological and Cultural) were identified that are likely to be associated with the proposed development:

Construction Phase:

- **Damage to or disturbance of archaeological sites and materials:** Archaeological materials may be affected during construction when equipment is brought onto site and earthworks and excavation takes place.
- **Alteration of the cultural landscape:** The landscape may be affected if the proposed project goes ahead, however it has a relatively low cultural significance.

Operational Phase:

- **Alteration of the cultural landscape:** The impact would definitely occur during the operational phase; however, the landscape has a relatively low cultural significance.

Decommissioning Phase:

- **Alteration of the cultural landscape:** In the event of decommissioning, the landscape will be affected, however the landscape has a relatively low cultural significance.

Cumulative Impacts:

- **Construction and Decommissioning Phases:**
 - Potential impacts on archaeology.
- **Operational Phase:**
 - Potential impacts on the cultural landscape.

Refer to the Heritage Impact Assessment in Appendix G.6 of this EIA Report for additional information on the potential impacts identified and mitigation measures recommended. The table below provides a summary of the impact assessment for this study.

Table 6.8: Assessment of the **potential Heritage risks and impacts of the proposed project**

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Ranking (Post-mitigation)	Confidence Level
DIRECT IMPACTS						
CONSTRUCTION PHASE						
Damage to or disturbance of archaeological sites and materials	Status	Negative	Low	▪ Finds of archaeological material are reported to Heritage Western Cape (HWC) and the project archaeologist	Very Low	High
	Spatial Extent	Site				
	Duration	Permanent				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Non-reversible				
	Irreplaceability	High				
Alteration of the cultural landscape	Status	Negative	High	▪ Implementation of recommendations of the Visual Impact Assessment (see Section 6.2.5 above) to reduce impacts to the cultural landscape	High	High
	Spatial Extent	Local				
	Duration	Long Term				
	Consequence	Substantial				
	Probability	Very Likely				
	Reversibility	High				
	Irreplaceability	High				
OPERATIONAL PHASE						
Alteration of the cultural landscape	Status	Negative	High	▪ Implementation of recommendations of the Visual Impact Assessment (see Section 6.2.5 above) to reduce impacts to the cultural landscape	High	High
	Spatial Extent	Local				
	Duration	Long Term				
	Consequence	Substantial				
	Probability	Very Likely				
	Reversibility	High				
	Irreplaceability	High				
DECOMMISSIONING PHASE						
Alteration of the cultural landscape	Status	Negative	High	▪ Implementation of recommendations of the Visual Impact Assessment (see Section 6.2.5 above) to reduce impacts to the cultural landscape	High	High
	Spatial Extent	Local				
	Duration	Long Term				
	Consequence	Substantial				
	Probability	Very Likely				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Ranking (Post-mitigation)	Confidence Level
	Reversibility	High				
	Irreplaceability	High				
CUMULATIVE IMPACTS						
CONSTRUCTION PHASE						
Impacts to archaeology, graves and the cultural landscape	Status	Negative	Low	- Avoid or mitigate sites as proposed in the specialist reports. - Report any chance finds to HWC and/or a project archaeologist. - Follow the recommendations of the Visual Specialist.	Low	High
	Spatial Extent	Regional				
	Duration	Permanent				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	Non-reversible				
	Irreplaceability	High				
OPERATIONAL PHASE						
Alteration of the cultural landscape	Status	Negative	High	Implementation of recommendations of the Visual Impact Assessment (see Section 6.2.5 above) to reduce impacts to the cultural landscape	High	High
	Spatial Extent	Local				
	Duration	Long Term				
	Consequence	Substantial				
	Probability	Very Likely				
	Reversibility	High				
	Irreplaceability	High				

6.2.6.2 Concluding Statement

This assessment has found that the area identified for the proposed project is a heritage environment of variable sensitivity but that significant impacts on heritage resources arising from the construction of the project are unlikely. Provided the recommended mitigation measures are implemented, the overall impact and significance of the proposed project on heritage resources will be low and the proposed activity is acceptable from a heritage perspective.

6.2.7 Palaeontology

The impact assessment below is based on the Palaeontology Impact Assessment included in Appendix G.7 of this EIA Report.

6.2.7.1 Impact Assessment

The following potential impacts on Palaeontological resources were identified that are likely to be associated with the proposed development:

Construction Phase:

- Loss of fossil Heritage

Operational and Decommissioning Phase:

- No impact on Fossil Heritage

Cumulative Impacts:

- Loss of fossil Heritage

Refer to the Palaeontological Impact Assessment in Appendix G.7 of this EIA Report for detailed information on the potential impacts identified and mitigation measures recommended. The table below provides a summary of the impact assessment for this study.

Table 6.9: Assessment of the potential Paleontological risks and impacts of the proposed project

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Ranking (Post-mitigation)	Confidence Level
DIRECT IMPACTS						
CONSTRUCTION PHASE						
Loss of fossil heritage	Status	Negative	Low	▪ Implement Chance Fossil Finds Protocol that has been integrated into the EMPr (Appendix H of this EIA Report)	Very Low	High
	Spatial Extent	Site specific				
	Duration	Permanent				
	Consequence	Moderate Risk				
	Probability	Unlikely				
	Reversibility	Non-reversible				
	Irreplaceability	Irreplaceable				
OPERATIONAL PHASE						
No impact on fossil heritage	Status					High
	Spatial Extent					
	Duration					
	Consequence					
	Probability					
	Reversibility					
	Irreplaceability					
DECOMMISSIONING PHASE						
No impact on fossil heritage	Status					High
	Spatial Extent					
	Duration					
	Consequence					
	Probability					
	Reversibility					
	Irreplaceability					
CUMULATIVE IMPACTS						
CONSTRUCTION PHASE						
Loss of fossil heritage	Status	Negative	Moderate		Low	High
	Spatial Extent	Site specific				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Ranking (Post-mitigation)	Confidence Level
	Duration	Permanent		Implement Chance Fossil Finds Protocol that has been integrated into the EMPr (Appendix H of this EIA Report)		
	Consequence	Moderate Risk				
	Probability	Unlikely				
	Reversibility	Non-reversable				
	Irreplaceability	Irreplaceable				

6.2.7.2 Concluding Statement

Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the SEF footprint is relatively rare. This is in contrast with the high sensitivity allocated to the development area by the SAHRIS Palaeo-sensitivity Map and DFFE Screening Tool. A low Palaeontological Significance has been allocated for the construction phase of the SEF development pre-mitigation and a very low significance post mitigation. The construction phase will be the only development phase impacting Palaeontological Heritage and no significant impacts are expected to impact the Operational and Decommissioning phases. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

6.2.8 Socio-Economic

The impact assessment below is based on the Socio-Economic Impact Assessment included in Appendix G.8 of this EIA Report.

6.2.8.1 Impact Assessment

The following potential Socio-Economic impacts were identified that are likely to be associated with the proposed development:

Direct Negative Impacts

Construction Phase:

- Social disruption and change in social dynamics; and
- Reduced quality of life and increased risks due to construction near residences

Decommissioning Phase:

- Reduced employment and funding.

Direct Positive Impacts

Construction Phase:

- Capital investment (CapEx) contributing to the national, regional and local economy;
- Generation of employment, income and skills.

Operational Phase:

- Operational investment (OpEx) contributing to the national, regional and local economy;
- Generation of employment, income and skills;
- Increased community prosperity through contributions and income from the SEF; and
- Increased power generation reducing the probability of load shedding.

Cumulative Positive Impacts:

- Stimulation of economic and employment growth; and

- Increased community prosperity through contributions and income from IPPs

Refer to the Socio-Economic Impact Assessment in Appendix G.8 of this EIA Report for detailed information on the potential impacts identified. The table below provides a summary of the impact assessment for this study.

Table 6.10: Assessment of the potential Socio-Economic impacts of the proposed project

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
DIRECT IMPACTS						
CONSTRUCTION PHASE						
Capital investment contributing to the national, regional and local economy	Status	Positive	Moderate	- Source as many goods and services as far as possible from the local and regional economy (e.g. use local contractors and accommodation and equipment suppliers as far as possible and purchase perishable goods locally). - Provide suitable training to service providers, where possible and practicable. - Develop and implement a fair and transparent procurement policy. - Provide training to staff and service providers on how to position themselves for other employment opportunities once construction ends. - Consult with existing IPP projects that successfully procure from local SMMEs to share learnings, where possible.	Moderate	Medium
	Spatial Extent	Regional				
	Duration	Medium-term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Partially reversible				
	Irreplaceability	n/a				
Generation of employment, income and skills	Status	Positive	Low	- Maximise use of local skills and resources through preferential employment of locals where practicable. - Develop, communicate and implement a fair and transparent labour and recruitment policy. - Ensure diversity and gender equality in recruitment, as far as possible. - Provide training to staff and service providers before and/or during the construction phase.	Moderate	Medium
	Spatial Extent	Regional				
	Duration	Medium-term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Employment reversible, training irreversible				
	Irreplaceability	n/a				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
				Provide training to staff and service providers on how to position themselves for other employment opportunities once construction ends.		
Social disruption and change in social dynamics	Status	Negative	Moderate	- Clearly publicise and implement a recruitment policy. - Work together with impartial local representatives to identify local people during the recruitment process. - Provide transport to site and other incentives to reduce the number of workers accommodated in EPC accommodation to an absolute minimum. - Consult with the municipality regarding the capacity of existing services and infrastructure (e.g. provision of water, electricity, waste removal, sanitation and housing) to cope with additional workers brought into the area during the construction period. - Consider supporting projects that improve local services and infrastructure and/or deal with social problems or conflicts through the social upliftment programme, if the need arises.	Low	Medium
	Spatial Extent	Regional				
	Duration	Medium-term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Partially reversible				
	Irreplaceability	n/a				
Reduced quality of life and increased risks due to construction near residences	Status	Negative	Low	- Liaise with nearby residents before and during construction to inform them of construction status and discuss safety management measures to reduce security risks. - Maintain a visible security presence on site.	Very low	High
	Spatial Extent	Local				
	Duration	Medium-term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Partially reversible				
	Irreplaceability	n/a				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
				▪ Implement a grievance mechanism during the construction phase. ▪ Communicate and implement a compensation procedure in the event of damages directly linked to the construction. ▪ Control site access. ▪ Provide transportation to site for unskilled workers. ▪ Declare areas outside of the construction site as no-go areas for construction staff. ▪ Erect and regularly inspect a boundary fence. ▪ Regularly inspect the project area and surrounding area for signs of illegal activity. ▪ Regularly clean any litter from the project area and surrounding area.		
OPERATIONAL PHASE						
Operational investment contributing to the national, regional and local economy	Status	Positive	Low	▪ Source as many goods and services as possible from the local and regional economy (e.g. use local contractors and accommodation and equipment suppliers as far as possible and purchase perishable goods locally). ▪ Provide suitable training to service providers, where possible and practicable. ▪ Develop and implement a fair and transparent procurement policy.	Low	Medium
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	Partially reversible				
	Irreplaceability	n/a				
Generation of employment, income and skills	Status	Positive	Low	▪ Maximise use of local skills and resources through preferential employment of locals where practicable.	Low	Medium
	Spatial Extent	Local				
	Duration	Long term				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
	Consequence	Moderate		- Develop and implement a fair and transparent labour and recruitment policy. - Ensure diversity and gender equality in recruitment, as far as possible. - Provide suitable training. - Provide ancillary training to workers on maximising the use of income and training to further future economic prospects, potentially through projects initiated as part of the social upliftment programme.		
	Probability	Very likely				
	Reversibility	Employment reversible, training irreversible				
	Irreplaceability	n/a				
Increased community prosperity through contributions and income from the SEF if the project complies with typical REIPPPP requirements	Status	Positive	Moderate	- Regularly engage with community stakeholders to develop meaningful strategies for community development. - Define vision for economic development in consultation with communities. - Develop a Governance Plan with clear governance rules for the Community Trust, including administration and trustee and beneficiary selection. - Ensure that funding requirements for each project are considered into the future so that projects are viable and sustainable. - Set clear goals for each project and phase out funding once these goals are achieved. - Ensure regular external auditing of the Community Trust as well as supported projects. - Consider auditing projects for several years after funding has ceased to ensure their benefits are sustained.	High	Medium
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	n/a				
	Irreplaceability	n/a				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
Increased community prosperity through contributions and income from the SEF if typical REIPPPP requirements do <u>not</u> apply	Status	Positive	Low	- Regularly engage with community stakeholders to develop meaningful strategies for community development. - Define vision for economic development in consultation with communities. - Ensure that funding requirements for each project are considered into the future so that projects are viable and sustainable. - Set clear goals for each project and phase out funding once these goals are achieved. - Consider auditing projects for several years after funding has ceased to ensure their benefits are sustained.	Low	Medium
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	n/a				
	Irreplaceability	n/a				
Increased South African power generation reducing the probability of load shedding	Status	Positive	Not rated	None	Not rated	
	Spatial Extent	n/a				
	Duration	n/a				
	Consequence	n/a				
	Probability	n/a				
	Reversibility	n/a				
	Irreplaceability	n/a				
DECOMMISSIONING PHASE						
Reduced employment and Funding	Status	Negative	Low	- Clearly communicate project duration to staff and communities. - Prolong the operational life of the project as much as possible. - Assist with recommendations and referrals where possible. - Assist with the sustainable administration of funds throughout the project lifetime.	Low	Medium
	Spatial Extent	Regional				
	Duration	Short-term				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	n/a				
	Irreplaceability	n/a				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
CUMULATIVE IMPACTS						
Stimulation of Economic and Employment Growth	Status	Positive	Moderate	- Source as many goods and services as far as possible from the local and regional economy (e.g. use local contractors and accommodation and equipment suppliers as far as possible and purchase perishable goods locally). - Provide suitable training to service providers, where possible and practicable. - Develop and implement a fair and transparent procurement policy. - Provide training to staff and service providers on how to position themselves for other employment opportunities once construction ends. - Consult with existing IPP projects that successfully procure from local SMMES to share learnings, where possible.	Moderate	Medium
	Spatial Extent	Regional				
	Duration	Medium-term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Partially reversible				
	Irreplaceability	n/a				
Increased community prosperity through contributions and income from the SEF if typical REIPPPP requirements do <u>not</u> apply	Status	Positive	Moderate	- Regularly engage with community stakeholders to develop meaningful strategies for community development. - Define vision for economic development in consultation with communities. - Develop a Governance Plan with clear governance rules for the Community Trust, including administration and trustee and beneficiary selection. - Ensure that funding requirements for each project are considered into the future so that projects are viable and sustainable. - Set clear goals for each project and phase out funding once these goals are achieved.	High	Medium
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	n/a				
	Irreplaceability	n/a				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
				▪ Ensure regular external auditing of the Community Trust as well as supported projects. ▪ Consider auditing projects for several years after funding has ceased to ensure their benefits are sustained.		

6.2.8.2 Concluding Statement

The construction of the proposed project provides significant socio-economic benefits, related to economic growth and employment and financial contributions to and upliftment of Previously Disadvantaged Individuals in rural communities.

Negative impacts associated with the project relate to possible change in social dynamics in surrounding communities and temporary reduction in quality of life of selected nearby residents during the construction phase (when activity on the site increases) and possible social conflict in the event of poor governance of community funding, such as socio-economic development contributions and upliftment initiatives. Mitigation of these impacts is critical, whereupon they are more than counterbalanced by the socio-economic benefits of the project.

The project has acceptable socio-economic impacts and desirable benefits, though careful management of benefits (governance of community funds) is critical. From a socio-economic perspective the project should be authorised.

6.2.9 Traffic

The impact assessment below is based on the Traffic Impact Assessment included in Appendix G.9 of this EIA Report.

