DRAFT SCOPING REPORT

Draft Scoping Report for the proposed development of the Vhuvhili Solar Photovoltaic (PV) Facility near Secunda in the Mpumalanga Province.

Prepared by:
CSIR Environmental Management Services
PO Box 320, Stellenbosch 7599
South Africa

Prepared for:
ENERTRAG South Africa

June 2022

ENERTRAG

CSIR
Touching lives through innovation

SCOPING AND ENVIRONMENTAL IMPACT ASSESSMENT

for the Proposed Development of the Vhuvhili Solar Photovoltaic (PV) Energy Facility and associated infrastructure near Secunda in the Mpumalanga Province

DRAFT SCOPING REPORT

June 2022

Prepared for:
Vhuvhili Solar RF (Pty) Ltd

Prepared by:
CSIR
Council for Scientific and Industrial Research (CSIR)
PO Box 320
Stellenbosch
7599
Tel: +27 21 888 2400
Fax: +27 21 888 2693

Lead Authors:
Minnelise Levendal and Dhiveshni Moodley (CSIR)

Mapping:
Dhiveshni Moodley (CSIR)

Formatting and Desktop Publishing:
Magdel van der Merwe (DTP Solutions)

Specialists:
Johann Lanz; Dr Noel van Rooyen; Lorain den Boogert; Chris van Rooyen; Albert Froneman, Kerry Schwartz; Dr Jayson Orton; Professor Marion Bamford; Iris Wink; Tony Barbour and Debbie Mitchell

REPORT DETAILS

Title:	**Scoping and Environmental Impact Assessment (EIA) for the proposed development of the Vhuvhili Solar Photovoltaic Facility and associated infrastructure near Secunda in the Mpumalanga Province: DRAFT SCOPING REPORT**
Prepared for:	The purpose of this Draft Scoping 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 scoping level specialist input to facilitate informed decision-making; • Provide an overview of the Scoping and EIA Process being 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 the Plan of Study for the EIA Phase for the proposed project. The Draft Scoping Report is now available to all Interested and Affected Parties (I&APs), Organs of State and stakeholders for a 30-day review period extending from 13 June to 14 July 2022. All comments submitted during the 30-day review will be incorporated in a detailed Comments and Responses Report, and addressed, as applicable and where relevant, and be included in the Final Scoping Report. The Final Scoping Report will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) as the Competent Authority (CA), for decision-making.
Prepared for:	Vhuvhili Solar RF (Pty) Ltd *Contact Person*: Kyle Swartz
Prepared by:	CSIR P O Box 320, Stellenbosch, 7599, South Africa Tel: +27 21 888 2432 Fax: +27 21 888 2693
Authors:	Minnelise Levendal, Dhiveshni Moodley, Rohaida Abed and Paul Lochner (Reviewer)
Mapping:	Dhiveshni Moodley
CSIR Project Number:	EEMS040
Date:	June 2022
To be cited as:	CSIR, 2022. Scoping and Environmental Impact Assessment for the proposed development of the Vhuvhili Solar Photovoltaic Facility and associated infrastructure near Secunda, Mpumalanga Province: Draft Scoping Report

CONTENTS

EXECUTIVE SUMMARY

PROJECT OVERVIEW AND LOCATION

The Project Applicant, Vhuvhili Solar RF (Pty) Ltd (hereafter referred to as the "Project Applicant"), is proposing to design, construct and operate the Vhuvhili Solar Photovoltaic (PV) Energy Facility and associated infrastructure approximately 7 km south-east of the town of Secunda in the Mpumalanga Province. The proposed Vhuvhili SEF will have a capacity of up to 300 MW. The proposed project is situated in the Govan Mbeki Local Municipality and the Gert Sibande District Municipality, in the Mpumalanga Province.

The associated infrastructure includes a Battery Energy Storage System (BESS) and various structures, buildings and electrical grid infrastructure (EGI) such as, but not limited to an on-site 33/132 kV Substation (SS). Two site alternatives for the on-site SS and BESS (known as the SS and BESS complex) (i.e., the Preferred and Alternative SS and BESS complex) have been identified by the Project Applicant (Figure A). A construction laydown area was also identified and includes the Operation and Maintenance (O&M) buildings. A detailed project description is provided in Chapter 2 of this Draft Scoping Report (DSR).

The proposed Vhuvhili SEF will be developed on the following farm portions:

- Remainder of Grootvlei Farm No.584;
- Portion 23 of Grootvlei Farm No. 293;
- Portion 18 of Grootvlei Farm No. 293;
- Portion 21 of Grootvlei Farm No. 293;
- Portion 20 of Grootvlei FarmNo. 293;
- Remainder of Poverty Acres Farm No. 585;
- Portion 21 of Vlakspruit Farm No.292; and
- Portion 22 of Vlakspruit Farm No.292.

The Project Applicant is also proposing to develop a 132 kV power line, a 33/132 kV Step-down SS and a Collector SS (if required) to feed the electricity generated by the proposed Vhuvhili SEF into the Sasol grid at. It is important to note that these EGI components will be assessed as part of a separate application and a Basic Assessment (BA) process to be undertaken by the Project Applicant.

The proposed Vhuvhili SEF is not located within any of the Renewable Energy Development Zones (REDZs) gazetted in Gazette 41445, GN R114 on 16 February 2018; and Gazette 44191, GN R144 on 26 February 2021. It is also not located within any of the strategic power corridors gazetted in Gazette

41445, GN R113 on 16 February 2018; and Gazette 44504, GN R383 on 29 April 2021. Therefore, a full Scoping and EIA Process is being undertaken for the proposed Vhuvhili SEF with a 107-day decision-making timeframe, as opposed to a BA Process and 57-day decision-making time frame allowed for in the REDZs and strategic power corridors.

The Draft Scoping Report was released to all Interested and Affected Parties (I&APs), Organs of State and stakeholders for a 30-day review period, extending from 13 June to 14 July 2022. All comments submitted during the 30-day review will be incorporated into a detailed Comments and Responses Report, and addressed, as applicable and where relevant, and will be included in the Final Scoping Report. The Final Scoping Report will then be submitted to the DARDLEA in accordance with Regulation 21 (1) of the 2014 NEMA EIA Regulations (as amended), for decision-making.

The locality of the proposed Vhuvhili SEF project is shown in Figure A. The co-ordinates of the proposed project site are detailed in Chapter 2 of this Draft Scoping Report.

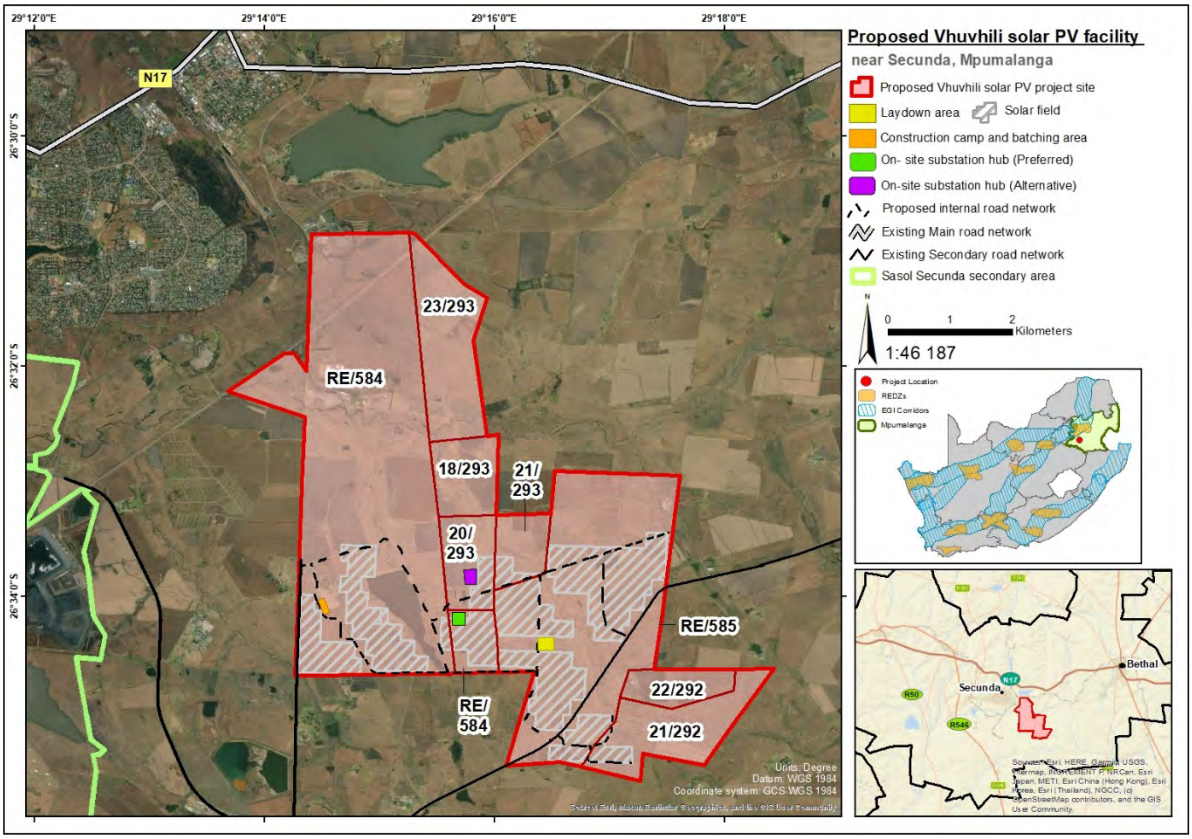


Figure A. Locality Map of the Proposed Vhuvhili Solar PV Project

PROJECT SCENARIOS

The Project Developer, ENERTRAG South Africa (Pty) Ltd (hereafter referred to as the "ENERTRAG"), is currently investigating two scenarios for the uptake of energy from the proposed Vhuvili SEF:

Scenario 1:

The proposed Vhuvhili SEF is planned to provide renewable energy to Sasol for the production of green hydrogen and green aviation fuel. This is viewed as the main proposed outcome of the proposed project, via an agreement between several consortium parties including ENERTRAG and Sasol.