6.2.9.1 Impact Assessment of the Proposed Solar Energy Facility

The following potential indirect Traffic impacts were identified that are likely to be associated with the development of the proposed solar facility including all associated infrastructure other than the development of the overhead power line (addressed in Section 6.2.9.2):

Construction Phase:

- **Increased road accidents.** The increased traffic volumes on the public roads will increase the potential of incidents on the road network within the study area;
- **Road degradation.** The increased traffic volumes on the public roads will increase the potential for localised road network degradation within the study area.
- **Dust.** The increased traffic volumes on the unpaved public roads will generate more dust. The larger the vehicle, the more dust is likely to be generated. This dust hinders the drivers wishing to over-take without a clear view for over-taking, resulting in drivers taking unnecessary chances, which could result in unfavourable consequences; and
- **Intersection safety.** The increased traffic volumes at intersections will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities, especially at the intersection on the main roads, when vehicles from the site need to cross over oncoming traffic.

Operational Phase:

- **Intersection safety.** The increased traffic volumes at intersections will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities, especially

at the intersection on the main roads, when vehicles from the site need to cross over oncoming traffic.

Decommissioning Phase:

- A separate traffic impact assessment should be undertaken as part of the decommissioning process since many of the characteristics related to the traffic impact assessment, i.e. access routes, road geometry, traffic volumes, etc., would have changed over the operational life of the development. Thus, no traffic assessment for the decommissioning phase has been undertaken as of yet.

Cumulative Impacts:

- The cumulative impact due to the increased traffic volumes at intersections will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities, especially at the intersection on the main roads, when vehicles from the site need to cross over oncoming traffic.

Refer to the Traffic Impact Assessment in Appendix G.9 of this EIA Report for detailed information on the potential impacts identified and mitigation measures recommended. The table below provides a summary of the impact assessment for this study for the solar energy facility. The traffic impact assessment summary for the associated power line follows in Section 6.2.9.2.

Table 6.11: Assessment of the potential Traffic risks and impacts of the proposed project

Impact		Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
INDIRECT IMPACTS							
CONSTRUCTION PHASE							
Increased Incidents	Road	Status	Negative	Moderate	- Post relevant road signage along affected routes. - Create a local WhatsApp Group, notifying other road users of expected deliveries and associated routes. - Ensure all vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator. - Transport Management Plan (TMP) is to be compiled once the contractor has been appointed and all the relevant details of the construction process are known. The TMP needs to address, inter alia: - clearly defined route/s to the site for specific vehicles needed to transport equipment and materials - scheduled deliveries to avoid local congestion.	Low	High
		Spatial Extent	Local				
		Duration	Short Term				
		Consequence	Medium				
		Probability	Definite / Continuous				
		Reversibility	Irreparably damaged				
		Irreplaceability	Irreparably damaged				
Road degradation		Status	Negative	Moderate	- Create a local WhatsApp Group for the local community and post notices of road conditions and proposed alternatives. - Developer to contribute to the maintenance of the public roads in the area during the construction phase of the development/s. - A photographic record of the road condition should be maintained throughout the various phases of the development/s. This provides an objective assessment and mitigates any subjective view from road users. - Upgrade unpaved roads to a suitable condition for proposed construction vehicles. - Ensure that the roads are left in the same or better condition, post-construction.	Low	High
		Spatial Extent	Local				
		Duration	Short Term				
		Consequence	Medium				
		Probability	Definite / Continuous				
		Reversibility	Recoverable				
		Irreplaceability	No irreparable damage				
Dust		Status	Negative	Moderate		Low	High

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Spatial Extent	Regional		▪ Reduce travel speed for construction vehicles on the gravel road to reduce dust. ▪ Dust suppression of the roads in the immediate vicinity of the site where feasible. ▪ Regular preventative maintenance of roads within the immediate vicinity of the site should be conducted over weekends to minimise the impact on the average construction period.		
	Duration	Medium Term				
	Consequence	High				
	Probability	Possible/ Frequent				
	Reversibility	Permanently modified				
	Irreplaceability	Irreparable				
Intersection Safety	Status	Negative	Moderate	▪ Compile a Traffic Management Plant (TMP). ▪ Reduce speed at intersections and use appropriate traffic warning signs. ▪ Identify alternative routes where possible. ▪ Request the assistance of local law enforcement, as required. ▪ Ensure that all construction vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator.	Moderate	High
	Spatial Extent	Site				
	Duration	Short Term				
	Consequence	Moderate				
	Probability	Definite / Continuous				
	Reversibility	Permanently modified				
	Irreplaceability	Irreparable				
OPERATIONAL PHASE						
Intersection safety	Status	Negative	Moderate	▪ Compile a Traffic Management Plant (TMP). ▪ Reduce speed at intersections and use appropriate traffic warning signs. ▪ Identify alternative routes where possible. ▪ Request the assistance of local law enforcement, as required. ▪ Ensure that all site vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator.	Moderate	TBC
	Spatial Extent	Site				
	Duration	ShortTerm				
	Consequence	Moderate				
	Probability	Definite / Continuous				
	Reversibility	Permanently modified				
	Irreplaceability	Irreparable				
DECOMMISSIONING PHASE						
As part of the decommissioning process, a separate traffic impact assessment should be undertaken since many of the characteristics related to the traffic impact assessment, i.e. access routes, road geometry, traffic volumes, etc., would have changed over the operational life of the development. Thus, the impact assessment for the decommissioning phase has not been provided.						

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
CUMULATIVE IMPACTS						
The cumulative impact due to the increased traffic volumes at intersections will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities, especially at the intersection on the main roads, when vehicles from the site need to cross over oncoming traffic.	Status	Negative	Moderate	- Post relevant road signage along affected routes. - Create a local WhatsApp Group, notifying other road users of expected deliveries and associated routes. - Ensure all vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator. - Transport Management Plan (TMP) is to be compiled once the contractor has been appointed and all the relevant details of the construction process are known. The TMP needs to address, inter alia: - clearly defined route/s to the site for specific vehicles needed to transport equipment and materials - scheduled deliveries to avoid local congestion. - Monitoring: Incident register and ongoing road safety awareness training	Moderate	High
	Spatial Extent	Local				
	Duration	Short Term				
	Consequence	Medium				
	Probability	Definite / Continuous				
	Reversibility	Irreparably damaged				
	Irreplaceability	Irreparably damaged				

6.2.9.2 Impact Assessment of the Proposed Overhead Power Line

The following potential indirect Traffic impacts were identified that are likely to be associated with the development of the proposed overhead power line that will evacuate electricity from the proposed solar facility:

Construction Phase:

- **Increased road accidents.** The increased traffic volumes on the public roads will increase the potential of incidents on the road network within the study area;
- **Road degradation.** The increased traffic volumes on the public roads will increase the potential for localised road network degradation within the study area.
- **Dust.** The increased traffic volumes on the unpaved public roads will generate more dust. The larger the vehicle, the more dust is likely to be generated. This dust hinders the drivers wishing to over-take without a clear view for over-taking, resulting in drivers taking unnecessary chances, which could result in unfavourable consequences; and
- **Intersection safety.** The increased traffic volumes at intersections will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities, especially at the intersection on the main roads, when vehicles from the site need to cross over oncoming traffic.
- **Stringing transmission line across existing infrastructure.** The impact generated by stringing the overhead transmission lines across existing infrastructure, which results in a temporary delay in traffic.

Operational Phase:

- The overhead power line will be operated and maintained by the developer. It is envisaged that the overhead power line will be inspected annually. The operator will use the public road to gain access to the servitude and conduct the inspection of the overhead power line along with the servitude. Thus, the impact of the overhead power line inspection of the public road is negligible and has not been formally rated.

Decommissioning Phase:

- A separate traffic impact assessment should be undertaken as part of the decommissioning process since many of the characteristics related to the traffic impact assessment, i.e. access routes, road geometry, traffic volumes, etc., would have changed over the operational life of the development. Thus, no traffic assessment for the decommissioning phase has been undertaken as of yet.

Cumulative Impacts:

- The cumulative impact due to the increased traffic volumes at intersections will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities, especially at the intersection on the main roads, when vehicles from the site need to cross over oncoming traffic.

Refer to the Traffic Impact Assessment in Appendix G.9 of this EIA Report for detailed information on the potential impacts identified and mitigation measures recommended. The table below provides a summary of the impact assessment for this study for the development of the associated power line.

Table 6.7: Assessment of the potential Traffic risks and impacts of the proposed project

Impact		Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
INDIRECT IMPACTS							
CONSTRUCTION PHASE							
Increased Incidents	Road	Status	Negative	Moderate	- Post relevant road signage along affected routes. - Create a local WhatsApp Group, notifying other road users of expected deliveries and associated routes. - Ensure all vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator. - Transport Management Plan (TMP) is to be compiled once the contractor has been appointed and all the relevant details of the construction process are known. The TMP needs to address, inter alia: - clearly defined route/s to the site for specific vehicles needed to transport equipment and materials - scheduled deliveries to avoid local congestion. - Monitoring: Incident register and ongoing road safety awareness training	Low	High
		Spatial Extent	Local				
		Duration	Short Term				
		Consequence	Medium				
		Probability	Definite / Continuous				
		Reversibility	Irreparably damaged				
		Irreplaceability	Irreparably damaged				
Road degradation		Status	Negative	Moderate	- Create a local WhatsApp Group for the local community and post notices of road conditions and proposed alternatives. - Developer to contribute to the maintenance of the public roads in the area during the construction phase of the development/s. - A photographic record of the road condition should be maintained throughout the various phases of the development/s. This provides an objective assessment and mitigates any subjective view from road users. - Upgrade unpaved roads to a suitable condition for proposed construction vehicles. - Ensure that the roads are left in the same or better condition, post-construction.	Low	High
		Spatial Extent	Local				
		Duration	Short Term				
		Consequence	Medium				
		Probability	Definite / Continuous				
		Reversibility	Recoverable				
		Irreplaceability	No irreparable damage				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
				Monitoring: Weekly inspection		
Dust	Status	Negative	Moderate	- Reduce travel speed for construction vehicles on the gravel road to reduce dust. - Dust suppression of the roads in the immediate vicinity of the site where feasible. - Regular preventative maintenance of roads within the immediate vicinity of the site should be conducted over weekends to minimise the impact on the average construction period. - Monitoring: Continues observation, remedial action needs to be taken as and when required	Low	High
	Spatial Extent	Regional				
	Duration	Medium Term				
	Consequence	High				
	Probability	Possible/ Frequent				
	Reversibility	Permanently modified				
	Irreplaceability	Irreparable				
Intersection Safety	Status	Negative	Moderate	- Compile a Traffic Management Plant (TMP). - Reduce speed at intersections and use appropriate traffic warning signs. - Identify alternative routes where possible. - Request the assistance of local law enforcement, as required. - Ensure that all construction vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator. - Monitoring: Incident register and ongoing road safety awareness training	Moderate	High
	Spatial Extent	Site				
	Duration	Short Term				
	Consequence	Moderate				
	Probability	Definite / Continuous				
	Reversibility	Permanently modified				
	Irreplaceability	Irreparable				
During the stringing of overhead transmission lines across public roads, the traffic will be temporarily delayed.	Status	Negative	Very Low	- Compile a Traffic Management Plant (TMP). - Reduce speed at intersections and use appropriate traffic warning signs. - Identify alternative routes where possible. - Request the assistance of local law enforcement, as required. - Construct temporary structures on either side of the road to support the overhead power lines over the public road thus mitigating road closure - Monitoring: Incident register and ongoing road safety awareness training	Very Low	High
	Spatial Extent	Site				
	Duration	ShortTerm				
	Consequence	Moderate				
	Probability	Definite / Continuous				
	Reversibility	Permanently modified				
	Irreplaceability	Irreparable				

Impact	Impact Criteria	Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
OPERATIONAL PHASE					
The overhead power line will be operated and maintained by the developer. It is envisaged that the overhead power line will be inspected annually. The operator will use the public road to gain access to the servitude and conduct the inspection of the overhead power line along with the servitude. Thus, the impact of the overhead power line inspection of the public road is negligible and has not been formally rated.					
DECOMMISSIONING PHASE					
As part of the decommissioning process, a separate traffic impact assessment should be undertaken since many of the characteristics related to the traffic impact assessment, i.e. access routes, road geometry, traffic volumes, etc., would have changed over the operational life of the development. Thus, the impact assessment for the decommissioning phase has not been provided.					
CUMULATIVE IMPACTS					
The cumulative impact due to the increased traffic volumes at intersections will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities, especially at the intersection on the main roads, when vehicles from the site need to cross over oncoming traffic.	Status	Negative	Moderate	Moderate	High
	Spatial Extent	Local			
	Duration	Short Term			
	Consequence	Medium			
	Probability	Definite / Continuous			
	Reversibility	Irreparably damaged			
	Irreplaceability	Irreparably damaged			
			- Post relevant road signage along affected routes. - Create a local WhatsApp Group, notifying other road users of expected deliveries and associated routes. - Ensure all vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator. - Transport Management Plan (TMP) is to be compiled once the contractor has been appointed and all the relevant details of the construction process are known. The TMP needs to address, inter alia: - clearly defined route/s to the site for specific vehicles needed to transport equipment and materials - scheduled deliveries to avoid local congestion. - Monitoring: Incident register and ongoing road safety awareness training		

6.2.9.3 Concluding Statement

It is the reasoned opinion of the Traffic specialist that the proposed development can be approved from a traffic and transportation perspective as there are no constraints or notable impacts that would jeopardise the implementation of the development, subject to the implementation of the recommended mitigation measures.

6.2.10 Battery Energy Storage System (BESS) Risk Assessment

A high-level Safety, Health and Environment (SHE) Risk Assessment was commissioned for the Battery Energy Storage System (BESS) proposed as part of the proposed Solar Energy Facility. The BESS Risk Assessment serves as a technical report and therefore is not required to comply with Appendix 6 of the 2014 NEMA EIA Regulations (as amended), or the Assessment Protocols published in GN R320 on March 2020 or in GN R1150 on October 2020.

Refer to the BESS SHE Risk Assessment in Appendix G.10 of this EIA Report for detailed information on the potential issues identified. The sections below provides a summary of the issues and recommendations identified for the development of the BESS with the on-site substation complex of the proposed solar energy facility development.

6.2.10.1 General

- 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 for the proposed BESS installations at the DBF South Solar Energy Facility near Beaufort West, Western 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 preventative and mitigative measures to reduce these risks to tolerable levels. (Refer to tables in section 4 under preventative and mitigative measures). State-of-the-art technology should be used, i.e., not old technology that 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.

6.2.10.2 Lithium-Ion or Sodium-Ion Solid State Containerized Batteries

- With lithium or sodium 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 batteries at all scales and modern technology providers include many preventative and mitigative features in their designs. 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 nearby.
- If the flammable gases accumulate within the container before they ignite, they may eventually ignite with explosive force. This type of event is unusual 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 layout, impacts at the closest isolated farmhouses are not expected.
- In terms of a worst conceivable case explosion, the significant impact zone is likely to be limited to within 10m of the container and minor impacts such as debris within 50m. Based on the current proposed layout, impacts at the closest isolated farmhouses 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. The proposed BESS for the DBF South solar facility is within 500m of an occupied farmstead complex which is not ideal, particularly as there is a dominant south easterly wind which can blow across the BESS towards the farmstead.

6.2.10.3 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 on tanks, leak detection on equipment etc. (Refer to tables in section 4 under preventative and mitigative measures).
- 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. (Refer to tables in section 4 under preventative and mitigative measures).

6.2.10.4 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. However, the above conclusions may be due to the fact that the VRFB technology is not as mature as SSL technology and therefore there is not as much operating experience and accident information available for the VRFB. Overall, from and SHE RA points of view, there is no specific preference for a type of technology.
- From a SHE risks assessment point of view, where there is a choice of location that is further from public roads, water courses or isolated farmhouses/occupied developments, this would be preferred. VRFB hazards are mostly related to possible loss of containment of electrolyte and SSL batteries to fires producing toxic smoke and fire fighting which may result in contaminated firewater runoff. One would not want these liquids to enter water courses nor the smoke to pass close to houses / public traffic.

6.2.10.5 Recommendations

The following recommendations have been made by the BESS Risk Assessment (Appendix G.10 of this EIA Report):

- There are numerous different battery technologies but using one consistent battery technology system for the BESS installations associated with all the developments in the Beaufort West area associated with the Genesis Renewable Energy Cluster would allow for ease of training, maintenance, emergency response and could significantly reduce risks.
- 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.
- There are no fatal flaws associated with the proposed Solar Energy battery installation for either technology type.
- The tables in Section 4 of this report contains technical and systems suggestions for managing and reducing risks. Ensure the items listed in these tables under preventative and mitigative measures are included in the design.
- The overall design should be subject to a full Hazop prior to finalization of the design.
- For the VRFB systems 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 DBF BESS is located within 500m of an occupied farmstead complex. This is not ideal, especially as there is a dominant wind from the south east. The DBF BESS should preferably be located slightly further (>100m) to the south. If this is not possible, it is noted that the risks are low and advice of mitigative measures should be provided to the farm occupants, e.g. shelter in place indoors. The relocation of the BESS 100m to the south can be accommodated within the assessed on-site substation complex area.
- Where there is a choice of alternative locations for the BESS, those that are further from water courses would be preferred. VRFB hazards are mostly related to possible loss of containment of electrolyte and solid-state systems may experience fires that may result in loss of containment of liquids or the use of large amounts of fire water which could be contaminated. One would not want these run-offs to enter water courses directly. The buffer distance between water bodies and the facilities containing chemicals should be set in consultation with a water specialist and is therefore not specified in the SHE RA. It is noted that there are no tributaries of the main water courses in the area within 200m of the proposed BESS Location.
- Finally, it is suggested once the technology has been chosen and more details of the actual design are available, the necessary updated Risk Assessments should be in place.

6.2.11 Geohydrology

The Desktop Geohydrology Assessment for groundwater development and identification of potential borehole locations was undertaken and is included in Appendix G.11 of this EIA Report. As noted in Chapter 4 of this EIA Report, the Geohydrology assessment is an additional assessment that was commissioned for the proposed development but which was not identified for inclusion by the DFFE National Web based Screening Tool. This geohydrological assessment was necessary to identify potential boreholes for use and potential areas for groundwater development to provide sufficient water for the SEF.

It should be noted that the use of existing boreholes to source groundwater (if available and suitable) is only the third most likely water use option. Water sourced from the local municipality is the first option in terms of viability and the second is to source water from a third party, but consideration of other options is vital. Potential environmental impacts pertaining to local groundwater resources have been considered in the EIA, and various management inputs have been recommended in the EMPr (Appendix H of this EIA Report) to ensure safe and sustainable management of the groundwater resources in the area. However, these impact management actions are not mandatory if water is indeed sourced from the local municipality or via a third party.

Refer to the Geohydrology Assessment in Appendix G.11 of this EIA Report for detailed information on the potential impacts identified and mitigation measures recommended. The section below provides a summary of the issues identified by the groundwater study.

6.2.11.1 Impact Assessment

The following potential impacts on groundwater resources were identified that may be associated with the proposed development:

Construction Phase

- Groundwater impact (lowering) as a result of groundwater abstraction for construction requirements;
- Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages, and cleaning agents.

Operational Phase

- Groundwater impact (lowering) as a result of groundwater abstraction for operational requirements.
- Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages, and cleaning agents.

Decommissioning Phase

- Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages, and cleaning agents.
- Groundwater impact (lowering) as a result of groundwater abstraction for decommissioning requirements.

Groundwater impact as a result of groundwater abstraction. It is believed that the impact on the groundwater availability of this facility is low/insignificant, since there is likely a similar lower cumulative volume presently being extracted.

- **Mitigation/ monitoring measures:** A quarterly groundwater monitoring programme is recommended to ensure that groundwater abstraction is sustainable due to the high number of existing boreholes in the area. The programme should ideally be initiated at least one year prior to the commencement of construction if the project timeframes permit. This would serve to confirm the baseline water levels throughout one wet and dry season cycle, as well as confirm the baseline water quality. The monitoring will also indicate if the groundwater resource is impacted and mitigation measures can be instituted before long term impacts occur. Mitigation for over-abstraction would be reduction in abstraction. It is therefore highly improbable that the groundwater resource will be depleted as a result of over abstraction, should a quarterly monitoring programme be instated.
- Monitoring would also ensure that the extracted volumes comply with relevant authorised abstraction volumes. Temporal water level, water quality and abstraction data should be collected. This data should be reviewed and interpreted on at least a quarterly basis.

Potential Impact on Groundwater Quality as a result of Accidental Oil Spillages or Fuel Leakages, and cleaning agents. The national scale groundwater vulnerability map indicates that the study site has a low/medium to low vulnerability to surface-based contaminants.

- **Mitigation/ monitoring measures:** A precautionary approach must be implemented and reasonable measures must be undertaken to prevent oil spillages and fuel leakages from occurring during the construction phase:
 - Vehicles must be regularly serviced and maintained to check and ensure there are no leakages. A designated area should be established at the construction site camp for this purpose.
 - Any engines that stand in one place for an excessive length of time must have drip trays.
 - Diesel fuel storage tanks should be above ground on an impermeable concrete surface in a bunded area.
 - Construction vehicles and equipment should also be refuelled on an impermeable surface. A designated area should be established at the construction site camp for this purpose, if off-site refuelling is not possible.
 - If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, and reported.
 - Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.
 - Biodegradable and/or environmentally friendly agents should be used to reduce/minimise the impact of solar panel cleaning on the quality of the regional/local groundwater quality.
 - To ensure that any harmful chemicals are detected, an appropriate groundwater monitoring program should be instated.
- **Monitoring measures:**
 - Chemical contamination of the soils, rocks and groundwater beneath the sites that have been proposed for development also pose risk to the environment due to cleaning of solar panels, albeit low. However, it is advised that (chemical) groundwater monitoring be conducted on at least a quarterly basis as precaution for contamination during the construction phase and for a year following. If changes in the groundwater chemistry are detected (e.g. chemicals derived from cleaning agents or compounds derived from petroleum), the advice of a specialist subcontractor should be sought for remediation of the groundwater chemistry.

Cumulative Impacts:

Assuming a worst-case scenario, that each facility (i.e. the Genesis DBF South Solar, Genesis DBF South Wind, Genesis Beau Valley Solar, and Beau Valley Wind) will commence with the construction phase simultaneously, a total volume of 360 000 m³/a would be required for construction, which far exceeds the annual water available under a GA (138 045 m³/a). Assuming all four facilities assume the operational phase simultaneously, the cumulative water demands for these facilities will be less than the cumulative groundwater abstraction that is allowable under a GA.

However, the above assumes that the Wind Farms and Solar Farms will be developed simultaneously, that each component of the facility is constructed and operated in parallel, and that the entirety of the water requirements for the Genesis Southern Cluster will be sourced from the farm portions it encompasses, rather than from third party sources.

The cumulative impacts due to the water requirements are unlikely to cause a significant impact on the aquifer(s) underlying the Genesis Southern Cluster. However, the impact would need to be monitored on a quarterly basis, as recommended above, to assess the potential impact for the life of the facility.

6.2.11.2 Concluding Statement

With effective implementation of the recommended mitigation measures, the impact of the proposed development on groundwater is predicted to be of very low significance. Therefore, there is no reason from a geohydrological perspective why the proposed development should not be approved.

The geohydrology assessment has found that the volumes of water required for the development should be readily available and could be supplied by groundwater in the region. However, it may not be feasible or practical to extract water under a General Authorisation since several triggers for a Water Use License exist, as verified by the Aquatic Specialist (see Section 6.2.3.2 and Appendix G.3 of this EIA Report). In Chapter 7, the undertaking of the Water Use Licence Application and obtaining of approval from the DWS/ Breede Olifants Catchment Management Agency will be recommended to be conditioned in the EA, should it be granted.

6.2.12 Geotechnical

The impact assessment below is based on the Desktop Geotechnical Specialists Study undertaken for the proposed development, which is included in Appendix G.12 of this EIA Report.

6.2.12.1 Impact Assessment

The following potential impacts on the geotechnical conditions as a consequence of the proposed development were identified:

Direct and Cumulative Impacts during the Construction, Operational, and Decommissioning phases:

- **Displacement of geologic materials.** This is related to increased unnatural hard surfaces that will yield increased runoff, potentially increasing erosion. Removal of rocks and other geologic materials for site levelling and grading during construction and decommissioning, resulting in loss of geologic materials, e.g. topsoil removal/loss, and potentially the destruction of habitats of endemic species.
- **Contamination of subsoils and loss of topsoil.** This includes contamination of geologic materials as a consequence of the construction and decommissioning activities by earthworks machinery and other apparatus; as well as through typical maintenance activities during the operation phase, such as washing of solar panels, or spillages associated with the BESS.

Refer to the Geotechnical Assessment in Appendix G.12 of this EIA Report for detailed information on the potential impacts identified and mitigation measures recommended. The table below provides a summary of the impact assessment for this study.

Table 6.12: Assessment of the potential Geotechnical risks and impacts of the proposed project

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
DIRECT IMPACTS						
CONSTRUCTION PHASE						
Displacement of geologic materials	Status	Negative	Low	- Favour dolerite as an aggregate (as opposed to Karoo sandstones and mudstones). Subject to investigation. - Any road cuttings should be designed by an appropriately qualified professional. - Drainage on site should be designed and managed appropriately. - Investigate and confirm the geotechnical suitability of each structure (or other appropriate level of investigation) prior to construction (i.e. determine that soil with an adequate bearing capacity is obtained beneath each footing). Such investigations would not be required to fulfil the requirements of the EIA process. However, it would be necessary prior to construction. - Only strip vegetation necessary for the next phase of construction. - Install temporary drainage to divert stormwater away from active construction activities, where required. - Stormwater Management Plan must be developed in the preconstruction phase. It should detail the stormwater structures and management interventions that must be installed to manage the increase of surface water flow directly into any natural systems (in consultation with suitably qualified professionals). Effective stormwater management must include effective stabilisation (e.g. gabions and Reno mattresses) of exposed soil. - Suitable stormwater management systems must be installed along roads and other areas and be monitored during the first few months of use. Any erosion/sedimentation must be resolved through any additional interventions that may be necessary (e.g., extension, energy dissipaters, spreaders, etc.).	Very Low	Medium
	Spatial Extent	Local				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Ranking (Post-mitigation)	Confidence Level
				- Where impacted through construction-related activities, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled. - Sloped areas stabilised using designed structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly. - Any rehabilitation should be scheduled to ensure rehabilitation can take place at the optimal time for vegetation establishment. - Where earthwork is being undertaken near any watercourses, slopes must be stabilised using suitable materials, e.g. sandbags or geotextile fabric, to prevent sand and rock from entering the channel. Subject to mitigation measures specified by the Aquatic specialist. - Appropriate rehabilitation and re-vegetation measures for any disturbed watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows. Subject to mitigation measures specified by the Aquatic specialist.		
Contamination of geologic materials	Status	Negative	Low	- During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented, e.g. including ensuring that construction equipment is well maintained. - Provision must be made for refuelling at the storage area/site camp, and workshop by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. - Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used. - A spill kit should be maintained on site. If spillages occur, they should be contained and removed as rapidly as possible, with	Very Low	Medium
	Spatial Extent	Local				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
				correct disposal procedures of the spilt material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.		
OPERATIONAL PHASE						
Displacement of geologic materials	Status	Negative	Low	- Install drainage to divert stormwater away from activities, roads/tracks, structures, where required. - Generic management for typical infrastructure of the proposed development, including: - Stormwater Management Plan must be developed in the preconstruction phase and should detail the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems, where possible and lawful. Effective stormwater management must include effective stabilisation (e.g. gabions and Reno mattresses) of exposed soil etc. - Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through any additional interventions that may be necessary (e.g., extension, energy dissipaters, spreaders, etc.). - Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. - No regular maintenance activities to take place outside of the authorised footprint and all vehicles to remain on authorised roads and tracks.	Very Low	Medium
	Spatial Extent	Local				
	Duration	Long				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Contamination of geologic materials	Status	Negative	Low	During the execution of the operations, appropriate measures to prevent pollution and contamination of the riparian environment	Very Low	Medium
	Spatial Extent	Local				
	Duration	Short term				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Consequence	Moderate		must be implemented e.g. including ensuring that construction equipment is well maintained. Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover/bunding. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used. If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.		
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
DECOMMISSIONING PHASE						
Displacement of geologic materials	Status	Negative	Very Low	Only drive and park vehicles where necessary. Land rehabilitation to near natural state, i.e. removal of foundations and backfilling of any resultant voids within the soil, as well as removal of hard surfaced areas. Replacement soil should be sourced locally to ensure homogeneity. Reseeding with natural vegetation grasses, and seeds will further mitigate future displacement. Reinstate natural topography where cut-to-fill embankments have been constructed. Implement generic environmental management procedures for infrastructure.	Very Low	Medium
	Spatial Extent	Local				
	Duration	Short				
	Consequence	Slight				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Contamination of geologic materials	Status	Negative	Very Low	During the execution of the decommissioning, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that equipment is well maintained. Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where	Very Low	Medium
	Spatial Extent	Local				
	Duration	Short				
	Consequence	Slight				
	Probability	Likely				
	Reversibility	Moderate				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Irreplaceability	Moderate		dispensing equipment is used, a drip tray must be used to ensure small spills are contained. - Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used. - A spill kit should be maintained on site. If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.		
CUMULATIVE IMPACTS						
CONSTRUCTION PHASE						
Displacement of geologic materials	Status	Negative	Moderate	The mitigation measures are the same as those recommended for the Construction Phase.	Low	Medium
	Spatial Extent	Regional				
	Duration	Medium-term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Contamination of geologic materials	Status	Negative	Moderate	The mitigation measures are the same as those recommended for the Construction Phase.	Low	Medium
	Spatial Extent	Regional				
	Duration	Medium-term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
OPERATIONAL PHASE						
Displacement of geologic materials	Status	Negative	Moderate	The mitigation measures are the same as those recommended for the Operational Phase.	Low	Medium
	Spatial Extent	Regional				
	Duration	Medium-term				
	Consequence	Substantial				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Contamination of geologic materials	Status	Negative	Moderate	The mitigation measures are the same as those recommended for the Operational Phase.	Low	Medium
	Spatial Extent	Regional				
	Duration	Medium-term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
DECOMMISSIONING PHASE						
Displacement of geologic materials	Status	Negative	Moderate	The mitigation measures are the same as those recommended for the Decommissioning Phase.	Low	Medium
	Spatial Extent	Local				
	Duration	Short term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Contamination of geologic materials	Status	Negative	Moderate	The mitigation measures are the same as those recommended for the Construction, Operational and Decommissioning Phases (as relevant).	Low	Medium
	Spatial Extent	Local				
	Duration	Short term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

6.2.12.2 Concluding Statement

Based on the findings of this study, development should proceed provided the mitigation measures are implemented. No fatal flaws from a geotechnical standpoint have been identified.

6.2.13 Civil Aviation

As indicated in Chapter 3 and Chapter 4 of this EIA Report, the National Web-Based Environmental Screening Tool (Screening Tool) has indicated that the study area falls within an area of low sensitivity from a Civil Aviation perspective. The low sensitivity was verified and confirmed via a site visit. An SSV is provided in Appendix G.13 of this EIA Report. Based on the requirements of GN 320, if a site is verified as low sensitivity, there are no further requirements. Therefore, no impact assessment is required in this regard.

6.2.14 Defence

As indicated in Chapter 3 and Chapter 4 of this EIA Report, the Screening Tool has indicated that the study area falls within an area of low sensitivity from a Defence perspective. The low sensitivity was verified and confirmed via a site visit. An SSV is provided in Appendix G.14 of this EIA Report. Based on the requirements of GN 320, if a site is verified as low sensitivity, there are no further requirements. Therefore, no impact assessment is required in this regard.

6.2.15 Conclusion

Table 6.13 below provides a summary of the overall impact significance assessed by the relevant specialists at the EIA Level. It includes the overall impact significance, based on the implementation of mitigation measures for each phase of the proposed project, including direct and cumulative impacts.

Overall, based on Table 6.13 it can be deduced that the effect of potential impacts can be limited or reduced to acceptable levels through avoidance, minimisation and the implementation of appropriate mitigation measures and management actions during the construction, operational and decommissioning phases. Therefore, based on the EIA level specialist input, potential negative impacts associated with the proposed project are anticipated to mainly be of low to very low significance after mitigation, whilst some impacts of moderate significance are expected post mitigation.