Scenario 2:

However, should the above agreement not materialise under Scenario 1, and a private off-taker of the renewable energy cannot be obtained, the proposed Vhuvhili SEF will be bid into the future rounds of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) or similar bidding processes. It is understood that the Environmental Authorisation (EA) received for the proposed Vhuvili SEF (should it be granted) would be suitable for both scenarios. Furthermore, the scenario of providing the proposed renewable energy to Sasol via a private off-taker agreement and the scenario of bidding the project into the REIPPPP would have no bearing on the assessment of potential environmental impacts of the proposed project by the Environmental Assessment Practitioner (EAP).

Therefore, both scenarios have been documented in the Scoping Report, i.e., Scenario 1 of having a private off-taker (i.e., Sasol) and Scenario 2 of bidding the project into the REIPPPP or another suitable tender process.

PROJECT TEAM

In accordance with Regulation 12 (1) of the 2014 NEMA EIA Regulations (as amended), the Project Developer, ENERTRAG South Africa (Pty) Ltd, has appointed the Council for Scientific and Industrial Research (CSIR) to undertake the required Scoping and EIA Process to determine the biophysical, social and economic impacts associated with undertaking the proposed development. The project team, including the relevant specialists, is indicated in Table A below.

Table A. Project Team for the Vhuvhili SEF Scoping and EIA Process

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
Environmental Management Services (CSIR)		
Paul Lochner *(Registered EAP (2019/745))*	CSIR	Technical Advisor and Quality Assurance
Minnelise Levendal (*Pr.Sci.Nat.)*	CSIR	Project Manager and EAP
Dhiveshni Moodley *(Cand.Sci.Nat.)*	CSIR	Project Officer and GIS specialist
Specialists		
Johann Lanz (*Pr.Sci.Nat.)*	Private	Agriculture and Soils Assessment
Dr Noel van Rooyen *(Pr.Sci.Nat.)*	Ekotrust cc	Terrestrial Biodiversity and Species Impact Assessment
Lorainmari den Boogert (Pr.Sci.Nat.), Antoinette Bootsma Nee van Wyk (Pr.Sci.Nat.), Rudi Bezuidenhoudt (Pr.Sci.Nat.) and André Strydom	Iggdrasil Scientific Services & Limosella Consulting	Aquatic Biodiversity and Species Impact Assessment
Chris van Rooyen and Albert Froneman (*Pr.Sci.Nat.)*	Chris van Rooyen Consulting	Avifauna Impact Assessment

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
Kerry Schwartz	SiVEST SA (Pty) Ltd	Visual Impact Assessment
Dr Jayson Orton	ASHA Consulting (Pty) Ltd	Heritage Impact Assessment (Archaeology and Cultural Landscape)
Professor Marion Bamford	Private	Palaeontology Site Sensitivity Verification Report
Tony Barbour	Tony Barbour Environmental Consulting	Socio-Economic Impact Assessment
Avheani Ramawa and Iris Wink *(Pr Tech Eng)*	JG Afrika (Pty) Ltd	Traffic Impact Assessment
Debbie Mitchell *(Pr Eng)*	Ishecon cc	Battery Storage High Level Safety, Health and Environment Risk Assessment
Sandile Nkosi	WSP GOLDER	Geotechnical Desktop study
Minnelise Levendal (*Pr.Sci.Nat.*) and Rohaida Abed *(Pr.Sci.Nat.)*	CSIR	Civil Aviation Site Sensitivity Verification and, where required, Compliance Statement **(**Note: TBC)
Minnelise Levendal (Pr.Sci.Nat.) and Rohaida Abed (Pr.Sci.Nat.)	CSIR	Defence Site Sensitivity Verification

PROJECT DESCRIPTION

It is important to point out at the outset that the exact specifications of the proposed project components will be determined during the detailed engineering phase (subsequent to the issuing of Environmental Authorisation (EA), should it be granted for the proposed project). **It should also be noted that the project footprint may be refined as part of the detailed specialist studies to be undertaken in the EIA phase. Hence, an updated, refined footprint may be presented in the EIA Report.**

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

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

COMPONENT	DESCRIPTION
Solar Field	
Type of Technology	PV Technology
Generation Capacity (Maximum Installed)	300 MW
Approximate area of the PV Array (i.e., Area occupied by the PV Modules)	Approximately 600 ha
Total developable area that includes all associated infrastructure within the fenced off area of the PV facility	Approximately 650 ha
PV Panel Structure (with the following possible tracking and mounting systems): ▪ Single Axis Tracking structures (aligned north-south); ▪ Fixed Axis Tracking (aligned east-west); ▪ Dual Axis Tracking (aligned east-west and north-south); ▪ Fixed Tilt Mounting Structure; or ▪ Bifacial Solar Modules.	Height: Approximately 3.5 m (maximum)
Building Infrastructure	
Warehouses/Workshops	▪ Footprint: Approximately 1000 m^2 ▪ Height: Up to 10 m
Site Offices and meeting room	▪ Footprint: Approximately 250 m^2 ▪ Height: Up to 10 m
Operational and Maintenance (O&M) Control Centre	▪ Footprint: Approximately 250 m^2 ▪ Height: Up to 10 m This will form part of the construction laydown area
Guard Houses	▪ Number of guard houses: Up to 6 ▪ Footprint of each guard house: Approximately 35 m^2 ▪ Height of each guard house: Up to 6 m
Ablution facilities	▪ Number of ablution facilities: Up to 6 ▪ Footprint of each ablution facility: Approximately 250 m^2 ▪ Height of each ablution facility: Up to 6 m

COMPONENT	DESCRIPTION
Inverter/Transformer Stations	▪ Preliminary total number of stations: 249 ▪ Footprint: Approximately 220 m^2 each ▪ Height: Approximately 3 m each
On-site Substation Complex	▪ Footprint: Approximately 4 ha ▪ Height: Up to 10 m ▪ Capacity: This varies according to the detailed design and requirements from potential clients. A transformation capacity of 200 - 250 MVA is assumed, and generally stepped up from 22 kV or 33 kV to 132 kV for connection to the Eskom grid (or to the Sasol grid via the proposed 150 MW Hydrogen electrolyser). ▪ The on-site Substation will accommodate 1 x 132 kV incoming feeder bay, 1 x 132 kV outgoing feeder bay and a motorised isolator with protection and metering.
Associated Infrastructure	
Battery Energy Storage System (BESS)	▪ Technology: It is proposed that Lithium Battery Technologies, such as Lithium-Ion Phosphate, Lithium Nickel Manganese Cobalt oxides or Vanadium Redox flow technologies will be considered as the preferred battery technology, however, the specific technology will only be determined following Engineering, Procurement and Construction (EPC) procurement. ▪ Footprint: Approximately 5 ha ▪ Height of BESS: Up to 10 m ▪ Capacity of BESS: Up to 300 MW/1200 MWh
On-site medium voltage (22 or 33 kV) internal power lines/underground cables	Depth: Maximum depth of 1.5 m
Underground low voltage cables or cable trays	Depth: Maximum depth of 1.5 m
Access roads (including upgrading and widening of existing roads)	Current width: Approximately 5 m Upgraded width: Approximately 10 m Two site access points are recommended for the site. The access points are proposed off the gravel sections of the D823 and D619 road.
Internal roads	Internal roads to be widened to approximately 10 m, including turning circle/bypass areas of

COMPONENT	DESCRIPTION
	up to 20 m at some sections during the construction phase. As such, the roads and cables will be positioned within a 20 m wide corridor. Existing roads will be upgraded wherever possible, although new roads will be constructed where necessary.
Length of internal access roads	To be determined based on final layout
Fencing around the PV Facility Perimeter	Type: Palisade or mesh or fully electrified Height: 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. A detailed stormwater management plan would need to be developed.
Work area during the construction phase (i.e., laydown area)	Temporary Laydown area: Approximately: 4.5 ha. The need for a permanent laydown area will be confirmed during the EIA Phase.
Water Requirements	▪ Approximately 30 000 m^3 of water is estimated to be required for the construction phase, over an estimated up to a 36-month construction period. ▪ Approximately 5 000 m^3 of water is estimated to be required per annum for the operational phase for a minimum of 20-year operational lifespan. ▪ Water be sourced from the following potential sources: Local municipality, third-party water supplier (e.g., Sasol) or existing or drilled boreholes on site.

NEED FOR AN ENVIRONMENTAL IMPACT ASSESSMENT

As noted above, in terms of the 2014 NEMA EIA Regulations (as amended) published in GN R326, R327, R325 and R324, 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 a facility 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 R327, R325, and R324 which may be triggered by the various project components and thus form part of the Scoping and EIA Process.

The purpose of the EIA is to identify, assess and report on any potential impacts the proposed project, if implemented, may have on the receiving environment. The environmental assessment, therefore, needs to show the CA, the DARDLEA, 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, as far as possible, be enhanced or mitigated and managed as the case may be.

IDENTIFICATION OF ISSUES

The list below indicates the main issues identified thus far during the Scoping Phase and to be addressed during the EIA Process. These issues and impacts have been identified via the environmental status quo of the receiving environment (environmental, social and heritage features present on site) (discussed in Chapter 3 of this Draft Scoping Report), a review of environmental impacts from other similar solar energy projects, and scoping inputs from the specialists that form part of the project team (which are included in Appendix G of this Draft Scoping Report). It is emphasised that this chapter and the Scoping Report in general provide preliminary impacts, sensitivities and impact significance ratings which will be updated and finalised, as relevant, and presented in more detail in the detailed Specialist studies in the EIA phase and in the EIA Report.

SPECIALIST ASSESSMENT / INPUT	KEY ISSUES TO BE ADDRESSED
Agriculture and Soils	**Construction Phase:** ▪ Loss of agricultural potential by occupation of land. ▪ Loss of agricultural potential by soil degradation. **Operational Phase:** ▪ Agricultural potential enhancement through increased financial security for farming operations *(positive impact).* **Decommissioning Phase:** ▪ Agricultural potential loss by soil degradation.

SPECIALIST ASSESSMENT / INPUT	KEY ISSUES TO BE ADDRESSED
Aquatic Biodiversity and Species	**Construction, Operational and Decommissioning Phases:** ▪ Alteration in flow regime. ▪ Changes in sediment regimes. ▪ Introduction and spread of alien vegetation. ▪ Loss and disturbance of riparian/watercourse habitat and vegetation. ▪ Alteration in water quality due to pollution. ▪ Loss of aquatic biota.
Terrestrial Biodiversity and Species	**Construction Phase:** ▪ The clearing of natural vegetation. ▪ The loss of threatened, protected, CITES listed and/or endemic plants/animals. ▪ Loss of faunal habitat. ▪ Direct faunal mortalities due to construction and increased traffic. ▪ Increased dust deposition. ▪ Increased human activity, noise and light levels. ▪ Establishment of alien vegetation. ▪ Increased water run-off and erosion. ▪ Changes in animal behaviour. **Operational Phase:** ▪ Direct faunal mortalities. ▪ Establishment of alien vegetation. ▪ Increased water run-off and erosion. ▪ Changes in animal behaviour. **Decommissioning Phase:** ▪ Establishment of alien vegetation. ▪ Increased water run-off and erosion.
Avifauna Impact Assessment	**Construction Phase:** ▪ Displacement due to disturbance and habitat transformation associated with the construction of the solar PV plants and associated infrastructure. **Operational Phase:** ▪ Displacement due to habitat transformation associated with the presence of the solar panels. ▪ Collisions with the solar panels. ▪ Entrapment in perimeter fences. ▪ Electrocutions in the onsite substations. **Decommissioning Phase:** ▪ Displacement due to disturbance associated with the decommissioning of the solar PV plants and associated infrastructure.
Heritage Impact Assessment (including Archaeology and Cultural Landscape)	**Construction Phase** ▪ Potential impacts on archaeological remains. ▪ Potential impacts on graves. ▪ Potential impacts on the cultural landscape.

SPECIALIST ASSESSMENT / INPUT	KEY ISSUES TO BE ADDRESSED
	Operational Phase ▪ Impacts to the cultural landscape. **Decommissioning Phase** ▪ Impacts to the cultural landscape.
Palaeontology Impact Assessment	**Construction and Decommissioning Phases:** ▪ Damage and/or destruction of scientifically valuable fossils preserved at or beneath the ground due to surface clearance or excavations. **Operational Phase:** Note: No impacts identified for the Operational Phase.
Socio-Economic Assessment	**Construction Phase:** ▪ Creation of employment and business opportunities during the construction phase, and the opportunity for skills development and on-site training. ▪ Potential impacts on family structures and social networks associated with the presence of construction workers. ▪ Potential impacts on family structures, social networks and community services associated with the influx of job seekers. ▪ Potential risk to farmers and farm workers, livestock and damage to farm infrastructure associated with the presence and activities of construction workers on site. ▪ Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires. ▪ Potential noise, dust and safety impacts associated with construction related activities. ▪ Impact on productive farmland. **Operational Phase:** ▪ The establishment of infrastructure to improve energy security and support the renewable sector. ▪ Creation of employment opportunities. ▪ Generation of additional income for affected landowners. ▪ Visual impacts and associated impacts on rural sense of place. ▪ Impact on property values. ▪ Impact on existing and future tourism operations. **Decommissioning Phase:** ▪ Social impacts associated with retrenchment including loss of jobs, and source of income. ▪ Creation of temporary employment opportunities, which would represent a positive temporary impact.
Visual Impact Assessment	**Construction Phase:** ▪ Potential alteration of the visual character and sense of place resulting from construction activities. ▪ Potential visual intrusion resulting from large construction vehicles and equipment. ▪ Potential visual effect of construction laydown areas and material stockpiles. ▪ Potential impacts of increased dust emissions from construction

SPECIALIST ASSESSMENT / INPUT	KEY ISSUES TO BE ADDRESSED
	activities and related traffic. ▪ Potential visual scarring of the landscape as a result of site clearance and earthworks. ▪ Potential visual pollution resulting from littering on the construction site. **Operational Phase:** ▪ Potential alteration of the visual character and sense of place. ▪ Potential visual intrusion resulting from the presence of PV arrays, particularly in more natural undisturbed settings. ▪ Potential visual clutter caused by substation and other associated infrastructure on-site. ▪ Potential impacts of increased dust emissions from maintenance vehicles accessing the site via gravel roads. ▪ Potential visual scarring of the landscape as a result of site clearance and earthworks. ▪ Potential glint and glare impacts on passing motorists and nearby receptors. ▪ Potential visual impact on the night-time visual environment. **Decommissioning Phase:** ▪ Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process. ▪ Potential impacts of increased dust emissions resulting from decommissioning activities and related traffic. ▪ Potential visual scarring of the landscape as a result of decommissioning activities. ▪ Potential visual intrusion of any remaining infrastructure on the site.
Battery Energy Storage Facility	**The following issues are for consideration for the proposed BESS:** ▪ Toxic smoke and fires/explosions and proximity to occupied residences. ▪ Suitable secondary spill containment for the large volume of electrolyte.

PUBLIC PARTICIPATION PROCESS

The Draft Scoping Report is hereby released for a 30-day commenting period which extends from 13 June to 14 July 2022.

The Draft Scoping Report is made available on the following website (https://www.csir.co.za/environmental-impact-assessment). A newspaper advertisement has been placed in the "Ridge Times" in English and Afrikaans to notify Interested and Affected Parties of the release of this Draft Scoping Report for comment (proof of which will be included in the Final Scoping Report).

Hard copies of the Draft Scoping Report were couriered to:

- Mpumalanga DARDLEA;

- Gert Sibande District Municipality;
- Govan Mbeki Local Municipality; and
- Secunda Library where it is available for public viewing.

Notifications will be sent to I&APs via email and via sms (where cellphone numbers are available) to announce the release of the Draft Scoping Report for comment.

Summary of where requirements of Appendix 2 of the 2014 NEMA EIA Regulations (as amended, GN R326) are provided in this Scoping Report

Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended, GN R326)	Chapter / Appendix	YES / NO
Appendix 2 - (1)(a)	Details of - i. the EAP who prepared the report; and ii. the expertise of the EAP, including a curriculum vitae;	**Appendix A and Appendix B**	**Yes**
Appendix 2 - (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**	**Yes**
Appendix 2 - (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 2**	**Yes**
Appendix 2 - (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 4.2**	**Yes**
Appendix 2 - (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 4.1**	**Yes**
Appendix 2 - (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 1.9**	**Yes**

Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended, GN R326)	Chapter / Appendix	YES / NO
Appendix 2 - (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; ii. details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	**i) Chapter 5.1** **ii) Chapter 4.4; Appendix D, Appendix E, Appendix F**	**Yes**
	iii. a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; iv. the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; v. the impacts and risks 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; 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; vii. positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; viii. the possible mitigation measures that could be applied and level of residual risk; ix. the outcome of the site selection matrix; x. if no alternatives, including alternative locations for the activity, were investigated, the motivation for not considering such and xi. a concluding statement indicating the preferred alternatives, including the preferred location of the activity;	**iii) Appendix F More issues by I&APs to be included in the Final Scoping Report** **iv) Chapter 3 and Appendix G Chapter 6 and Appendix F** **v) Chapter 6 and Appendix G** **vi) Chapter 7.5** **vii) Chapter 6 and Appendix G** **viii) Chapter 6.4 and Appendix G** **ix) Chapter 5** **x) Chapter 5** **xi) Chapter 5.3.**	**Yes**

Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended, GN R326)	Chapter / Appendix	YES / NO
Appendix 2 - (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;	**Section 7.1 - 7.8**	**Yes**
	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.	**Section 7.1 - 7.8**	**Yes**
Appendix 2 - (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**	**Yes**
Appendix 2 - (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**	**Yes**
Appendix 2 - (1)(k)	Where applicable, any specific information required by the competent authority.	**N/A**	**X**
Appendix 2 - (1)(l)	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	**N/A**	**X**

Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended, GN R326)	Chapter / Appendix	YES / NO
Appendix 2 – (2)	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 Scoping Report, but various gazetted assessment and reporting protocols have been complied with for the specialist studies. Refer to Chapter 4 of this Scoping Report.**	**Yes**

DRAFT SCOPING REPORT

Draft Scoping Report for the proposed development of the Vhuvhili Solar Photovoltaic (PV) Facility near Secunda in the Mpumalanga Province.