Table 6.13: Overall Impact Significance with the Implementation of Mitigation Measures for Direct and Cumulative Impacts for the proposed project

Phase → Specialist Study ↓	Construction	Operational	Decommissioning
Direct Negative Impacts			
Agriculture	Very Low	Very Low	Very Low
Terrestrial Biodiversity and Terrestrial Animal Species	Moderate	Low	Low
Karoo Dwarf Tortoise Species Assessment	Low	Low	Low
Terrestrial Plant Species	Low	Low	Low
Aquatic Biodiversity and Species	Moderate	Moderate	Low
Avifauna Assessment	Low	Low	Low
Visual Impact Assessment	Moderate	Low	Moderate
Heritage Impact Assessment (Archaeology and Cultural Heritage)	Low	Low	Low
Palaeontological Impact Assessment	Low	No impact	No impact
Socio-Economic Assessment	Insignificant and/or not identified and/or not applicable	Insignificant and/or not identified and/or not applicable	Low
Traffic Impact Assessment	Low	Moderate	New TIA to be undertaken at decommissioning
Geohydrology Assessment	Low	Very Low	Very Low
Geotechnical Assessment	Very Low	Very Low	Very Low
Direct Positive Impacts			
Socio-Economic Assessment	Moderate	Low	Insignificant and/or not identified and/or not applicable
Cumulative Negative Impacts			
Agriculture	Low	Low	Low
Terrestrial Biodiversity and Terrestrial Animal Species	Moderate	Low	Low
Karoo Dwarf Tortoise Species Assessment	Low	Low	Low
Terrestrial Plant Species	Low	Low	Low
Aquatic Biodiversity and Species	Low	Low	Very Low
Avifauna Assessment	Low	Moderate	Low
Visual Impact Assessment	Moderate	Moderate	Moderate
Heritage Impact Assessment (Archaeology and Cultural Heritage)	Low	Low	Low
Palaeontological Impact Assessment	Low	No impact	No impact

Socio-Economic Assessment	Insignificant and/or not identified and/or not applicable	Insignificant and/or not identified and/or not applicable	Low (negative)
Traffic Impact Assessment	Moderate	Moderate	New TIA to be undertaken at decommissioning
Geohydrology Assessment	Low	Very Low	Very Low
Geotechnical Assessment	Low	Low	Low
Cumulative Positive Impacts			
Socio-Economic Assessment	Moderate	Low	Insignificant and/or not identified and/or not applicable

6.3 Environmental Sensitivity Mapping and Analysis

Based on the environmental sensitivities identified and verified by the Specialists on site during the EIA Phase (as per studies included as Appendix G to this EIA Report), an overall combined environmental feature map and environmental sensitivity map has been compiled for the study area. The proposed development footprint is overlain onto these maps to show how it relates to the environmental features and sensitivities, and how they have been avoided.

Figure 6.3 shows the identified and assessed environmental features present within the study area; whereas Figure 6.4 shows the recommended environmental sensitivity and buffers that have been allocated to these features. Refer to Appendix C of the EIA Report for detailed thematic sensitivity maps. These maps indicate that the inherent environmental sensitivity of the proposed project study area is generally medium to low, with some very high and high sensitivity areas. The study area is suited for the development of the proposed project based on the understanding that measures have been taken to firstly avoid the sensitive features as best as possible, and all measures to manage or mitigate potential impacts have been translated into the EMPr (Appendix H of this EIA Report) for implementation on site during the lifecycle of the proposed development, should it be authorised.

Table 6.14 provides a summary of the environmental sensitivities identified by the respective specialist assessments.

Table 6.14: Key Environmental Features and Sensitivities identified by respective EIA Phase Specialist Assessments

Specialist Study or Theme	Sensitivity Description
Agriculture	The Compliance Statement verified that the site is of low agricultural sensitivity with a land capability value of 4 to 5. There are no areas that need to be avoided from an agricultural perspective. The layout has no relevance to agricultural impact in this case. Refer to the Agricultural Compliance Statement (Appendix G.1) for additional information.
Terrestrial Biodiversity, Terrestrial Plant Species and Terrestrial Animal Species	Very High Sensitivity: - The rocky hills and steep slopes is considered very highly sensitive habitat which must be avoided. - The larger riparian area is considered very highly sensitive which must be avoided. Buffers as per the Aquatic specialist's recommendation should be implemented. High Sensitivity: - The pans and drainage lines are considered highly sensitive habitat which must be avoided. Buffers as per the Aquatic specialist's recommendation should be implemented. - Linear infrastructure such as roads and overhead powerlines are considered to have a low impact on the high sensitivity areas, and therefore may cross these areas.

Specialist Study or Theme	Sensitivity Description
	Medium Sensitivity: - Wash areas are considered medium sensitivity. Very Low Sensitivity: - Existing transformed areas.
Aquatic Biodiversity	The recommended buffer area between the aquatic features and the project components to ensure these aquatic ecosystems are not impacted by the proposed activities are as follows: High Sensitivity: - The larger rivers that are indicated to be of high sensitivity – 50 m buffer Medium Sensitivity: - Smaller streams and drainage features that are indicated to be of medium sensitivity – 35 m buffer - Depression wetlands and wider wash areas indicated to be of medium sensitivity should be avoided.
Avifauna	All infrastructure exclusion zones: Verreaux's Eagle nest: A 1 km all infrastructure exclusion zone is recommended to prevent the displacement of the breeding pair during the construction phase due to disturbance. Drainage lines, dams, and waterpoints: It is preferable to leave some open space where possible with no solar panels, for birds to access and leave the surface water area unhindered. The buffer zones as recommended by the Aquatic Biodiversity Specialist should be followed. - The entire PAOI is a high sensitivity zone due to the confirmed presence of several SCCs which could utilise the whole PAOI for foraging. However, these species <u>do not require specific avoidance</u> measures because there is still adequate habitat available outside the PAOI.
Visual	Very High Sensitivity: - National roads – 500m buffer - Arterial and main roads – 350m buffer - Secondary roads – 150m buffer - Homesteads – 500m buffer - Dams, wetland and Pans – 250m buffer - National Parks – 2km buffer High Sensitivity - High mountains - Mountains and tall hills - Slopes > 20% Moderate Sensitivity - Strongly undulating plains and hills
Heritage (Archaeology and Cultural Heritage)	- Most resources located within the study area are of low cultural significance and hence low sensitivity. - These resources are not located within the development footprint.

Specialist Study or Theme	Sensitivity Description
Palaeontology	There are no areas that need to be avoided from a palaeontology perspective. The site survey undertaken by the specialist found minimal bedrock exposure and concluded that the site is of low palaeo-sensitivity.
Socio-Economic Assessment	Not applicable. There are no sensitivities of this nature that can be mapped and that would influence the layout of the proposed project.
Traffic	Not applicable. There are no sensitivities of this nature that can be mapped and that would influence the layout of the proposed project.
BESS High Level Risk Assessment	- Ideally the BESS should be placed at least 50 m away from known boreholes and water points, and 100 m away from major surface water features, such as major rivers and wetlands. - Ideally, due to the possibility of noxious smoke from potential fires, any lithium-ion BESS should be located over 500 m from residential areas, in this case isolated farm houses that are occupied. If this is not possible, it is noted that the risks are low and advice of mitigative measures should be provided to the farm occupants, e.g. shelter in place indoors.
Geohydrology	The Geohydrology Assessment identified no areas to be avoided from a geohydrology/ groundwater resource perspective.
Geotechnical	It must be noted that there are no areas within the study area that should be avoided from a geotechnical sensitivity perspective. However, areas of moderate to steep topography would likely render development financially unfeasible.
Civil Aviation	No sensitive civil aviation features have been identified within the study area.
Defence	No sensitive defence features have been identified within the study area.

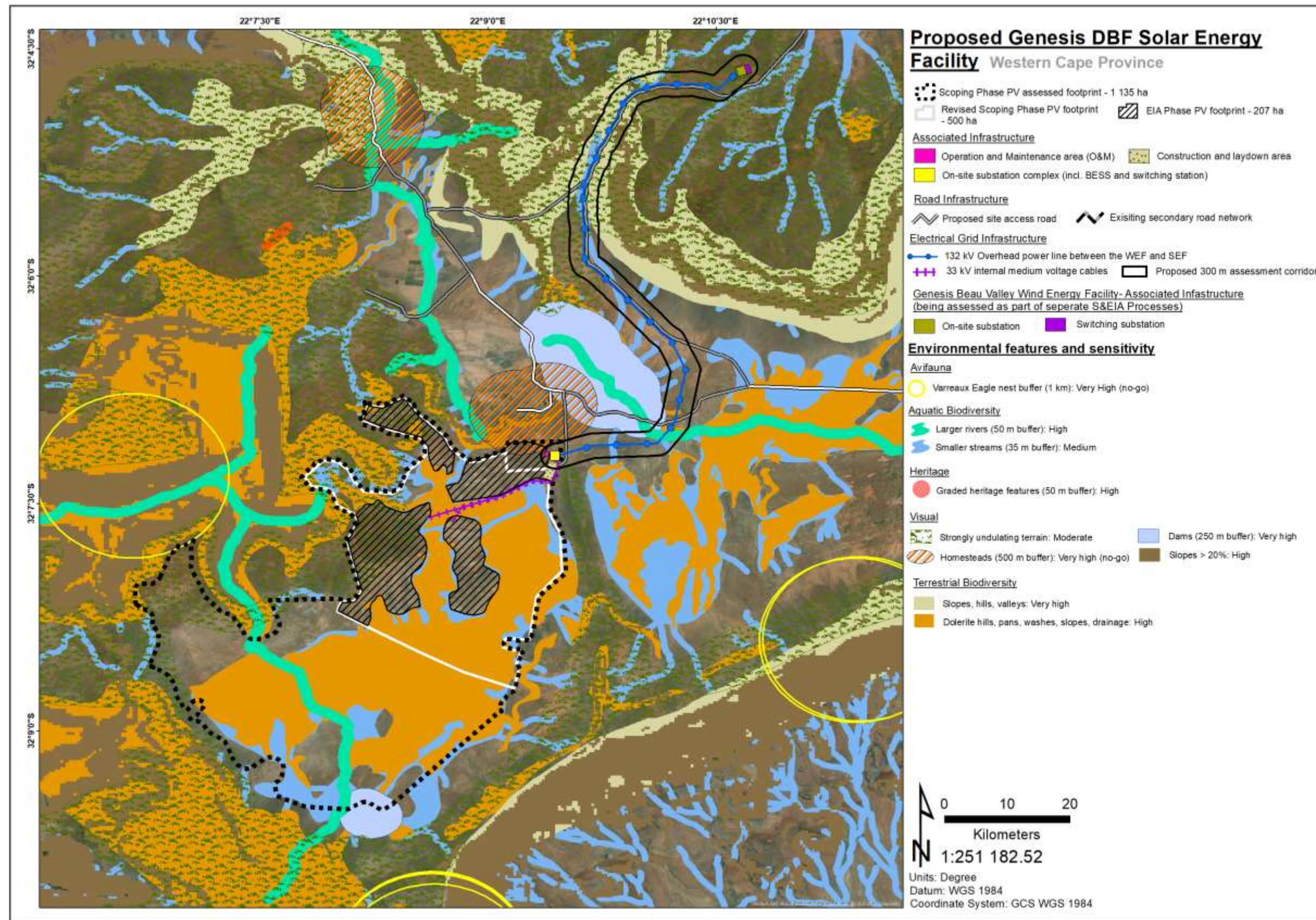


Figure 6.3: Combined environmental feature map for the proposed project study area based on EIA level specialist inputs.

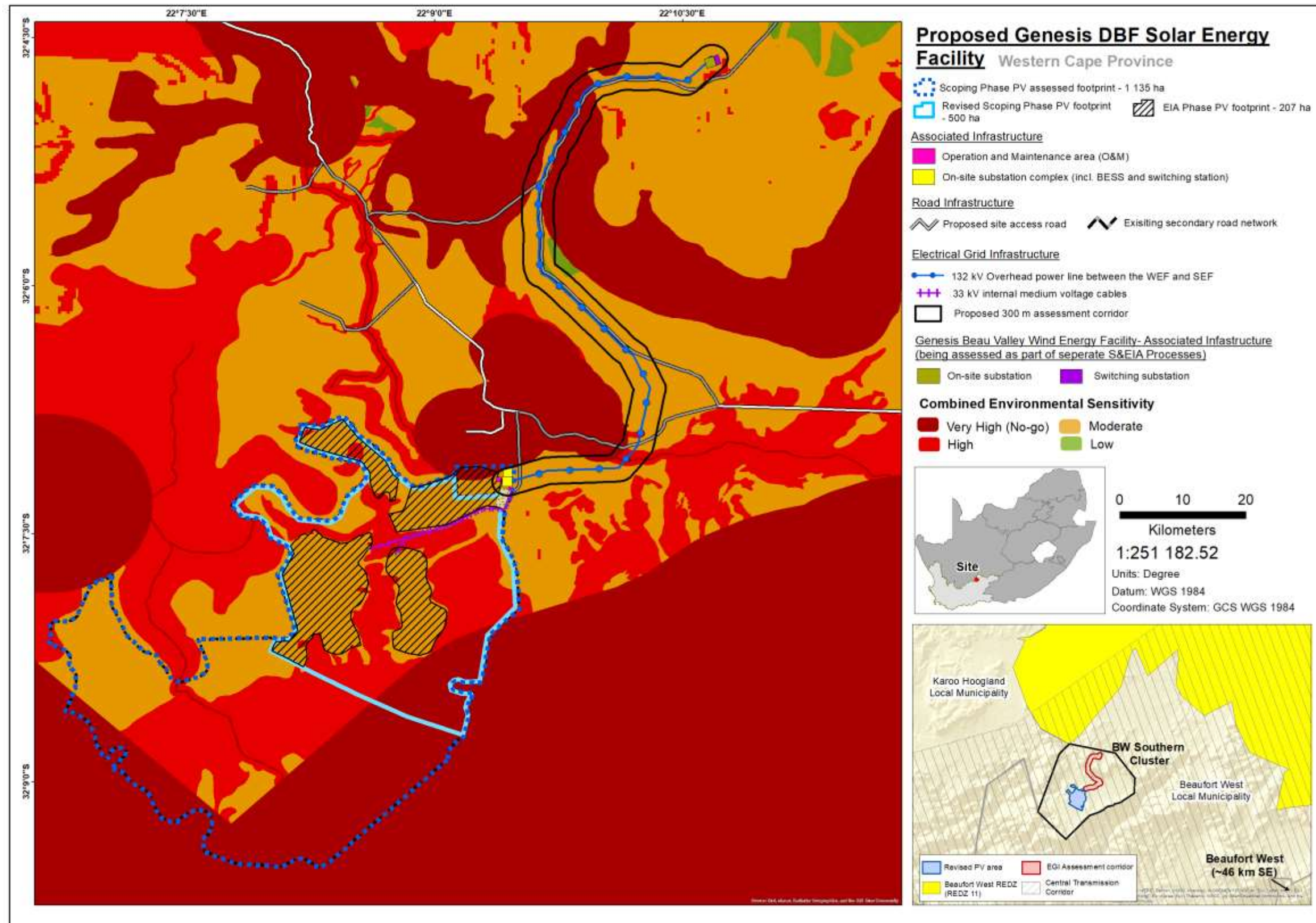


Figure 6.4: Combined environmental sensitivity map for the proposed project study area based on EIA level specialist inputs.

Scoping and Environmental Impact Assessment for the
proposed development of the Genesis DBF South Solar
Energy Facility and associated infrastructure near
Beaufort West in the Western Cape



FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CHAPTER 7: Conclusions and Recommendations



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7. CONCLUSIONS AND RECOMMENDATIONS

This chapter contains the main conclusions and recommendations from the Environmental Impact Assessment (EIA) Process, provides the key findings of the specialist assessments (i.e., outlines the most significant impacts identified, together with the key mitigation and management actions required to avoid or mitigate the negative impacts or enhance positive benefits), and an integrated summary of factors that will inform decision-making by the Competent Authority (i.e., the Department of Forestry, Fisheries and the Environment (DFFE)). In addition, the chapter also includes the recommendation of the Environmental Assessment Practitioner (EAP) on the environmental suitability of the project and whether the project should receive Environmental Authorisation (EA).