PART A: MAIN REPORT

ENERTRAG

CSIR
Touching lives through innovation

DRAFT SCOPING REPORT

Draft Scoping Report for the proposed development of the Vhuvhili Solar Photovoltaic (PV) Facility near Secunda in the Mpumalanga Province.

CHAPTER 1:

Introduction

ENERTRAG

CSIR
Touching lives through innovation

CONTENTS

TABLES

FIGURES

1 INTRODUCTION

1.1. Project Overview

The Project Applicant, Vhuvhili Solar RF (Pty) Ltd (hereafter referred to as the "Project Applicant"), is proposing to design, construct and operate the Vhuvhili Solar Photovoltaic (PV) Energy Facility and associated infrastructure approximately 7 km south-east of the town of Secunda in the Mpumalanga Province. The proposed Vhuvhili Solar Energy Facility (SEF) will have a capacity of up to 300 MW. The locality and current footpring of the proposed project is depicted in Figure 1-1. It should also be noted that the project footprint may be refined as part of the detailed specialist studies to be undertaken in the EIA phase. Hence, an updated, refined footprint may be presented in the EIA Report. The proposed project is situated in the Govan Mbeki Local Municipality and the Gert Sibande District Municipality, in the Mpumalanga Province (Figure 1-2).

The associated infrastructure includes a Battery Energy Storage System (BESS) and various structures, buildings and electrical grid infrastructure (EGI) such as, but not limited to an on-site 33/132 kV Substation (SS). Two site alternatives for the on-site SS and BESS (known as the SS and BESS complex) (i.e., the Preferred and Alternative SS and BESS complex) have been identified by the Project Applicant (Figure 1-1). A construction laydown area was also identified and includes the Operation and Maintenance (O&M) buildings. A detailed project description is provided in Chapter 2 of this Draft Scoping Report (DSR).

Appendix 2 of the 2014 NEMA EIA Regulations (as amended) states that a Scoping 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 Scoping Report must include a plan which locates the proposed activity or activities applied for at an appropriate scale.

Table 1-1: The farm portions to be affected by the proposed Vhuvhili SEF project

Farm name	Farm No.	Farm Portion	SG code
GROOTVLEI	584	RE	T0IS000000000058400000
GROOTVLEI	293	23	T0IS000000000029300023
GROOTVLEI	293	18	T0IS000000000029300018
GROOTVLEI	293	20	T0IS000000000029300020
GROOTVLEI	293	21	T0IS000000000029300021
POVERTY ACRES	585	RE	T0IS000000000058500000
VLAKSPRUIT	292	22	T0IS000000000029200022
VLAKSPRUIT	292	21	T0IS000000000029200021

In line with the above, refer to Figure 1-1 for a locality map of the proposed Vhuvhili SEF and associated infrastructure. Refer to Appendix C of this DSR for additional maps. The proposed Vhuvhili SEF project will be developed on the farm portions as indicated in Table 1-1 which also 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 PV project (i.e., 20 years).The Project Applicant is also proposing to develop a 132 kV power line, a 33/132 kV Step-down SS and a Collector SS (if required) to feed the electricity generated by the proposed Vhuvhili SEF into the Sasol grid at (Figure 1-3). It is important to note that these EGI components will be assessed as part of a separate application and a Basic Assessment (BA) process to be undertaken by the Project Applicant.

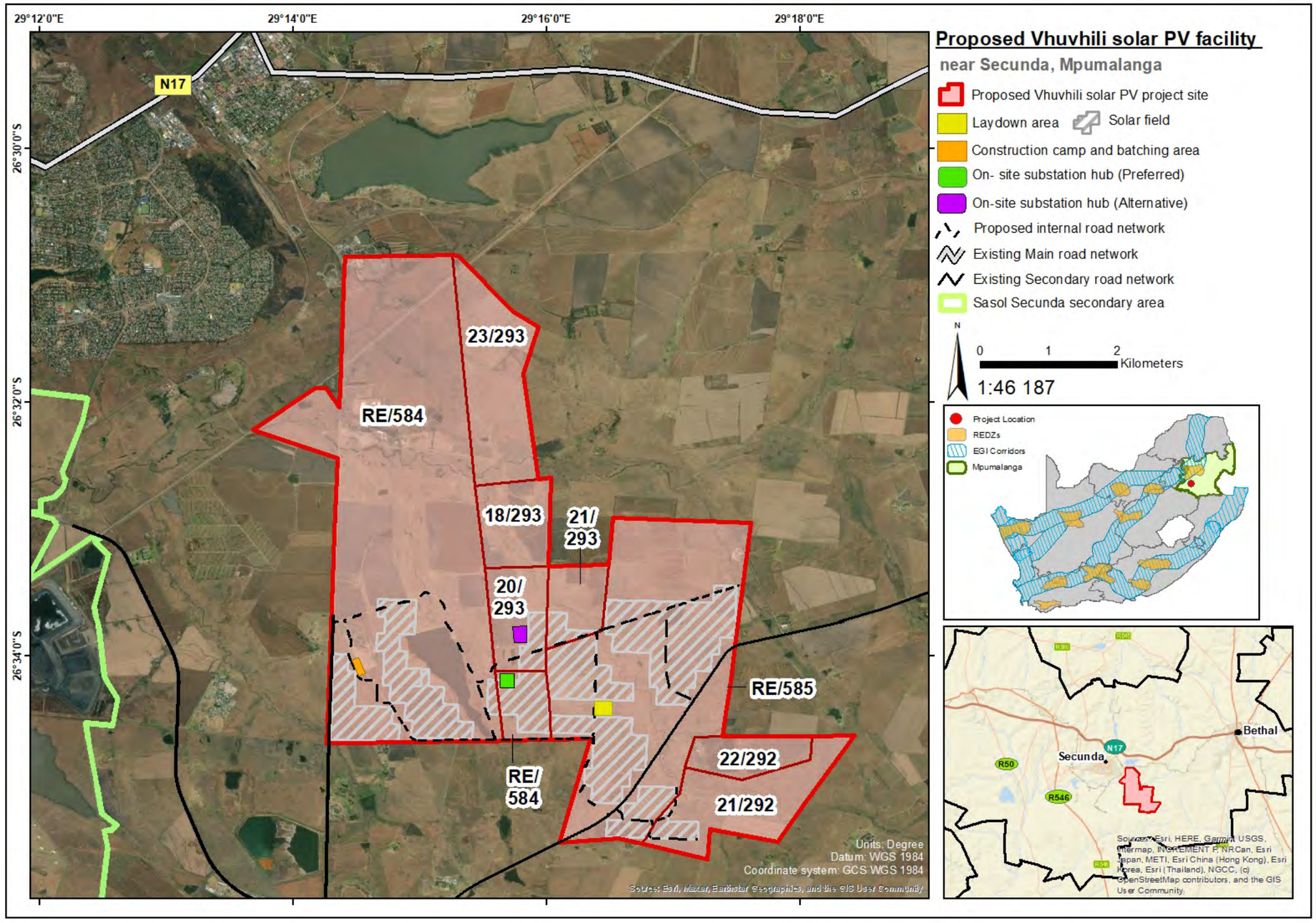


Figure 1-1: Locality map for the proposed Vhuvhili Solar PV Facility near Secunda in the Mpumalanga Province.

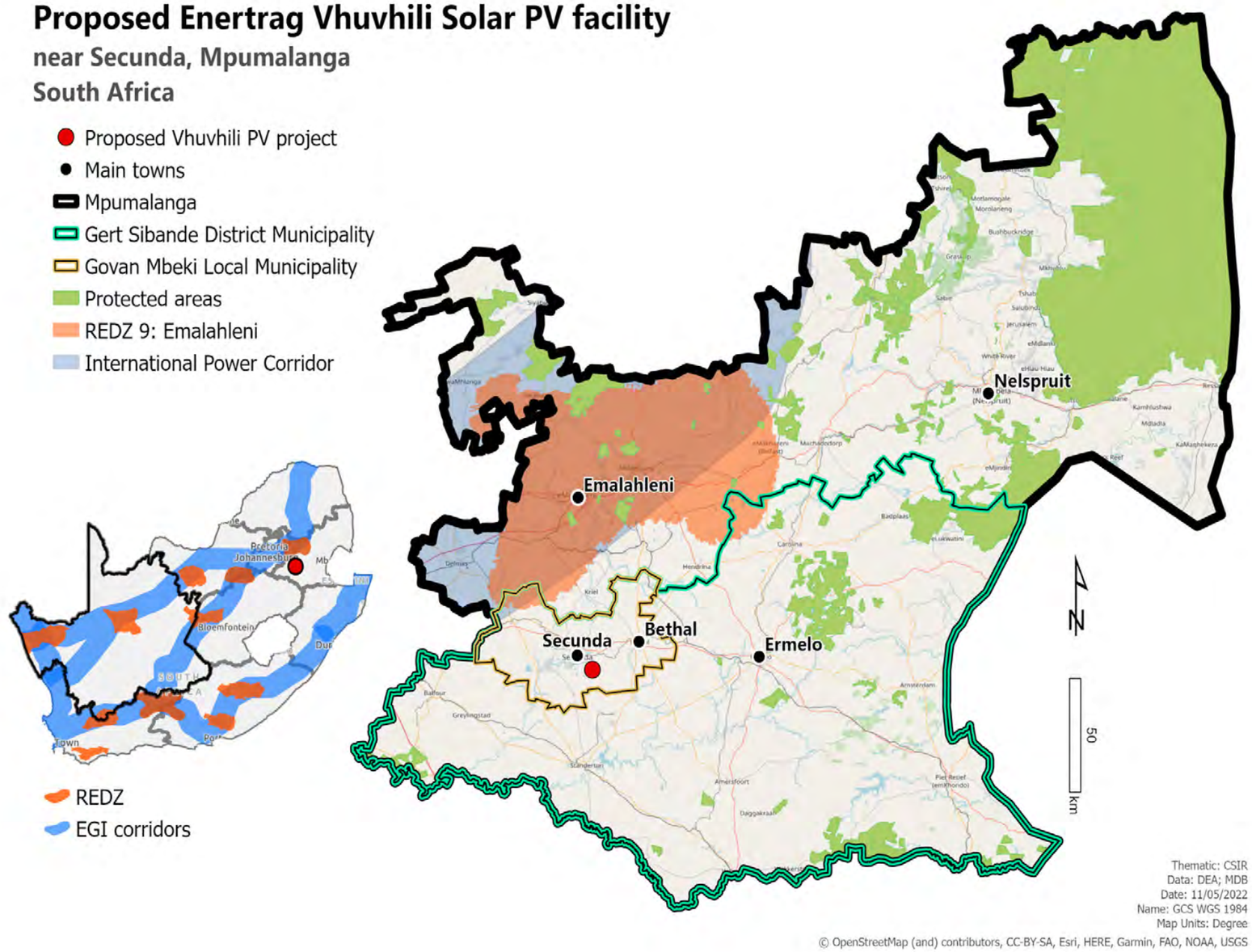


Figure 1-2: Regional context map for the proposed Vhuvhili SEF situated near Secunda in the Mpumalanga Province

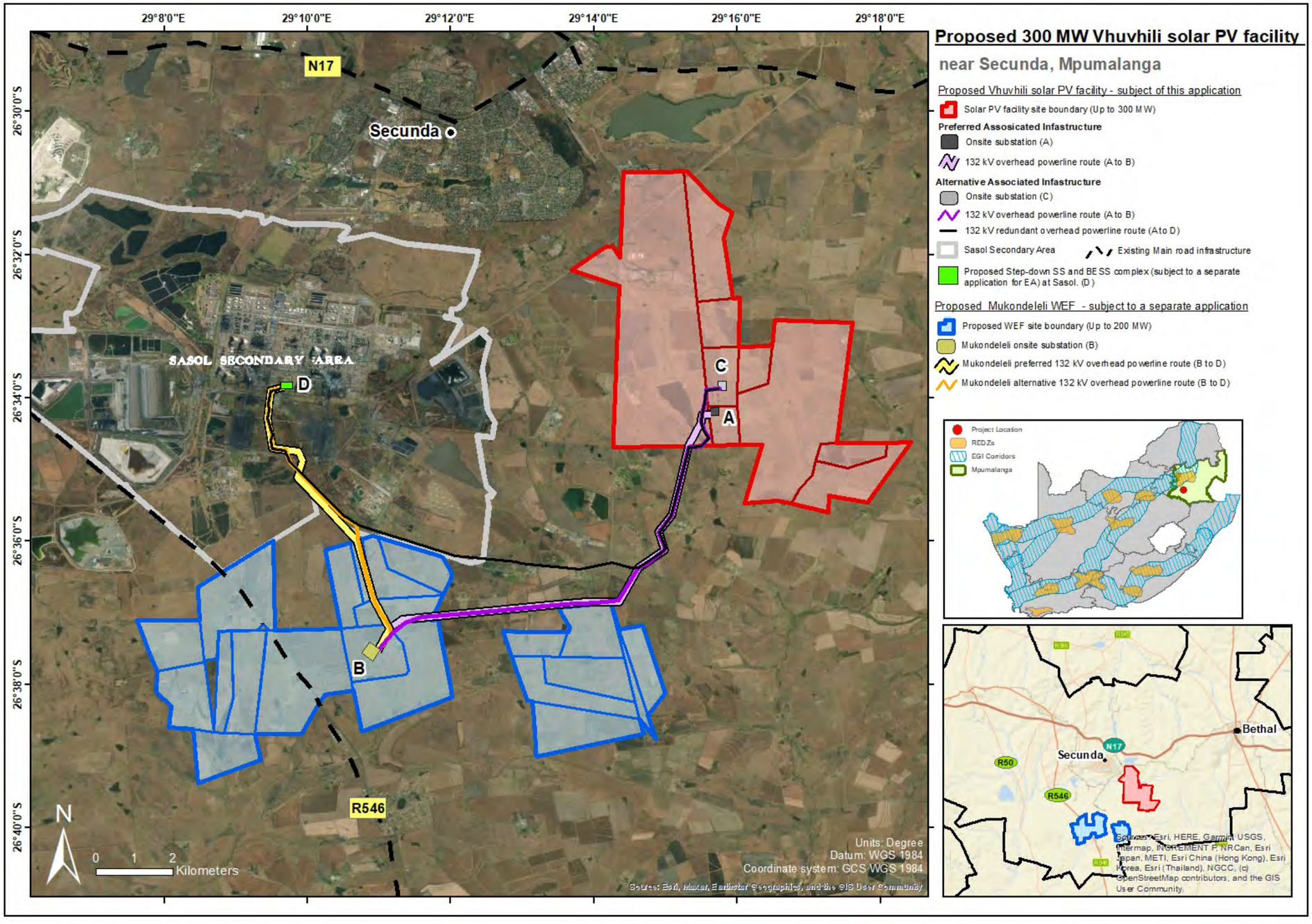


Figure 1-3: Proposed Power Line and Electrical Grid Infrastructure associated with the proposed Vhuvhili Solar PV Facility (subject to a separate Environmental Assessment application).

1.2. Project Coordinates

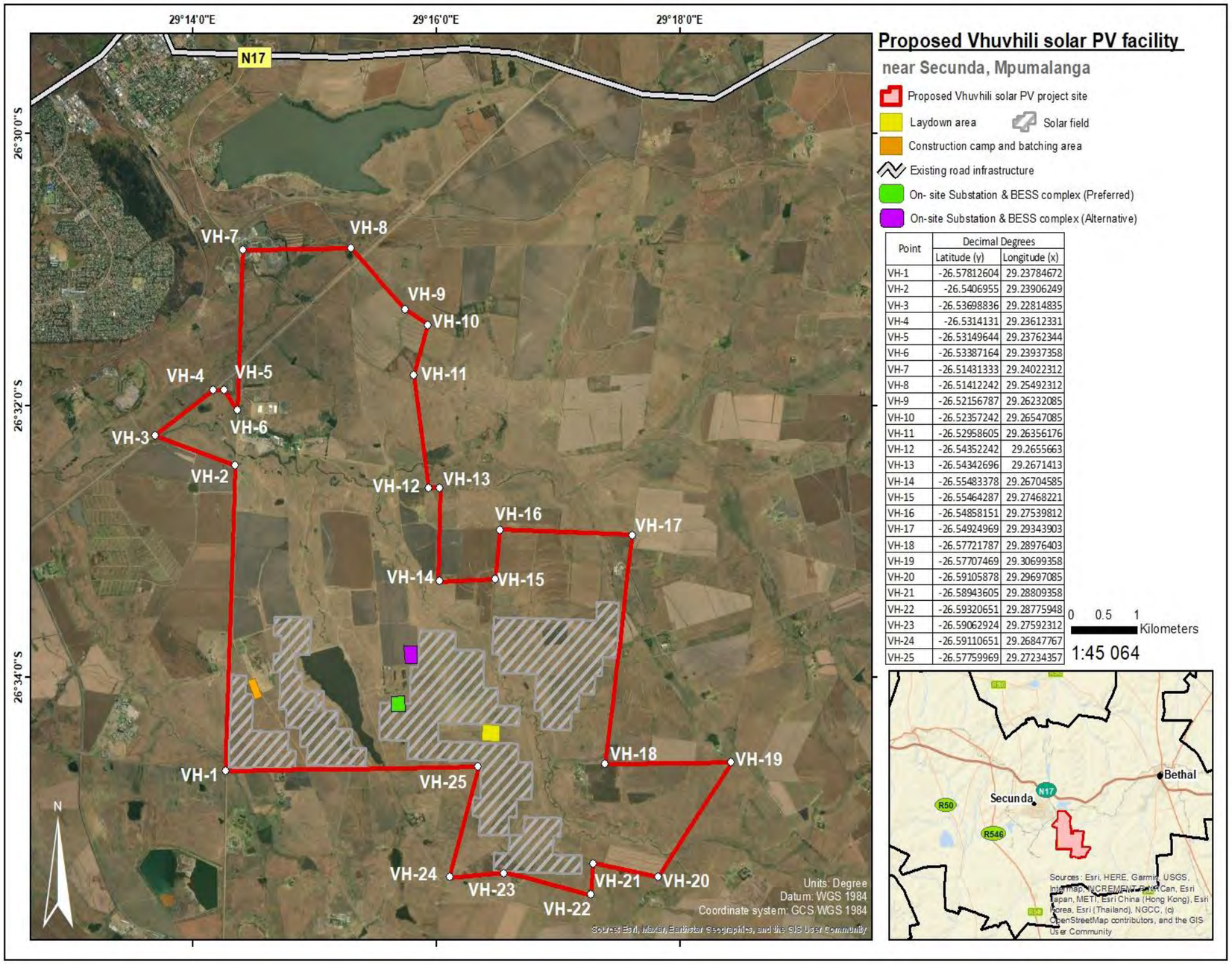
The approximate co-ordinates of the boundary points of the project site for the proposed Vhuvhili SEF project are included in Table 1-2a. A map corresponding to the co-ordinate points are indicated in Figure 1-4. Coordinates of the mid-point of the development area as well as the mid-point of the preferred on-site SS and BESS complex are also included in Table 1-2b.