This EIA Report has investigated and assessed the significance of potential positive and negative direct, indirect and cumulative impacts associated with the proposed DBF South Solar Energy Facility (hereafter referred to as the “proposed project” or “DBF SEF”). Detailed assessments of the potential impacts identified and assessed by the specialists during the EIA Phase are included in Chapter 6 of this EIA Report. **Following the exclusion of all “no-go” areas as identified by the specialist assessments, no negative residual impacts have been identified within this EIA that, in the opinion of the EAP who has conducted this Scoping and EIA Process, should be considered “fatal flaws” from an environmental perspective, and thereby necessitate substantial re-design or termination of the project. Furthermore, as presented in this chapter, the conclusions from the specialist studies do not identify any reason why the project should not receive Environmental Authorisation, provided the recommended mitigation measures are applied effectively.**

This chapter constitutes an **Environmental Impact Statement**, as required in terms of Appendix 3 of the 2014 NEMA EIA Regulations (as amended), which includes the following:

- a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted Scoping Report indicating any areas that should be avoided, including buffers (Section 7.3);
- a summary of the identified project alternatives (Sections 7.2);
- a summary of the key findings of the environmental impact assessment (Section 7.4 and Section 7.5); and
- a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives (Section 7.4 and Section 7.5).

7.1 Need and Desirability

For development to be sustainable, it is important that the EIA process ascertain whether the proposed development will meet the needs of people, and whether it will be socially, economically, and ecologically desirable. This EIA considered the nature, scale and location of the proposed development as well as the wise use of land (i.e., is this the right time and place for the development of this proposed project).

The need for the development of renewable energy is strongly supported at a national, provincial, and local level. The proposed project is linked to the national planning vision for large-scale wind and solar development in South Africa. The need for renewable energy is becoming increasingly apparent, in both local and international contexts, with South Africa's international climate commitments obligating it to transition from its substantial (90%) dependence on a fossil fuel-based energy system to a sustainable, clean, and affordable energy system based on renewable resources and low carbon-emitting technologies. Given that South Africa receives among the highest levels of solar radiation on earth, it is clear that solar power generation should feature prominently in efforts to decarbonise the country's complement of energy sources in order to mitigate human-induced climate change. As recognised by the National Energy Act (Act 34 of 2008) and the NDP: Vision 2030, the clean energy transition can be a critical enabler of inclusive (just) and transformational economic development that is contained within the limits of surrounding socio-ecological systems.

Within the context of the current shortage of energy generation capacity in South Africa and need for additional generation capacity, solar PV with battery storage is the least cost option for new generation capacity in South Africa and has the shortest lead-in time of the large-scale generation options. Furthermore, in terms of national grid planning, the proposed project is also located within the Central Strategic Transmission Corridor that was gazetted in February 2018. This facilitates large scale transmission and distribution EGI, which would be needed to support the proposed project.

According to the Western Cape Provincial SDF (2014), renewable energy generation is also deemed one of the most promising economic sectors in the Central Karoo region that will add significant value to the regional Gross Domestic Product, while having the potential to change the composition and character of towns throughout the municipal district. The Central Karoo district is attractive for renewable energy projects due to the significant solar and wind energy resources. Various renewable energy projects have been approved in the Central Karoo District Municipality, but most have yet to be implemented. The Central Karoo District Municipality Strategic Development Framework (2019) has identified considerable opportunities for IPPs to locate renewable energy projects specifically related to solar and wind power generation in the district.

The Beaufort West Local Municipality Integrated Development Plan (2017-2022) identifies low economic growth as a key challenge and threat to livelihoods and local communities. The proposed project will provide advanced skills transfer and training to the local communities and create contractual and permanent employment in the area. Furthermore, the proposed project is aligned with one of the key priority areas of the IDP which is to drive sustainable economic growth by leveraging competitive advantages of the region – i.e. the region's significant renewable energy resources. Renewable energy developments represent a key side linkage to diversify of the local economy and to provide catalytic opportunities for downstream economic development. In this

manner, should the proposed development be authorised, it will enable Just Sustainable Development in Beaufort West, the Central Karoo District and the wider South African context.

Therefore, as outlined above, the proposed project is in line with national, provincial and local planning, particularly with regard to the imperative for South Africa to secure new sources energy generation and transition to a low-carbon economy.

During the Scoping and EIA Process, the main concern raised by I&APs centred on the location of the proposed development site within the National Protected Area Expansion Strategy (NPAES) Focus Area associated with the Karoo National Park (KNP). The spatial plan of the NPAES (2018) is to add in the order of 1 million hectares to the north and west of the KNP. In terms of the National Environmental Management: Protected Areas Act (NEM: PA, Act 57 of 2003, as amended), the legal procedure for the declaration of protected areas requires that in the case of privately owned land, the landowner consents to the declaration in the form of a written agreement. The NPAES (2018) identifies three mechanisms for protected area expansion:

- (1) acquisition of land (which is recognised as involving large upfront costs);
- (2) contract agreements with landowners who maintain ownership of their land; and
- (3) declaration of public or state land that requires reassigning of the land to a protected area agency (this option has limited potential as very little of the priority areas are public or state land).

The NPAES (2018) states that the negotiation and conclusion of contractual agreements with landowners was the predominant mechanism for achieving protected area expansion in phase 1 (2008 to 2014). This option is often much more cost effective than acquisition of land and is used increasingly as part of biodiversity stewardship programmes (DEA, 2018). It is clearly recognised in the NPAES that financing is a very significant constraint to the ability of protected area agencies (i.e. SANParks) to meet their targets for management effectiveness and protected area expansion.

The presence of a solar energy development on the site would have some impact on the value of the affected area for formal conservation expansion. Therefore, in order to reduce the impact of the development on the NPAES Focus Area, the Terrestrial Biodiversity specialist recommended that (1) the development footprint within the NPAES Focus Area should be reduced as much as possible, (2) SANParks should be engaged at the earliest stage during the Scoping and EIA phase, and (3) the developer should consider investigating a stewardship or conservation programme in collaboration with SANParks to address the impacts the proposed development may have on the NPAES focus area.

Accordingly, as discussed in Chapter 7.3, the PV footprint area that is recommended to be authorised has been reduced to approximately 207 ha from an original scoping phase PV assessment area of 1135 ha. Therefore, the reduced PV area is not considered to be a highly significant impact given the size of the NPAES Focus Area adjacent to the KNP (40 000 ha). Furthermore, indigenous vegetation beneath the solar arrays will be retained and maintained by livestock grazing (the current land use) which will enable habitat recovery post decommissioning of the proposed development.

During the Scoping Phase, an on-site meeting was held between SANParks, the Project Developer and the CSIR on 14 March 2023. Consultation with the KNP/ SANParks was therefore initiated at an early stage during the Scoping and EIA process. Mitigation measures such as committing some

of the land adjacent to the KNP to stewardship or similar conservation commitment are being investigated with SANParks. The purpose of these engagements are to co-generate a mechanism that balances and achieves the imperatives of both biodiversity conservation and renewable energy development. In addition, Kevin McCann of Biodiversity Outcomes has been appointed to facilitate the development of the stewardship agreement between SANParks, the Project Applicant and the landowner. The conclusion of an agreement between SANParks, the Project Applicant and the affected landowners is recommended by the EAP as a condition to be included in the EA by the Competent Authority, the DFFE.

7.2 Summary of Project Alternatives

As discussed in Chapter 5 of this EIA Report, various alternatives have been considered and assessed as part of the EIA Phase.

- **No-Go Alternative:**

- The no-go alternative assumes that the proposed project will not go ahead i.e. it is the option of not constructing the proposed DBF SEF. This alternative would result in no environmental impacts (positive or negative) on the preferred site or surrounding local area. It will provide a baseline against which to compare other alternatives. The no-go alternative was assessed by all the specialists on the project team. The no-go alternative is not preferred.

- **Land-Use Alternative:**

- The current land-use is agriculture, specifically low density small stock grazing. The study area has a low agricultural sensitivity and low agricultural capability. The proposed project offers some positive impact on agriculture by way of improved financial security for livestock farming operations, as well as wider, societal benefits. The development of the proposed project at the preferred site is more favourable than the agricultural land-use alternative.

- **Type of Activity Alternative:**

- This relates to the generation of electricity from a renewable energy source, and in this particular case, from solar resources. The **generation of electricity from a renewable energy source was the only activity considered** by the Applicant, and thus considered in this EIA Process. **No other activity types were considered or deemed appropriate** based on the expertise of the Applicant.

- **Renewable Energy Alternatives:**

- The Project Developer is undertaking Scoping and EIA processes for a holistic renewable energy cluster consisting of both wind and solar energy facilities. In terms of the suitability of solar energy development at this location, the proposed project study area falls within the second highest GHI category of 2 000 kWh/m² to 2 200 kWh/m² in terms of the long-term yearly total. The mean wind power density map shows that the project study area falls within an area of approximately 101 – 300 W/m². **Local conditions are, therefore,**

favourable to the complement of renewable energy developments proposed by the Project Developer.

- In addition, Hydro Power and Biomass Energy are unfeasible and unsuitable.
- **Preferred Site and Development Footprint within the site:**
 - The preferred site for the proposed DBF SEF comprises the following farm portions, which serves as the study area for this Scoping and EIA Process:
 - Remaining extent of Doornboomfontyn Farm Nr. 89
 - Remaining extent of Hartebeeste Vleis Berg Farm Nr. 213
 - Portion 1 of Doornboomfontyn Farm Nr. 89
 - A screening and site verification exercise of the study area was undertaken by the specialist team during this Scoping Phase. This led to the identification of the Original Scoping Phase Assessment Area (1135 ha) within the preferred site. The findings of the Scoping Level Specialist Assessments were used to determine the Revised Scoping Assessment Area for the PV array (500 ha). Informed by the sensitivities identified by the specialists, the EIA phase proposed PV area (207 ha) recommended for approval in Chapter 7 avoids the no-go sensitivities identified by the specialists.
 - Following the refined EIA phase proposed development footprint, the PV array and associated infrastructure enclosed in the fenced off area of the facility is proposed to be located on:
 - Remaining extent of Doornboomfontyn Farm Nr. 89
 - The associated 132 kV Overhead Transmission Powerline is proposed to be located on:
 - Remaining extent of Doornboomfontyn Farm Nr. 89
 - Portion 1 of Doornboomfontyn Farm Nr. 89
- **Technology Alternatives**
 - Owing to the extensive land area requirements and water requirements of Concentrated Solar Power (CSP) technology, it was deemed unfeasible and unsuitable for the proposed site.
 - Only the Photovoltaic (PV) technology was assessed in this Scoping and EIA Process, along with various mounting options that will be considered in the design.
 - More specifically, the project developer proposes to utilise bifacial panels as the preferred PV panel technology which has an up to 30% higher yield than monofacial panels (alternative). It should be noted that the final selection of PV panel type is to be made in the pre-construction detailed engineering design and planning phase.
 - The following Battery Energy Storage Systems (BESS) technologies were assessed in the EIA Process:
 - Solid State Lithium-ion BESS;
 - Solid State Sodium-ion BESS; and
 - Redox Flow Batteries (RFB).
 - All three BESS alternatives were found acceptable for development to support the proposed solar facility. However, due to the risk of electrolyte (dangerous/hazardous good) spillage associated the storage tanks of RFB, the sealed solid-state BESS options (namely, Lithium-ion and Sodium-ion) are selected as the preferred BESS technologies and are recommended for environmental approval.

7.3 Development footprint submitted for approval based on Environmental Sensitivity mapping

A screening and site verification exercise of the study area (Table 7.1) was undertaken by the specialist team during this Scoping Phase. This led to the identification of the Original Scoping Phase Assessment Area (1135 ha) within the preferred site. The findings of the Scoping Level Specialist Assessments were used to determine the Revised Scoping Assessment Area for the PV array (500 ha) to be taken into the EIA Phase.

Based on the integration of the impact assessments and mitigation actions for the proposed development site, the EAP has recommended a reduced PV array footprint of 207 ha that is suitable for development. This is informed by the mapping of features such as terrestrial biodiversity and aquatic wash features, and their associated buffers and environmental constraints (see Figure 7.1, Figure 7.2 and Appendix C). In addition, this is based on mitigation recommendations by the terrestrial biodiversity specialist study to minimise as far as possible the development footprint within the NPAES Focus Area associated with the Karoo National Park. **Hence the EAP recommends a revised PV footprint of approximately 207 ha for approval by the DFFE on the farm portions indicated in Table 7.1 and presented in Figure 7.1.**

Table 7.1: Affected Farm Portions

FARM PORTION	SG CODE	Area (ha)	SEF	OHPL
Doornboomfontyn Farm RE/89	C00900000000008900000	5 758	X	X
Doornboomfontyn Farm 1/89	C00900000000008900001	2 597		X

Table 7.2 and Figure 7.1 shows the PV array footprint which was assessed in the EIA Phase and the revised PV footprint which is recommended for approval.

Table 7.2: SEF Footprint and PV arrays assessed in the Scoping and then revised in the EIA phase

	PV footprint assessed in Scoping Phase	PV footprint taken into EIA phase	Revised PV footprint recommended for approval
PV Footprint	1 135 ha	500 ha	207 ha

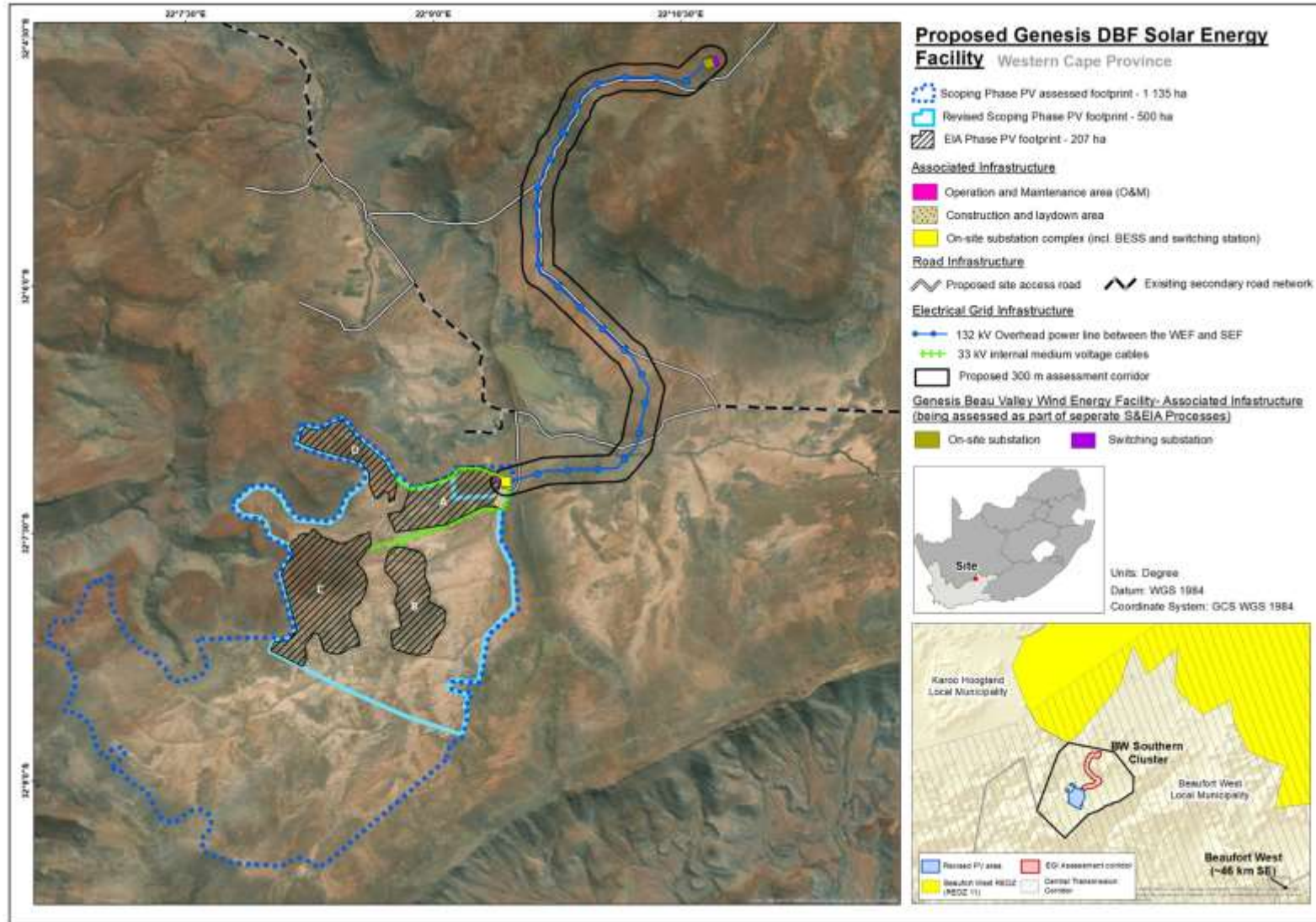


Figure 7.1: Revised site layout recommended by the EAP for approval for the proposed DBF South SEF project which was assessed during the EIA Phase.

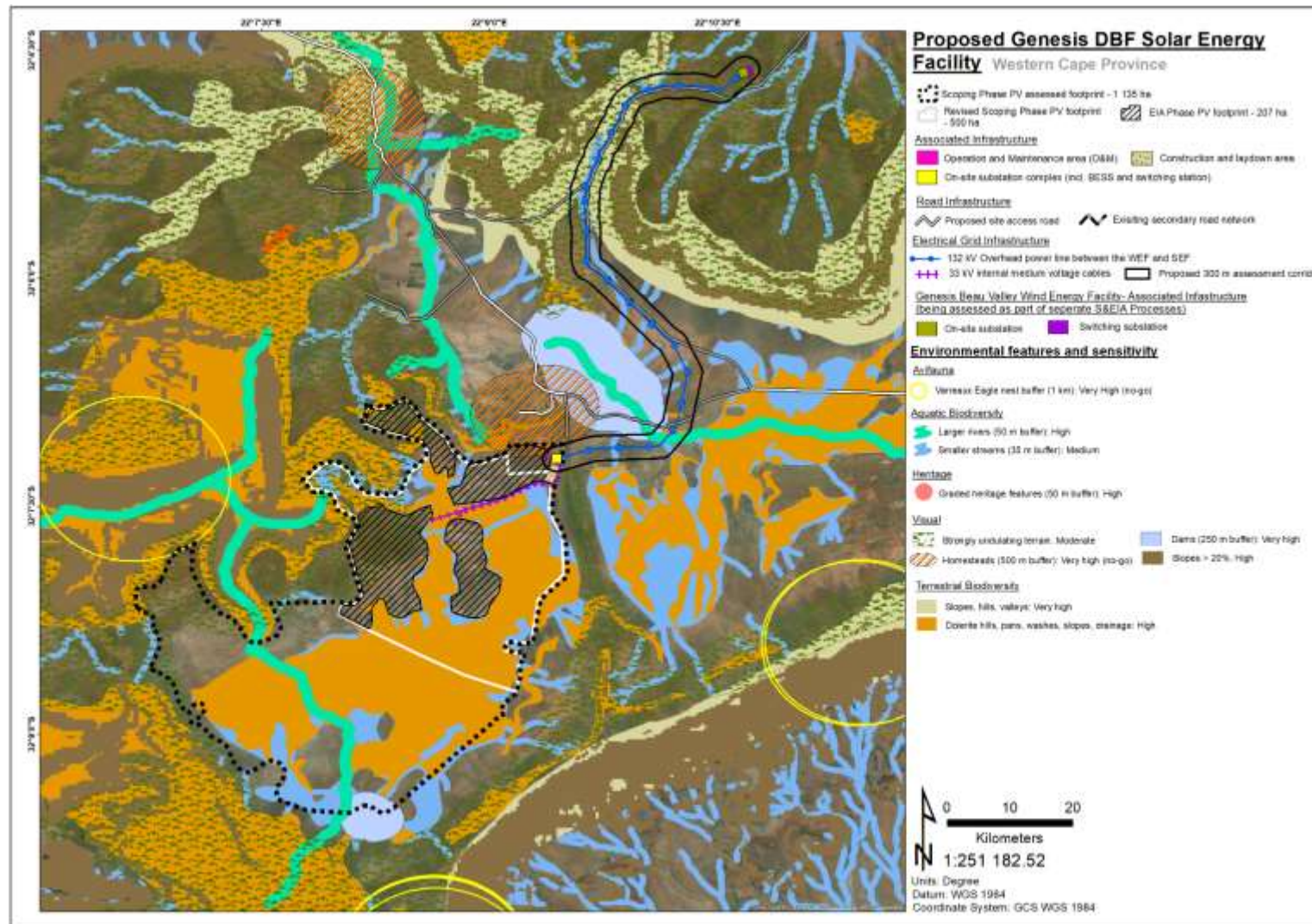


Figure 7.2: Revised site layout recommended by the EAP superimposed on the combined specialist environmental sensitivities and features identified during the EIA process.

7.4 Specialist Impact Assessment

Based on the detailed specialist assessments, various potential impacts have been identified. A summary of the main impacts identified is provided in Table 7.1. Note that several mitigation measures have also been provided by the specialists, however only selected key measures are noted in the table below. The specialist assessments included in Appendix G of this EIA Report contain all the detail. The recommended mitigation measures have been included in the Environmental Management Programme (EMPr) in Appendix H of this EIA Report.

Table 7.3: Summary of Key Impacts that were identified and assessed during the EIA Phase as part of the Specialist Assessments, including key recommended mitigation measures

Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
Appendix G.1: Agriculture Compliance Statement	<u>Negative Direct Impacts:</u> Construction Phase: - Loss of agricultural potential by occupation of land. - Loss of agricultural potential by soil degradation. Soil can be degraded by impacts in three different ways: erosion; topsoil loss; and contamination. Decommissioning Phase: - Loss of agricultural potential by soil degradation. Soil can be degraded by impacts in three different ways: erosion; topsoil loss; and contamination. <u>Positive Indirect Impacts (mainly during operations):</u> - Increased financial security for farming operations.	Planning Phase: - Design an effective system of stormwater run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion. Construction and Decommissioning Phases: - Implement an effective system of stormwater run-off control, where it is required (as specified above). Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there. - Any excavations done during the construction phase, in areas that will be re-vegetated at the end of the construction phase, must separate the upper 20 cm of topsoil from the rest of the excavation spoils and store it in a separate stockpile. When the excavation is back-filled, the topsoil must be back-filled last, so that it is at the surface. Topsoil should only be stripped in areas that are excavated. Operational Phase: - Maintain the stormwater run-off control system. Monitor erosion and remedy the stormwater control system in the event of any erosion occurring.
Appendix G.2: Terrestrial Biodiversity, Terrestrial Plant Species, and Terrestrial	<u>Negative Direct Impacts:</u> Construction Phase: - Impacts on CBAs, ESAs and ecological processes within the site - Impact on habitat loss within NPAES Focus Areas	Construction Phase: - Minimise the development footprint as far as possible. - Locate temporary-use areas such as construction camps and lay-down areas in low sensitivity or previously disturbed areas. - Avoid mapped No-Go areas in the placement of pylons, switching stations and access tracks. - Clearly demarcate riparian areas near to the development footprint as No-Go areas with appropriate signage and barriers.

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Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
Animal Species Assessment	Operational Phase: - Impact on ecological processes within the site - Impact on Karoo Dwarf Tortoises at the site during operation due to operational activities (vehicles/disturbance) as well as predation by crows. Cumulative Impacts: - Cumulative habitat loss and impact on broad-scale ecological processes	- Appropriate design of roads and other infrastructure to minimise faunal impacts. - The fencing around infrastructure should not have any electrified strands within 30cm of the ground as this may result in tortoises being electrocuted. Alternatively, guard wires or mesh can be placed outside of the fence to prevent tortoises from accessing the electrified fence. - Investigate options in collaboration with SANParks as to ways in the potential impact of the development on the NPAES can be reduced and mitigated.. Operational Phase: - Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h. - Service staff should remain within the development footprint and not be allowed to wander into the veld. - No fauna including tortoises should be disturbed or removed from the veld. - A log should be kept detailing and fauna-related incidences or mortalities that occur on site. These should be reviewed annually by the Environmental Officer and used to inform operational management and mitigation measures. - Crow nests along any overhead lines within the site, identified during annual surveys and located within 1km of suitable Karoo Dwarf Tortoise habitat should be removed following consultation with an avifaunal specialist to discourage predation of Karoo Dwarf Tortoise by crows.
Appendix G.3: Aquatic Biodiversity	<u>Negative Direct Impacts:</u> Construction Phase: - Decrease in habitat integrity. - Decrease in aquatic ecosystem integrity (removal of aquatic vegetation). - Stress on a water resource. - Decrease in aquatic ecosystem integrity (alien vegetation infestation). - Decrease in water quality. Operational Phase: - Decrease in aquatic ecosystem integrity (ongoing disturbance). - Decrease in aquatic ecosystem integrity (disturbance of cover vegetation and soil). - Modified hydraulics in the watercourses Decommissioning Phase:	Construction Phase: - The medium sensitivity aquatic habitats should be avoided in the layout design, with only low sensitivity habitats being disturbed during construction. - Place PV modules and associated infrastructure outside of aquatic features and recommended development setbacks to minimise works within aquatic ecosystems (i.e. recommended buffer of at least 35 m for the smaller drainage features; and a 50m setback from the larger rivers) - Clearing of indigenous vegetation should not take place within the aquatic features and the recommended buffers. - Water use for construction should be minimised as much as possible. - The road crossing structures should be designed to not impede flow in watercourses - low water crossing is preferred. - The existing road infrastructure should be utilised as far as possible to access new infrastructure to minimise the overall disturbance. It is recommended that any new linear type of infrastructure crossings over watercourses be placed where there are existing structures or road crossings within the watercourse corridors. - Sources of alien seed should be prevented from being brought onto the site with imported materials. - Rehabilitate disturbed aquatic habitats once construction works are complete. - Undertake monitoring for the growth of alien vegetation during the post-construction phase. - Any works within aquatic features should be undertaken in the dry season where possible. - Sediment traps should be used where necessary.

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Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
	- Increased disturbance of aquatic habitat due to the increased activity on the site. - Increased sedimentation and risks of contamination of surface water runoff. <u>Negative Cumulative Impacts:</u> Construction and Decommissioning Phases: - Increased disturbance of aquatic habitat due to the increased activity in the wider area. Operational Phases: - Degradation of ecological condition of aquatic ecosystems	- Good housekeeping and site management measures must be implemented at the laydown areas and the construction site as per the project EMPr and monitored by the appointed ECO. Operational Phase: - Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areas do not become infested with invasive alien plants. - Develop a stormwater management plan for the proposed development that addresses the stormwater runoff from the developed areas. - Stormwater run-off infrastructure must be designed to mitigate both the flow and water quality impacts of any stormwater leaving the developed areas. The runoff should rather be dissipated over a broad area covered by natural vegetation or managed using appropriate shaping of the road with berms or channels and swales adjacent to hardened surfaces where necessary. Decommissioning Phase: - Minimise works within aquatic ecosystems. If the project layout avoided these areas, the decommissioning works would also be able to avoid aquatic habitats on the property. - Rehabilitate and revegetate disturbed areas, where required. - Mitigation and follow-up monitoring of residual impacts (alien vegetation growth and erosion) may be required. - The road network should be returned to that resembling pre-construction, with all additional roads removed where possible. - Decommissioning activities within aquatic features should be undertaken in the dry season where possible. - Sediment traps should be used where necessary. - Laydown areas should be placed within approved PV footprint and layout. - Good housekeeping measures should be implemented as per the project EMPr and monitored by the appointed ECO.
Appendix G.4: Avifauna Assessment	<u>Negative Direct Impacts:</u> Construction Phase: - Displacement due to disturbance associated with the construction of the solar PV plant and associated infrastructure. Operational Phase: - Displacement due to habitat transformation associated with the presence of the solar PV plant and associated infrastructure. - Collisions with the solar panels.	Construction Phase: - Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum as far as practical. - The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint is concerned. - A 1 km all infrastructure exclusion zone around the Verreaux's Eagle nests (at -32° 7'18.77"S, 22° 6'39.32"E and at 32°10'18.71"S, 22° 8'41.47"E) is recommended prevent disturbance of the breeding pair. Operational Phase: - The recommendations of the botanical specialist must be strictly implemented, especially as far as limiting the vegetation clearance to what is absolutely necessary, and rehabilitation of transformed areas are concerned.

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Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
	▪ Entrapment in perimeter fences. ▪ Electrocutions on the internal 33kV powerlines (if above ground) and in the onsite substation complex. ▪ Collisions with the internal 33kV powerlines (if above ground) and the 132kV grid connection. Decommissioning Phase: ▪ Displacement due to disturbance associated with the decommissioning of the solar PV plant and associated infrastructure. <u>Negative Cumulative Impacts:</u> Construction and Decommissioning Phases: ▪ Displacement due to disturbance associated with the construction and decommissioning of the solar PV plants and associated infrastructure. Operational Phase: ▪ Displacement due to habitat transformation associated with the presence of the solar PV plants and associated infrastructure. ▪ Collisions with the solar panels. ▪ Entrapment in perimeter fences. ▪ Electrocutions on the internal 33kV powerlines (if above ground) and in the onsite substation complex.	▪ Where possible, surface water (dams and drainage lines) must be buffered according to the freshwater specialists' recommendations to ensure unhindered access of priority species to the water. No PV panels should be constructed in this zone. ▪ A single perimeter fence should be used. ▪ The hardware within the proposed substation yards is too complex to warrant any mitigation for electrocution at this stage. It is recommended that if on-going impacts are recorded once operational, site-specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red List priority species are unlikely to frequent the substation and be electrocuted. ▪ In instances where the medium voltage cables cannot be buried due to technical constraints, a bird-friendly pole design must be used for the overhead lines. The avifaunal specialist must approve the pole design. ▪ Bird Flight Diverters must be fitted to all overhead lines according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines). Decommissioning Phase: ▪ Activity should as far as possible be restricted to the footprint of the infrastructure. ▪ Maximum use should be made of existing access roads during the decommissioning phase and the construction of new roads should be kept to a minimum as far as practical.
Appendix G.5: Visual Impact Assessment	<u>Negative Direct Impacts:</u> Construction Phase: ▪ Potential visual impact of construction activities on sensitive visual receptors in close proximity (within 1 km) to the proposed PV facility . Operational Phase: ▪ Potential visual impact on sensitive visual receptors located within a 1km radius of the PV Facility	Planning Phase: ▪ Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. ▪ Use anti-reflective panels and dull polishing on structures, where possible and industry standard. ▪ Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) where possible. Construction Phase: ▪ Ensure that vegetation is not unnecessarily removed during the construction period. ▪ Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.