Table 1-2a. Co-ordinate Points along the boundary of the proposed Vhuvhili SEF project

Point	Decimal Degrees		Degrees, Minutes, Seconds	
	Latitude (Y)	Longitude (X)	Latitude (Y)	Longitude (X)
VH-1	-26.57812604	29.23784672	26° 34' 41.25"	29° 14' 16.25"
VH-2	-26.5406955	29.23906249	26° 32' 26.50"	29° 14' 20.62"
VH-3	-26.53698836	29.22814835	26° 32' 13.16"	29° 13' 41.33"
VH-4	-26.5314131	29.23612331	26° 31' 53.09"	29° 14' 10.04"
VH-5	-26.53149644	29.23762344	26° 31' 53.39"	29° 14' 15.44"
VH-6	-26.53387164	29.23937358	26° 32' 1.94"	29° 14' 21.74"
VH-7	-26.51431333	29.24022312	26° 30' 51.53"	29° 14' 24.80"
VH-8	-26.51412242	29.25492312	26° 30' 50.84"	29° 15' 17.72"
VH-9	-26.52156787	29.26232085	26° 31' 17.64"	29° 15' 44.36"
VH-10	-26.52357242	29.26547085	26° 31' 24.86"	29° 15' 55.70"
VH-11	-26.52958605	29.26356176	26° 31' 46.51"	29° 15' 48.82"
VH-12	-26.54352242	29.2655663	26° 32' 36.68"	29° 15' 56.04"
VH-13	-26.54342696	29.2671413	26° 32' 36.34"	29° 16' 1.71"
VH-14	-26.55483378	29.26704585	26° 33' 17.40"	29° 16' 1.37"
VH-15	-26.55464287	29.27468221	26° 33' 16.71"	29° 16' 28.86"
VH-16	-26.54858151	29.27539812	26° 32' 54.89"	29° 16' 31.43"
VH-17	-26.54924969	29.29343903	26° 32' 57.30"	29° 17' 36.38"
VH-18	-26.57721787	29.28976403	26° 34' 37.98"	29° 17' 23.15"
VH-19	-26.57707469	29.30699358	26° 34' 37.47"	29° 18' 25.18"
VH-20	-26.59105878	29.29697085	26° 35' 27.81"	29° 17' 49.10"
VH-21	-26.58943605	29.28809358	26° 35' 21.97"	29° 17' 17.14"
VH-22	-26.59320651	29.28775948	26° 35' 35.54"	29° 17' 15.93"
VH-23	-26.59062924	29.27592312	26° 35' 26.27"	29° 16' 33.32"
VH-24	-26.59110651	29.26847767	26° 35' 27.99"	29° 16' 6.52"
VH-25	-26.57759969	29.27234357	26° 34' 39.36"	29° 16' 20.44"

Table 1.2b. Co-ordinate Points of the mid-point of the proposed Vhuvhili SEF study area and mid-point of the preferred on-site Substation and Battery Energy Storage System complex area (preferred option)

Point	Decimal Degrees		Degrees, Minutes, Seconds	
	Latitude (Y)	Longitude (X)	Latitude (S)	Longitude (E)
Mid-point of project area	-26.555314	29.265552	26° 33' 19.1304"	29° 15' 55.9872"
Mid-point of preferred on-site SS and BESS complex (Option 1)	-26.569868	29.26139	26° 34' 11.5248"	29° 15' 41.004"



Point	Decimal Degrees	
	Latitude (y)	Longitude (x)
VH-1	-26.57812604	29.23784672
VH-2	-26.5406955	29.23906249
VH-3	-26.53698836	29.22814835
VH-4	-26.5314131	29.23612331
VH-5	-26.53149644	29.23762344
VH-6	-26.53387164	29.23937358
VH-7	-26.51431333	29.24022312
VH-8	-26.51412242	29.25492312
VH-9	-26.52156787	29.26232085
VH-10	-26.52357242	29.26547085
VH-11	-26.52958605	29.26356176
VH-12	-26.54352242	29.2655663
VH-13	-26.54342696	29.2671413
VH-14	-26.55483378	29.26704585
VH-15	-26.55464287	29.27468221
VH-16	-26.54858151	29.27539812
VH-17	-26.54924969	29.29343903
VH-18	-26.57721787	29.28976403
VH-19	-26.57707469	29.30699358
VH-20	-26.59105878	29.29697085
VH-21	-26.58943605	29.28809358
VH-22	-26.59320651	29.28775948
VH-23	-26.59062924	29.27592312
VH-24	-26.59110651	29.26847767
VH-25	-26.57759969	29.27234357

Figure 1-4: Vhuvhili SEF Boundary Co-ordinate Point Map

1.3. Project Scenarios

The Project Developer, ENERTRAG South Africa (Pty) Ltd (hereafter referred to as the "ENERTRAG"), is currently investigating two scenarios for the uptake of energy from the proposed Vhuvili SEF:

Scenario 1:

The proposed Vhuvhili SEF is planned to provide renewable energy to Sasol for the production of green hydrogen and green aviation fuel. This is viewed as the main proposed outcome of the proposed project, via an agreement between several consortium parties including ENERTRAG and Sasol.

Scenario 2:

However, should the above agreement not materialise under Scenario 1, and a private off-taker of the renewable energy cannot be obtained, the proposed Vhuvhili SEF will be bid into the future rounds of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) or similar bidding processes. It is understood that the Environmental Authorisation (EA) received for the proposed Vhuvhili SEF (should it be granted) would be suitable for both scenarios. Furthermore, the scenario of providing the proposed renewable energy to Sasol via a private off-taker agreement and the scenario of bidding the project into the REIPPPP would have no bearing on the assessment of potential environmental impacts of the proposed project by the Environmental Assessment Practitioner (EAP).

Therefore, both scenarios have been documented in the Scoping Report, i.e., Scenario 1 of having a private off-taker (i.e., Sasol) and Scenario 2 of bidding the project into the REIPPPP or another suitable tender process.

1.4. Project Motivation

1.4.1. The need for renewable energy in South Africa

The need for renewable energy is becoming increasingly apparent, in both local and international context, with South Africa becoming an integral part of the global transition towards renewable sources of electricity generation. The urgency behind this evolution can be appreciated considering that South Africa is one of the largest emitters of greenhouse gases in Africa[1], and is also estimated to rank amongst the top 20 largest emitters of greenhouse gases 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. South Africa is therefore one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer of carbon emissions. The South African government is therefore 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

[1] https://ourworldindata.org/co2/country/south-africa?country=ZAF~NGA~KEN~ZWE~IRN~LBY~GIN~LBR~MWI~TGO~BWA~BFA~BDI~CMR~SDN#citation

footprint from power generation (including externality costs), and thereby to steer the country on a pathway towards sustainability.

South Africa is facing the challenge of securing clean, affordable and sustainable energy to power its economy and to contribute to the transition to a climate-neutral society. A clean energy future is seen as a critical enabler of inclusive and transformational economic growth and development. This challenge is addressed in the National Energy Act of 2008 which aims to ensure that diverse energy resources are available in affordable quantities to the South African economy to support economic growth and poverty alleviation whilst accounting for surrounding environments and economic sectors[2].

Commitment toward decarbonisation of the economy is clearly illustrated in the South Africa's National Development Plan (NDP) Vision 2030 published in 2012. Chapter 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[3]. 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.