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Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
	- Potential visual impact on sensitive visual receptors within the 1 – 3km radius - Potential visual impact on sensitive visual receptors within the 3 – 6km radius - Potential visual impact on sensitive visual receptors within the greater area (beyond 6km radius) - Potential visual impact of operational, safety and security lighting of the facility at night - Potential visual impact of solar glint and glare as a visual distraction and possible air/road travel hazard - Potential visual impact of solar glint and glare on static ground-based receptors (residents of homesteads) in close proximity (within 1km) to the PV facility - Visual impact of the ancillary infrastructure on observers in close proximity to the structures. Decommissioning Phase: - Visual impact of construction activities on sensitive visual receptors in close proximity (within 1km) to the proposed facility. <u>Negative Indirect Impacts:</u> Operational Phase: - The potential impact on the sense of place of the region. <u>Negative Cumulative Impacts:</u> Construction, Operational and Decommissioning Phases: - The potential cumulative visual impact of PV facilities on the visual quality of the landscape.	- Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at licensed waste facilities. - Reduce and control construction dust using approved dust suppression techniques as and when required - Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts. - Rehabilitate all disturbed areas immediately after the completion of construction works. Operational Phase: - Maintain the general appearance of the facility as a whole. - Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint, where possible. - Shield the sources of light by physical barriers (walls, vegetation, or the structure itself). - Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights. - Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes. - Use anti-reflective panels and dull polishing on structures, where possible and industry standard. - If specific sensitive visual receptors are identified during operation, investigate screening at the receptor site, where possible Decommissioning Phase: - Remove infrastructure not required for the post-decommissioning use of the site. - Rehabilitate all areas as per the rehabilitation plan undertaken. Consult an ecologist regarding rehabilitation specifications. - Monitor rehabilitated areas post-decommissioning and implement remedial actions as required.
Appendix G.6: Heritage Impact Assessment (Archaeology and Cultural Landscape)	<u>Negative Direct Impacts:</u> Construction Phase: - Damage to or disturbance of archaeological sites and materials - Alteration of the cultural landscape	Construction Phase: - Finds of archaeological material are reported to Heritage Western Cape (HWC) and the project archaeologist - Implementation of recommendations of the Visual Impact Assessment to reduce impacts to the cultural landscape.

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Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
	Operational Phase: - Alteration of the cultural landscape. Decommissioning Phase: - Alteration of the cultural landscape. <u>Negative Cumulative Impacts:</u> Construction and Decommissioning Phases: - Potential impacts on archaeology. Operational Phase: - Potential impacts on the cultural landscape.	Operational Phase: - Implementation of recommendations of the Visual Impact Assessment to reduce impacts to the cultural landscape Decommissioning Phase: - Implementation of recommendations of the Visual Impact Assessment to reduce impacts to the cultural landscape.
Appendix G.7: Palaeontology Impact Assessment	<u>Negative Direct and Cumulative Impacts:</u> Construction Phase: Loss of fossil heritage	Construction Phase: Implement the Chance Fossil Finds Protocol that has been incorporated into the project EMPs (Appendix H of this EIA Report).
Chapter 13: Socio-Economic Assessment	<u>Direct Negative Impacts</u> Construction Phase: - Social disruption and change in social dynamics; and - Reduced quality of life and increased risks due to construction near residences Decommissioning Phase: - Reduced employment and funding. <u>Direct Positive Impacts</u> Construction Phase: - Capital investment (CapEx) contributing to the national, regional and local economy; - Generation of employment, income and skills. Operational Phase: - Operational investment (OpEx) contributing to the national, regional and local economy;	Note that several mitigation and enhancement measures have been identified in the assessment. The list below is only a summary of some of the recommendations. Positive Impacts – Enhancement Measures: Construction Phase: - Source as many goods and services as far as possible from the local and regional economy - Provide training to staff and service providers before and/or during the construction phase, where possible and practicable. - Ensure diversity and gender equality in recruitment, as far as possible. Operational Phase: - Provide suitable training to service providers, where possible and practicable. - Develop and implement a fair and transparent procurement policy. - Maximise use of local skills and resources through preferential employment of locals where practicable. - Regularly engage with community stakeholders to develop meaningful strategies for community development. - Ensure that funding requirements for each project are considered into the future so that projects are viable and sustainable.

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Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
	- Generation of employment, income and skills; - Increased community prosperity through contributions and income from the SEF; and - Increased power generation reducing the probability of load shedding. <u>Cumulative Positive Impacts:</u> - Stimulation of economic and employment growth; and - Increased community prosperity through contributions and income from IPPs.	Negative Impacts – Mitigation Measures: Construction Phase: - Work together with impartial local representatives to identify local people during the recruitment process. - Provide transport to site and other incentives to reduce the number of workers accommodated in EPC accommodation to an absolute minimum. - Consult with the municipality regarding the capacity of existing services and infrastructure to cope with additional workers brought into the area during the construction period. - Consider supporting projects that improve local services and infrastructure and/or deal with social problems or conflicts through the social upliftment programme, if the need arises. - Maintain a visible security presence on site. - Implement a grievance mechanism during the construction phase. - Control site access. - Declare areas outside of the construction site as no-go areas for construction staff. Decommissioning Phase: - Clearly communicate project duration to staff and communities. - Prolong the operational life of the project as much as possible. - Assist with the sustainable administration of funds throughout the project lifetime.
Appendix G.9: Traffic Impact Assessment	<u>Indirect Negative Impacts</u> Construction Phase: - Increased Road Incidents - Road degradation - Dust - Intersection Safety Operational Phase: - Intersection Safety. <u>Cumulative Negative Impacts</u> Construction and Operational Phases: - The cumulative impact due to the increased traffic volumes at intersections will increase the potential risk of accidents	Construction Phase: - Post relevant road signage along affected routes. - Create a local WhatsApp Group, notifying other road users of expected deliveries and associated routes. - Ensure all vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator. - Traffic Management Plan (TMP) is to be compiled once the contractor has been appointed and all the relevant details of the construction process are known. - Developer to contribute to the maintenance of the public roads in the area during the construction phase of the development/s. - A photographic record of the road condition should be maintained throughout the various phases of the development/s. This provides an objective assessment and mitigates any subjective view from road users. - Upgrade unpaved roads to a suitable condition for proposed construction vehicles. - Ensure that the roads are left in the same or better condition, post-construction. - Dust suppression of the roads in the immediate vicinity of the site where feasible. - Regular preventative maintenance of roads within the immediate vicinity of the site. - Reduce speed at intersections and use appropriate traffic warning signs.

ENVIRONMENTAL IMPACT REPORT: Scoping and Environmental Impact Assessment (EIA) Process for the Proposed Development of the
Genesis DBF South Solar Energy Facility and associated infrastructure, near Beaufort West, Western Cape Province

Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
	at the intersections, resulting in serious injuries or even fatalities, especially at the intersection on the main roads, when vehicles from the site need to cross over oncoming traffic.	Operational Phase: - Compile a Traffic Management Plant (TMP). - Reduce speed at intersections and use appropriate traffic warning signs.
Appendix G.10: Battery Energy Storage System High Level Safety, Health and Environment Risk Assessment	Various risks were identified in terms of safety, health and the environment due to the proposed BESS. The BESS High Level Safety, Health and Environment Risk Assessment identified risks, hazards, and consequences, such as, but not limited to: - Human Health - chronic exposure to toxic chemical or biological agents. Causes - Construction materials such as cement, paints, solvents, welding fumes, truck fumes etc. Consequences - Employee / contractor illness. - Human Health - exposure to noise. Causes - Drilling, piling, generators, air compressors. Consequences - Adverse impact on hearing of workers. Possible nuisance factor in near-by areas. - Human and Equipment Safety - exposure to fire radiation Causes – - Involvement in an external fire. Fire involving fuels used in construction vehicles or vehicles themselves (e.g., tyre fire). Fire due to uncontrolled welding or other hot-work. Consequences - Injuries due to radiation especially amongst first responders and bystanders. Fatalities unlikely from the heat radiation as not highly flammable nor massive fire. - Human and Equipment Safety - exposure to explosion over pressures. Transformer shorting / overheating / explosion. Consequences - Potential fatalities, e.g., amongst first responders. Damage to nearby equipment.	- There are numerous different battery technologies but using one consistent battery technology system for the BESS installations associated with all the developments in the Beaufort West area associated with the Genesis Renewable Energy Cluster would allow for ease of training, maintenance, emergency response and could significantly reduce risks. - 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 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. - Location of the facilities needs to ensure a suitable separation distance from public facilities/residences etc. The DBF BESS is partially located within 500m of an occupied farmstead complex. This is not ideal, especially as there is a dominant wind from the south east. The DBF BESS should preferably be located slightly further (>100m) to the south. If this is not possible, it is noted that the risks are low and advice of mitigative measures included in the EMPr (Appendix H) should be provided to the farm occupants, e.g. shelter in place indoors. The relocation of the BESS 100m to the south can be accommodated/ micro-sited within the assessed on-site substation complex area. - Where there is a choice of alternative locations for the BESS, those that are further from water courses would be preferred. It is noted that there are no tributaries of the main water courses in the area within 200m of the proposed BESS Location.
Appendix G.11: Geohydrology Assessment	Construction Phase Groundwater impact (lowering) as a result of groundwater abstraction for construction requirements;	Construction, Operation and Decommissioning Phases: A quarterly groundwater monitoring programme is recommended to ensure that groundwater abstraction is sustainable due to the high number of existing boreholes in the area. The programme should ideally be initiated at least one year prior to the commencement of construction if the project timeframes permit. This would serve to confirm the baseline water levels throughout one wet and dry season cycle, as well as confirm the baseline water

ENVIRONMENTAL IMPACT REPORT: Scoping and Environmental Impact Assessment (EIA) Process for the Proposed Development of the
Genesis DBF South Solar Energy Facility and associated infrastructure, near Beaufort West, Western Cape Province

Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
	- Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages, and cleaning agents. <u>Operational Phase</u> - Groundwater impact (lowering) as a result of groundwater abstraction for operational requirements. - Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages, and cleaning agents. <u>Decommissioning Phase</u> - Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages, and cleaning agents. - Groundwater impact (lowering) as a result of groundwater abstraction for decommissioning requirements.	quality. The monitoring will also indicate if the groundwater resource is impacted and mitigation measures can be instituted before long term impacts occur. Mitigation for over-abstraction would be reduction in abstraction. It is therefore highly improbable that the groundwater resource will be depleted as a result of over abstraction, should a quarterly monitoring programme be instated. - Monitoring would also ensure that the extracted volumes comply with relevant authorised abstraction volumes. - Vehicles must be regularly serviced and maintained to check and ensure there are no leakages. A designated area should be established at the construction site camp for this purpose. - Any engines that stand in one place for an excessive length of time must have drip trays. - Construction vehicles and equipment should also be refuelled on an impermeable surface. A designated area should be established at the construction site camp for this purpose, if off-site refuelling is not possible. - If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, and reported. - Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes. - Chemical contamination of the soils, rocks and groundwater beneath the sites that have been proposed for development also pose risk to the environment due to cleaning of solar panels, albeit low. However, it is advised that (chemical) groundwater monitoring be conducted on at least a quarterly basis as precaution for contamination during the construction phase and for a year following. If changes in the groundwater chemistry are detected (e.g. chemicals derived from cleaning agents or compounds derived from petroleum), the advice of a specialist subcontractor should be sought for remediation of the groundwater chemistry
Appendix G.12: Geotechnical Assessment	<u>Direct and Cumulative Negative Impacts during the Construction, Operational and Decommissioning phases:</u> - Displacement of geologic materials - Contamination of subsoils and loss of topsoil.	Construction Phase: - Favour dolerite as an aggregate (as opposed to Karoo sandstones and mudstones). - Any road cuttings should be designed by an appropriately qualified professional. - Drainage on site should be designed and managed appropriately. - Investigate and confirm the geotechnical suitability of each structure prior to construction (i.e. determine that soil with an adequate bearing capacity is obtained beneath each footing). - Only strip vegetation necessary for the next phase of construction. - Install temporary drainage to divert stormwater away from active construction activities, where required. - Stormwater Management Plan must be developed in the preconstruction phase. It should detail the stormwater structures and management interventions that must be installed to manage the increase of surface water flow directly into any natural systems (in consultation with suitably qualified professionals). - Suitable stormwater management systems must be installed along roads and other areas and be monitored during the first few months of use. Any erosion/sedimentation must be resolved through any additional interventions that may be necessary. - Where impacted through construction-related activities, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled. - Any rehabilitation should be scheduled to ensure rehabilitation can take place at the optimal time for vegetation establishment. - Where earthwork is being undertaken near any watercourses, slopes must be stabilised using suitable materials.

Specialist Assessment undertaken	Key Impacts Identified	Recommended Mitigation Measures
		▪ Provision must be made for refuelling at the storage area/site camp, and workshop by protecting the soil with an impermeable groundcover or drip trays must be used. ▪ A spill kit should be maintained on site. If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes. Operational Phase: ▪ Install drainage to divert stormwater away from activities, roads/tracks, structures, where required. ▪ Stormwater Management Plan must be developed in the preconstruction phase and should detail the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems, where possible and lawful. ▪ During the execution of the operations, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented. ▪ Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover/bunding. Where dispensing equipment is used, a drip tray must be used. ▪ If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material. Proof of disposal should be obtained and retained on file for auditing purposes. Construction Phase: ▪ Only drive and park vehicles where necessary. ▪ Land rehabilitation to near natural state, i.e. removal of foundations and backfilling of any resultant voids within the soil, as well as removal of hard surfaced areas. Replacement soil should be sourced locally to ensure homogeneity. Reseeding with natural vegetation grasses, and seeds will further mitigate future displacement. ▪ Reinstate natural topography where cut-to-fill embankments have been constructed. ▪ Appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that equipment is well maintained. ▪ Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. ▪ A spill kit should be maintained on site. If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material. Proof of disposal should be obtained and retained on file for auditing purposes.

7.5 Summary of Key Impact Assessment Findings

Based on the findings of the detailed specialist impact assessments, which are included in Appendix G of this EIA Report, the proposed project is considered to have an **overall Moderate to Low negative environmental impact** and an **overall Moderate to Low positive socio-economic impact** (with the implementation of respective mitigation and enhancement measures). Table 7.4 below provides a summary of the impact assessment for the proposed project post mitigation for direct impacts. Table 7.5 provides the same information for the cumulative impacts.

As indicated in Table 7.4, the **direct negative impacts** were rated with an overall **Low to Very Low** post-mitigation impact significance for the **construction phase**, with the exception of Terrestrial Biodiversity, Aquatic Biodiversity and Visual impacts being rated as Moderate. In terms of the **operational and decommissioning phases**, the majority of the direct negative impacts were rated with a **Low to Very Low** post-mitigation impact significance. In terms of **direct positive impacts**, the Socio-Economic impacts are rated as having a **Moderate** impact significance post-mitigation for the construction phase; and **Low** impact significance post-mitigation for the operational phase.

Based on Table 7.5, the majority of the **cumulative negative impacts** were rated with a **Low** post-mitigation impact significance for the **construction phase**, with the exception of Terrestrial Biodiversity and Visual impacts being rated as Moderate. In terms of the **operational phase**, the majority of the cumulative negative impacts were rated with a **Low to Very Low** post-mitigation impact significance; with the exception of Avifauna Biodiversity, Traffic impacts and Visual impacts being rated as Moderate. In terms of the **decommissioning phase**, the majority of the cumulative negative impacts were rated with a **Low to Very Low** post-mitigation impact significance; with the exception of Visual impacts being rated as Moderate. In terms of **cumulative positive impacts**, the Socio-Economic impacts are rated as having a **Moderate** impact significance post-mitigation for the construction phase; and **Low** impact significance post-mitigation for the operational phase.

Table 7.4: Overall Impact Significance with the Implementation of Mitigation Measures for Direct Negative and Positive Impacts

Specialist Study	Construction	Operational	Decommissioning
Direct Negative Impacts			
Agriculture	Very Low	Very Low	Very Low
Terrestrial Biodiversity and Terrestrial Animal Species	Moderate	Low	Low
Karoo Dwarf Tortoise Species Assessment	Low	Low	Low
Terrestrial Plant Species	Low	Low	Low
Aquatic Biodiversity and Species	Moderate	Moderate	Low
Avifauna Assessment	Low	Low	Low
Visual Impact Assessment	Moderate	Low	Moderate
Heritage Impact Assessment (Archaeology and Cultural Heritage)	Low	Low	Low

Specialist Study	Construction	Operational	Decommissioning
Palaeontological Impact Assessment	Low	No impact	No impact
Socio-Economic Assessment	Insignificant and/or not identified and/or not applicable	Insignificant and/or not identified and/or not applicable	Low
Traffic Impact Assessment	Low	Moderate	New TIA to be undertaken at decommissioning
Geohydrology Assessment	Low	Very Low	Very Low
Geotechnical Assessment	Very Low	Very Low	Very Low
Direct Positive Impacts			
Socio-Economic Assessment	Moderate	Low	Insignificant and/or not identified and/or not applicable

Table 7.5: Overall Impact Significance with the Implementation of Mitigation Measures for Cumulative Negative and Positive Impacts

Specialist Study	Construction	Operational	Decommissioning
Direct Negative Impacts			
Agriculture	Low	Low	Low
Terrestrial Biodiversity and Terrestrial Animal Species	Moderate	Low	Low
Karoo Dwarf Tortoise Species Assessment	Low	Low	Low
Terrestrial Plant Species	Low	Low	Low
Aquatic Biodiversity and Species	Low	Low	Very Low
Avifauna Assessment	Low	Moderate	Low
Visual Impact Assessment	Moderate	Moderate	Moderate
Heritage Impact Assessment (Archaeology and Cultural Heritage)	Low	Low	Low
Palaeontological Impact Assessment	Low	No impact	No impact
Socio-Economic Assessment	Insignificant and/or not identified and/or not applicable	Insignificant and/or not identified and/or not applicable	Low
Traffic Impact Assessment	Moderate	Moderate	New TIA to be undertaken at decommissioning
Geohydrology Assessment	Low	Very Low	Very Low
Geotechnical Assessment	Low	Low	Low
Direct Positive Impacts			
Socio-Economic Assessment	Moderate	Low	Insignificant and/or not identified and/or not applicable

7.6 Overall Environmental Impact Statement and Reasoned Opinion from the EAP

The information presented above, contributes to this overall environmental impact statement and reasoned opinion from the EAP as to whether the proposed project should or should not be authorised, including any conditions that should be made in respect of the authorisation (should it be granted).

Based on the findings of the detailed specialist assessments and technical studies, which all recommend that the proposed project can proceed and should be authorised by the DFFE, the proposed project is considered to have an **overall Moderate to Low negative environmental impact, and an overall Low to Moderate positive socio-economic impact** (with the effective implementation of respective mitigation and enhancement measures).

The proposed project will take place within the development footprint on the preferred project site, as contemplated in the accepted Final Scoping Report. The development footprint and buildable areas will avoid the “no-go” sensitive features identified and mapped by the respective specialists, where relevant and applicable, as discussed in Section 7.3 of this chapter.

This EIA has considered the nature, scale and location of the development as well as the wise use of land. When considering the timing of this project, the IRP 2019 proposes to secure 17 800 MW of renewable energy capacity by 2030. As discussed in the preceding chapters of this EIA Report, it is the Project Applicant’s intention to bid this project in the future bidding rounds of the REIPPPP.

The proposed project will be in line with and will be supportive of the objective of the BWLM IDP in terms of leveraging the competitive advantages of the region’s significant renewable energy resources. If approved by DFFE, the proposed Solar PV Facility will provide skills development opportunities, create contractual and permanent employment in the area, and consequently provide catalytic opportunities for downstream economic development.

Section 24 of the Constitutional Act states 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, that prevents pollution and ecological degradation; promotes conservation; and secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”*. Based on this, this EIA was undertaken to ensure that these principles are met through the inclusion of appropriate management and mitigation measures, and monitoring requirements. These measures will be undertaken to promote conservation by avoiding the sensitive environmental features present on site and through appropriate monitoring and management plans (refer to the EMP in Appendix H of this EIA Report).

Furthermore, mitigation measures such as committing some of the land adjacent to the KNP to stewardship or similar conservation commitment are being investigated. The purpose of these engagements are to co-generate a mechanism that balances and achieves the imperatives of both biodiversity conservation and renewable energy development. The conclusion of an agreement between SANParks, the Project Applicant and the affected landowners is recommended by the EAP as a condition to be included in the EA by the Competent Authority, the DFFE.

The outcomes of this project therefore succeed in meeting the environmental management objectives of protecting the ecologically sensitive areas and supporting sustainable development and the use of natural resources, whilst promoting justifiable socio-economic development in the towns nearest to the project site. The findings of this EIA show that all natural resources will be used in a sustainable manner (i.e., this project is a renewable energy project, and the majority of the negative site specific and cumulative environmental impacts are considered to be of low significance with mitigation measures implemented), while the benefits from the project will promote justifiable economic and social development. Furthermore, additional specialist studies (not recommended by the Screening Tool) have been undertaken as part of the EIA Process to ensure that all potential environmental impacts are addressed and assessed. Refer to Table 7.6 for a summary of reasoned opinions from the specialists.

Table 7.6: Summary of the Reasoned Opinions from the Specialists

Specialist Assessment undertaken	Reasoned Opinion on whether the project should be authorised
Appendix G.1: Agriculture Compliance Statement	▪ The conclusion of the assessment is that the proposed development offers a valuable opportunity for renewable energy development with very little loss of future agricultural production potential. ▪ Based on various factors, the impact of the proposed development on the agricultural production capability of the site is assessed as being acceptable. Therefore, from an agricultural impact point of view, it is recommended that the development be approved.
Appendix G.2: Terrestrial Biodiversity, Terrestrial Plant Species, and Terrestrial Animal Species Assessment	▪ While there are no impacts associated with the development of the DBF SEF on terrestrial biodiversity that are considered high after mitigation and which would be considered a fatal flaw, impacts on CBAs, NPAES Focus Areas and cumulative impacts are considered low to moderate after mitigation. A stewardship or conservation programme should be considered to address these moderate residual impacts. As such, the developer should consider investigating ways in which these impacts could potentially be mitigated or reduced in collaboration with SANParks. Provided and subject to such an agreement being reached, then there would be no reasons to oppose the development from proceeding.
Appendix G.3: Aquatic Biodiversity	▪ Based on the findings of the specialist assessment, there is no reason from a freshwater perspective, why the proposed activity (with the implementation of the recommended mitigation measures) should not be authorised. ▪ The proposed development footprint within the preferred development site (i.e. study area) has been amended through the EIA process to ensure that it will avoid high and medium aquatic sensitivities and is thus considered acceptable area to be authorised.
Appendix G.4: Avifauna Impact Assessment	▪ The proposed project will have a range of potential pre-mitigation impacts on priority avifauna ranging from low to high significance, which is expected to be reduced to medium and low significance with the appropriate mitigation. ▪ No fatal flaws were discovered during the investigations. The proposed project is supported, and it is therefore recommended that the activity is authorised, with the understanding that all mitigation measures recommended in this report will be strictly implemented.
Appendix G.5: Visual Impact Assessment	▪ Overall, the significance of the visual impacts is expected to range from moderate to low, as a result of the very low occurrence of sensitive visual receptors. If mitigation is undertaken as recommended in the EMP, it is concluded that the significance of most of the anticipated visual impacts will remain at or be managed to acceptable levels. As such, the proposed

Specialist Assessment undertaken	Reasoned Opinion on whether the project should be authorised
	development would be considered to be acceptable from a visual impact perspective and can therefore be authorised.
Appendix G.6: Heritage Impact Assessment (Archaeology and Cultural Landscape)	This assessment has found that the area identified for the proposed project is a heritage environment of variable sensitivity but that significant impacts on heritage resources arising from the construction of the project are unlikely. Provided the recommended mitigation measures are implemented, the overall impact and significance of the proposed project on heritage resources will be low and the proposed activity is acceptable from a heritage perspective.
Appendix G.7: Palaeontology Impact Assessment	- A low Palaeontological Significance has been allocated for the construction phase of the SEF development pre-mitigation and a very low significance post mitigation. The construction phase will be the only development phase impacting Palaeontological Heritage and no significant impacts are expected to impact the Operational and Decommissioning phases. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. - Provided that the Chance Fossil Finds Protocol is incorporated into the EMPr and fully implemented during the construction phase of the solar PV facility, there are no objections on palaeontological heritage grounds to authorisation of the proposed development footprint in its full extent.
Appendix G.8: Socio-Economic Assessment	- The construction of the proposed project provides significant socio-economic benefits, related to economic growth and employment and financial contributions to and upliftment of Previously Disadvantaged Individuals in rural communities. - The establishment of the proposed project and associated infrastructure is supported by the findings of the socio-economic assessment and should be authorised.
Appendix G.9: Traffic Impact Assessment	It is the reasoned opinion of the Traffic specialist that the proposed development can be approved from a traffic and transportation perspective as there are no constraints or notable impacts that would jeopardise the implementation of the development, subject to the implementation of the recommended mitigation measures.
Appendix G.10: Battery Energy Storage System High Level Safety, Health and Environment Risk Assessment	The Risk Assessment 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 for the proposed BESS installation.
Appendix G.11: Geohydrology Assessment	Based on various factors, such as the anticipated demands of the facility (individually) being less than the regional yield potential of the underlying aquifer, and the low to very low post-mitigation impact assessment, it is the opinion of the specialist that development of the proposed project may be authorised, provided that the mitigation measures are implemented during each phase of the project to suppress the intensity of identified impacts.
Appendix G.12: Geotechnical Assessment	Based on the geotechnical analysis conducted, it is recommended that the proposed project be authorised, as no fatal flaws were found during the desktop assessment. However, it is crucial to implement the recommended mitigation measures provided in the assessment and translated into the EMPr.
Appendix G.13: Civil Aviation Site Sensitivity Verification	The study area falls within an area of low sensitivity from a Civil Aviation perspective, and there is therefore no reason for the proposed development not to be authorised.
Appendix G.14: Defence Site Sensitivity Verification	The study area falls within an area of low sensitivity from a Defence perspective, and there is therefore no reason for the proposed development not to be authorised.

Taking into consideration the findings of the Scoping and EIA Process and given the national and provincial strategic requirements for infrastructure development, particularly from an electricity generation perspective, and based on the fact that the environmental sensitivity of the study area is largely medium to low, with a few isolated high and very high sensitivity areas, it is the opinion of the EAP, that the project benefits outweigh the costs and that the project will make a positive contribution to sustainable infrastructure development in the Beaufort West Local Municipality, as well as Central Karoo District.

Provided that the specified mitigation measures and management actions are applied effectively throughout, it is recommended that the proposed project receive EA in terms of the 2014 NEMA EIA Regulations (as amended).

It is understood that the information contained in this EIA Report and appendices is sufficient to make a decision in respect of the activity applied for.

It is recommended that the EA (should it be granted) be **valid for a period of 10 years**.

In addition, it is recommended that the EMPr compiled as part of this EIA Process, included in Appendix H of this EIA Report be approved concurrently in the EA (should it be granted). A detailed layout of the PV Facility has been identified at the EIA Phase. However, as confirmed by the specialists, changes to the detailed layouts are deemed acceptable if the changes remain within the approved buildable areas / development footprints and area assessed during the Scoping and EIA Process with no-go sensitive areas avoided. Any changes can be subjected to an EA amendment process, where warranted.

7.7 Cumulative Environmental Impact Statement

The cumulative impacts have been assessed by all the relevant specialists. The cumulative assessment included other renewable energy projects within a 30 km radius of the proposed project.

No cumulative impacts have been identified that were considered to be fatal flaws. The specialists recommended that the project receive EA in terms of the 2014 NEMA EIA Regulations (as amended), including consideration of cumulative impacts, provided the mitigation is applied.

7.8 Conditions recommended for inclusion in the EA

In order to ensure the effective implementation of the mitigation measures and management actions, three EMPrs have been compiled and are included in Appendix H of this EIA Report. These EMPrs include the EMPr for the proposed Solar PV facility and associated infrastructure, the EMPr for the proposed on-site substation complex, and the EMPr for the proposed power line infrastructure. The EMPrs for the proposed substation and power line infrastructure are the Generic EMPrs that are required to comply with the Generic EMPr gazetted for substation development and the Generic EMPr published for the development and expansion of overhead electricity transmission and distribution infrastructure (Government Gazette 42323, GN 435, dated 22 March 2019).

The mitigation measures necessary to ensure that the proposed projects are planned and carried out in an environmentally responsible manner are listed in the EMPs. The EMPs include the mitigation measures noted in this EIA Report, inclusive of the specialist assessments and technical studies. The EMPs are dynamic documents that should be updated as required and provide clear and implementable measures for the proposed project.

Listed below are the main recommendations applicable to the proposed project that should be considered for inclusion in the EA (should such authorisation be granted by the DFFE). These main recommendations as well as additional recommendations are included in the EMP and EIA Report.

- Mitigation measures detailed within the EIA Report, specialist assessments, technical studies and EMPs are to be implemented, where relevant and applicable.
- No-go areas of very high sensitivity identified by the specialists, and mapped accordingly, should be avoided.
- Vegetation clearing must be limited to the development footprint, as much as possible.
- Vegetation beneath the PV solar array must be retained and maintained as far as possible to enable habitat recovery post-decommissioning of the solar facility.
- Implement appropriate rehabilitation measures to restore each habitat to a natural state that is representative of the respective vegetation type after construction (for temporary use facilities in natural areas) and decommissioning.
- No alien and invasive plant species may be used for rehabilitation purposes; only indigenous species of the area / vegetation type may be used.
- Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areas do not become infested with invasive alien plants.
- An agreement between SANParks, the Project Applicant and the affected landowners to mitigate the residual impact of the proposed development on the NPAES Focus Area associated with the Karoo National Park must be concluded prior to the commencement of the construction phase for the development. This agreement must be informed by a Biodiversity Offset Study conducted in terms of the NEMA s24J National Offset Guideline published in Government Notice 3569 of Government Gazette 48841 on 23 June 2023.
- A Water Use Licence must be obtained from the relevant Water Use Authority for the relevant section 21 water use activities as provided in the National Water Act (Act 36 of 1998), as amended, prior to the commencement of the construction phase for the development. Subject to confirmation, these may include section 21 (a), (c), (i) and (g) water uses.
- The recommended buffer area between the aquatic features and the project components should be implemented.
- No infrastructure or panels may be placed within the high-sensitivity watercourses, but the underground cables and limited-service tracks may be constructed through these features, as well as existing access roads may be widened.
- Use existing disturbed areas (e.g., roads and access tracks) where possible. In terms of new service tracks, these must be kept to a minimum and should ideally not result in any new/permanent watercourse crossings, but if these are required, then a specific walk down should be conducted with the specialist to identify the most suited crossing position. Where these crossings do occur, it needs to be monitored for erosion. Stormwater management of access roads on steeper slopes, in particular, needs to be addressed to prevent erosion of the slopes and adjacent watercourses.

- Construction near sensitive aquatic features should preferably be undertaken in the dry season. If necessary, sediment traps should be placed downstream of works to capture sediment.
- Construction sites and laydown areas should be placed at least 50m away from the delineated aquatic features. Good housekeeping measures should be implemented at the construction sites that are set out in the EMPr and monitored by an appointed Environmental Control Officer (ECO) for the project.
- Bird Flight Diverters must be fitted to all overhead lines according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines).
- If any archaeological material or human burials are uncovered during the course of development, then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.
- Implement the Chance Fossil Finds Protocol during the construction phase of the solar PV facility.
- Undertake regular maintenance of the internal farm access roads by the contractor during the construction and decommissioning phases and by the operator during the operational phase.
- Ensure that the necessary permits or approvals from the relevant road authority are in place to accommodate the turning movements of the abnormal load vehicles on the surrounding road network.
- The route to the site should be further investigated to ensure that the abnormal loads are not obstructed at any point by geometric, height and width limitations along the route.
- If groundwater is sourced from existing boreholes, adherence to recommended mitigation measures should be strictly followed to prevent over abstraction of groundwater.
- Ensure that the BESS facilities are placed at least 50 m from any boreholes along with appropriate bunding and secondary containment.
- A stormwater management plan should be developed prior to the construction phase by an accredited professional.
- Ground protection measures to be implemented and spill kits to be available during maintenance and refuelling operations.
- Rehabilitation of soil and geological material to commence during the construction phase, if possible, alternatively following the construction phase to allow successful re-vegetation.
- Authorised vehicles to only use proposed access points and roads and keep within the footprint of the facility.
- Prior to the commencement of construction, A land use zoning authorisation must be obtained from the Beaufort West Local Municipality for the consent use of 'renewable energy structure' on the land which is zoned as agricultural zone 1.
- Prior to the commencement of construction, an Obstacle Application must be submitted to the Air Traffic and Navigation Services SOC Limited (ATNS) and the applicable approval must be obtained, as required by the ATNS.

Paul Lochner

NAME OF EAP

EAPASA Registration No. 2019/745



SIGNATURE OF EAP

18 September 2023

DATE