Further, the Minister of the Department of Forestry, Fisheries, and the Environment (DFFE), Ms Barbara Creecy announced the approval of the revised National Determined Contribution (NDC), the Climate Bill and South Africa's negotiating position for COP26 during a Media Release on 22 September 2021. The NDC describes South Africa's contribution to global efforts to reduce GHG emissions and mitigate climate change. The revised NDC includes the updated mitigation target range of 350-420 Mt CO_2-eq (previously 398-614 Mt CO^2-eq) in line with targets set out in the Paris Agreement. The updated NDC also states that emissions are due to decline from 2025 (previously 2035)[4].

The transition from an intense carbon-based energy system with substantial dependence on coal to a sustainable, clean and affordable energy system based on renewable resources is therefore a priority for South Africa as it pursues both economic prosperity and its international climate commitments.

The proposed Vhuvhili solar PV project will also have international significance as it will contribute 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.

[2] Strambo, Claudia, Jesse Burton, and Aaron Atteridge.2019, The End of Coal? Planning a 'Just Transition' in South Africa. Stockholm Environment Institute.
[3] Roos, T and Wright, J., 2021, Powerfuels and Green Hydrogen (public version). European Union.
[4] Department of Forestry, Fisheries and the Environment (DFFE), South African delegation meets climate envoys ahead of CoP26, Media release, [Online]. Available https://www.environment.gov.za/mediarelease/cop26climateenvoysmeeting. [Accessed 30 September 2021]

Green hydrogen has also been identified as a low-carbon solution to meet Greenhouse Gas (GHG) emission reduction targets and to power industries in which emissions have previously been difficult to abate[5]. Hydrogen is also used in various industrial processes, such as ammonia production, and thus has the potential to contribute to decarbonising a variety of industries.

In October 2021, at the second Sustainable Infrastructure Development Symposium, President Cyril Ramaphosa stated that green energy had the potential to drive industrialisation and establish a whole new industrial reality. Furthermore, the President stated that "We stand ready to be a major exporter in this market, to use hydrogen to rapidly decarbonise our existing industries, and attract industrial investment from across the globe seeking to meet new standards of green power in the production process".

The proposed development of the Vhuvhili SEF directly addresses the President's statements and the need to implement renewable energy technologies and green fuels and/or products in Mpumalanga.

1.4.2. The Green Hydrogen Economy

Hydrogen is widely referred to as an energy vector as it is an "energy-rich substance that facilitates the translocation and/or storage of energy [...] with the intention of using it at a distance in time and/or space from the primary production site"[6]. Green hydrogen is obtained through the electrolysis of water into hydrogen and oxygen molecules, using electricity obtained from renewable sources.

Positive energy trends moving towards decarbonisation goals in the energy sector have been noted since 2014. This trend is strongly attributed to the implementation of national policies and subsidies supporting renewables which resulted in the reduced cost of renewable energy and a consequent rapid roll out of renewable energy facilities between 2014 and 2019. The trend of the decreasing cost and consequent increased accessibility of renewable electricity opens opportunities for feasible production of green hydrogen[7]. Therefore, countries such as South Africa which are rich in renewable energy resources are at a competitive advantage lead in the global export of green hydrogen[8].

In addition, South Africa's land availability, and decreasing cost of renewable energy projects provides an opportunity "position itself as a country that can produce renewable hydrogen at scale and at competitive prices, triggering an export market from which economic growth and energy independence can be derived"[9].

[5] DSI (Department of Science and Innovation). 2021. Hydrogen Society Roadmap for South Africa 2021: Securing A Clean , Affordable And Sustainable Energy. [https://www.dst.gov.za /index.php/resource-center/strategies-and-reports/3574-hydrogen-society-roadmap-for-south-africa-2021]

[6] Abdin, Z., Zafaranloo, A., Rafiee, A., Mérida, W., Lipiński, W. and Khalilpour, K.R, "Hydrogen as an energy vector". Renewable and sustainable energy reviews, 120, p.109620, 2020

[7] Roos, T and Wright, J., 2021, Powerfuels and Green Hydrogen (public version). European Union

[8] Bischof-Niemz, T. "Liquid fuels from wind: Turning South Africa into the Saudi Arabia of the sustainable energy era," in Workshop: The Potential for Powerfuels, 9 December, Johannesburg, 2019.

[9] DSI (Department of Science and Innovation). 2021. Hydrogen Society Roadmap for South Africa 2021: Securing A Clean, Affordable And Sustainable Energy. Pp 15. Available at: https://www.dst.gov.za /index.php/resource-center/strategies-and-reports/3574-hydrogen-society-roadmap-for-south-africa-2021

1.4.3. South Africa's experience with Fischer-Tropsch Technology

In addition to the rich endowment of natural resources for renewable energy, coupled with South Africa's experience with Fischer-Tropsch (FT) technologies, positively positions the country as a strong contender to cost-effectively produce green hydrogen. Priscillah Mabelane, Executive Vice President for Energy at Sasol, expressed in a statement that Sasol believes "that Southern Africa is well positioned to play in the global green hydrogen economy due to key structural advantages. Our proprietary Fischer-Tropsch (FT) technologies and renewable endowments, are some of the best in the world,". She added that Sasol has committed to be net zero by 2050 and sees green hydrogen as core to enabling this goal."

The current FT process involves the conversion of coal into hydrocarbons via gasification in a Lurgi gasifier. Cooled oxygenated hydrocarbons are thereafter converted into a wide range of liquid fuels and chemicals[10]. The FT facilities at Secunda (Sasol Two and Sasol Three) account for 80% of Sasol's global GHG emissions. Sasol has emphasised its commitment to transition towards a less carbon intensive process and reducing GHG emissions via the use of through efficiency and cleaner energy sources. Incorporating green hydrogen into the FT process can significantly assist in lowering GHG emissions and meeting climate targets. Further, it is noted that the use of green hydrogen and green carbon (i.e., carbon captured from existing fuel gas or the air) in the production of Powerfuels will greatly assist Sasol and South Africa in meeting climate targets whilst ensuring a Just Energy Transition. The incorporation of green hydrogen in the FT process would also contribute to the beneficiation of South African Platinum reserves as platinum is a key component for electrolyser technology, required to produce green hydrogen.

Several global future markets have emerged for low-carbon Powerfuels. These markets provide numerous opportunities for South African businesses and international businesses located in South Africa[11], and thus have the potential to contribute to decarbonising a variety of industries. The aviation industry in particular is considered globally as one of the most challenging sectors to decarbonise. The production of Sustainable Aviation Fuels (SAFs) using green hydrogen and green carbon is considered key in reducing GHG emissions in the industry[12]. South Africa's rich endowment in renewable resources and experience with the FT process presents a key strategic advantage to address the decarbonisation of the aviation sector.

In 2021 Sasol partnered with Linde PLC, ENERTRAG AG and Navitas Holdings (Pty) Ltd to form the LEN Consortium whose main aim is to explore the feasibility of SAF production at the Secunda Synfuels plant in Mpumalanga, in order to produce to bid SAF under Germany's H2Global platform[13]. A successful bid would significantly improve South Africa's capacity to become a major role player in the global hydrogen economy, as well as improve the country's domestic green hydrogen production capacity[14]. Apart from

[10] De Klerk, A., 2008, Fischer-Tropsch Refining. Philosophiae Doctor Thesis, University of Pretoria.
[11] Roos, T and Wright, J., 2021, Powerfuels and Green Hydrogen (public version). European Union
[12] Ed Reed, 'Sasol signs up green hydrogen study in northwest', Energy Voice, 6 October 2021. energyvoice.com/renewables-energy-transition/hydrogen/ africa-hydrogen/354588/sasol-study-hydrogen-boegoebaai/; See the Just Transition Centre, ituc-csi.org/just-transition-centre.
[13] https://www.sasol.com/media-centre/media-releases/sasol-explore-potential-cleaner-aviation-fuels-world-class-partners
[14] Ed Reed, 'Sasol signs up green hydrogen study in northwest', Energy Voice, 6 October 2021. energyvoice.com/renewables-energy-transition/hydrogen/

increased energy security, it is also expected that the benefits of SAF production will promote socio-economic development through job creation in areas where biomass is farmed for feedstock[15]. This will contribute towards a just energy transition through the re-skilling of communities to take up opportunities in new and emerging energy areas[16].

The capacity of the SAF production project at the Secunda Synfuels plant is expected to comprise of up to 500 MW of renewable energy (i.e., using wind and solar technology) and a 150 MW hydrogen electrolyser to produce approximately 60,000 t/a of SAF (Figure 1-5). Should the proposed Vhuvhili SEF be acceptable and authorised, the facility will form one of two RE facilities which will feed into the hydrogen electrolyser at the Secunda Synfuels plant, contributing 300 MW of the required 500 MW.

The proposed Vhuvhili SEF will therefore form an integral component of the SAF production chain. Additionally, the proposed Vhuvhili SEF is intended to address the current energy shortages in South Africa and would contribute towards meeting the national energy target as set by the Department of Mineral Resources and Energy (DMRE) and will assist the South African government in achieving its proposed renewable energy targets.

africa-hydrogen/354588/sasol-study-hydrogen-boegoebaai/; See the Just Transition Centre, ituc-csi.org/just-transition-centre.

[15] Sasol to explore potential of cleaner aviation fuels with world class partners', Sasol, April 2021. sasol.com/media-centre/media-releases/sasol-explorepotential-cleaner-aviation-fuels-world-class-partners

[16] Sasol to explore potential of cleaner aviation fuels with world class partners', Sasol, April 2021. sasol.com/media-centre/media-releases/sasol-explorepotential-cleaner-aviation-fuels-world-class-partners.

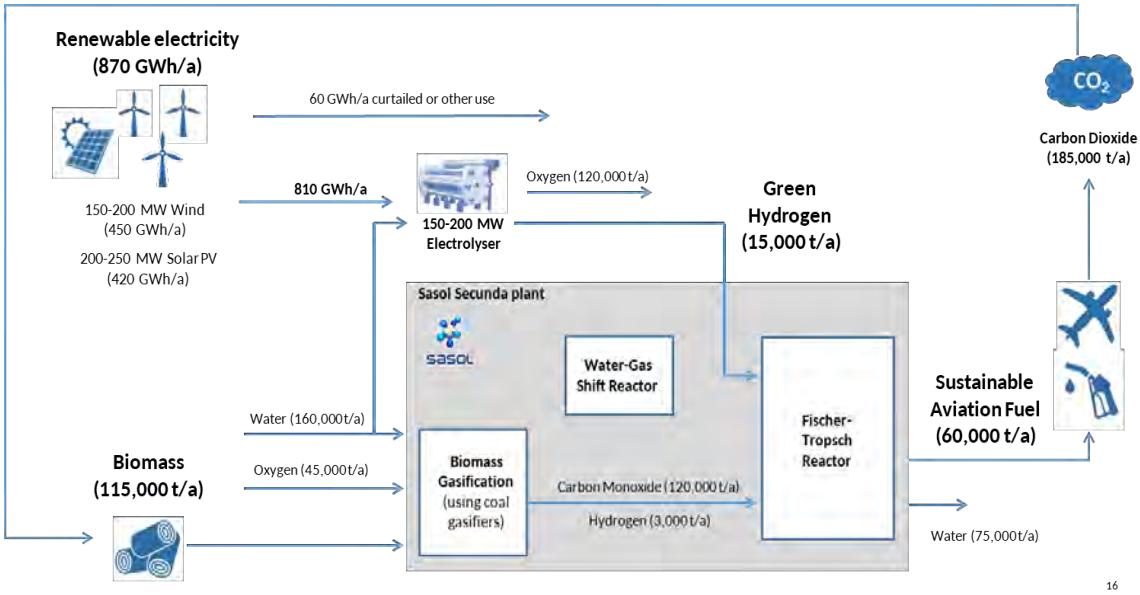


Figure 1-5: The SAF production process and estimated outputs proposed at the Sasol Secunda Synfuels plant in Mpumalanga for bidding into the German H2Global platform (Source[17])

1.4.4. An overview South Africa's Renewable Energy Independent Power Producer Programme (REIPPPP)

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 a draft of 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 DMRE) launched the 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 between 2021 to 2025, as published in Government Gazette 39111. Of this, the additional target allocated for solar energy is 2 200 MW.

The most recent update to the IRP, the IRP 2019, was gazetted by the Minister of the DMRE, Mr. Gwede Mantashe, in October 2019. The update revised the energy forecast for South Africa from the current period to the year 2030. Provision has been made for new additional capacity by 2030 including in particular 14 400 MW of wind, 6 000 MW of solar PV and 2 088 MW for storage. In terms of the REIPPPP, submitted proposals are then evaluated according to a Request for Proposal (RfP). Bidding Window 5 has

[17] [https://www.google.com/url?q=https://www.sasol.com/media-centre/media-releases/sasol-explore-potential-cleaner-aviation-fuels-world-class-partners&sa=D&source=docs&ust=1654098677107519&usg=AOvVaw14ZpqFoAK9s9LhCrIILINk

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. The overview summary document (DMRE, 2022[18]) 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.

Should the proposed Vhuvhili SEF not provide energy to Sasol, it is intended that the project will be bid into a future REIPPPP bidding rounds or other suitable tender processes. As announced by President Cyril Ramaphosa in the State of the Nation Address delivered on 11 February 2021, 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. Furthermore, Bidding Window 6 was announced in April 2022. This aims to procure up to 2 600 MW of additional renewable capacity to diversify the country's energy mix and ensure energy security. The proposal submission date is 11th August 2022.

The IRP 2019 forecasts that by 2030 coal will form a significant, but decreasing portion of the electrical energy mix (~55%). The IRP 2019 also provides for a significant allocation of capacity to new-build solar and wind renewable facilities[16]. The various iterations of the IRP all aim to establish long-term planning scenarios relative to a least-cost base plan to meet electricity demand requirements whilst considering government policy objectives for a diverse generation mix and therefore provides a detailed indication of South Africa's level of commitment to increasing the country's renewable energy capacity.

The success of the REIPPPP, the decrease in the cost of renewable energy projects along with the significant planned allocated capacity of new build renewable facilities, highlights the rapid growth of renewable energy capacity of South Africa and its future potential as a result of abundant renewable resources[19] [20].

Additionally, the proposed project is intended to address the current energy shortages in South Africa and would contribute towards meeting the national energy target as set by the DMRE and assist the government in achieving its proposed renewable energy targets if it is bid in a REIPPPP or similar bidding process.
Should the proposed Vhuvhili SEF be acceptable and authorised, it is considered viable that long-term benefits for the community and society in the Sasol/Secunda area would be realised. The proposed project

[18] 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]
[19] Roos, T and Wright, J., 2021, Powerfuels and Green Hydrogen (public version). European Union
[20] Bischof-Niemz, T. "Liquid fuels from wind: Turning South Africa into the Saudi Arabia of the sustainable energy era," in Workshop: The Potential for Powerfuels, 9 December, Johannesburg, 2019

will provide an opportunity for additional employment in an area where job creation is identified as a key priority. During the construction phase there will be approximately 300 employment opportunities over a period of 24 months. This will comprise of 20% skilled, 30% medium skilled (Patterson B and above) and 50% low positions. The operational phase will have fewer employment opportunities, i.e., approximately 60, but these positions will be long-term. The proposed Vhuvhili SEF project will make use of local labour as much as possible during the construction and operational phases of the proposed project.

In order 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.

1.5. 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 Government Notice (GN) R982, R983, R984 and R985 in Government Gazette 38282, dated 4 December 2014, which came into effect on 8 December 2014. These were amended in April 2017, specifically promulgated in GN R326, R327, R325 and R324 in Government Gazette 40772, dated 7 April 2017. GN R327 and GN R324 include 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. It must be noted that the 2014 NEMA EIA Regulations were further amended in Government Gazette 44701, GN 517 on 11 June 2021. Additional detail is provided in Chapter 4 of this DSR.

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

The proposed Vhuvhili SEF is not located within any of the Renewable Energy Development Zones (REDZs) gazetted in Gazette 41445, GN R114 on 16 February 2018; and Gazette 44191, GN R144 on 26 February 2021. It is also not located within any of the strategic power corridors gazetted in Gazette 41445, GN R113 on 16 February 2018; and Gazette 44504, GN R383 on 29 April 2021. Therefore, a full Scoping and EIA Process is being undertaken for the proposed Vhuvhili SEF with a 107-day decision-making timeframe, as opposed to a BA Process and 57-day decision-making time frame allowed for in the REDZs and strategic power corridors.

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 facility 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".

As noted above, the proposed Vhuvhili SEF requires EA from the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) as the Competent Authority (CA), acting in consultation with other spheres of government.

Chapter 4 of this DSR contains the detailed list of activities contained in R327, R325 and R324, which may be triggered by the various project components and thus form part of the 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 constructed and implemented, may have on the receiving environment. The environmental assessment therefore, needs to show the CA, what the biophysical and socio-economic impacts will be of the proposed SEF. It also needs to show the CA how such impacts can be avoided, remedied, mitigated or managed, and how positive impacts can be enhanced.

1.6. Project Developer

ENERTRAG South Africa (Pty) Ltd ("ENERTRAG") is a subsidiary of the German-based ENERTRAG AG, a hydrogen and renewable energy developer founded in 1992. ENERTRAG AG has an established track-record of renewable energy projects around the world, comprising over 100 wind turbines with an installed capacity of over 760 MW, and over 500 employees. Current projects are in Germany, United Kingdom, France, Poland, Bulgaria and Belarus.

ENERTRAG AG has established itself as a Green Hydrogen Developer globally. It developed its first green hydrogen facility, Hybridkraftwerk, in Germany which is powered by wind energy. The Hybridkraftwerk was commissioned in October 2011 and produces 94 tons of hydrogen per year (Figure 1-6).

ENERTRAG South Africa (Pty) Ltd (hereafter referred to as ENERTRAG) was established in 2017, with the intention to investigate and develop clean energy projects in South Africa. ENERTRAG currently owns the Darling Wind Farm in the Western Cape and has numerous wind measurement campaigns throughout South Africa, the first IPP to commence with a wind measurement campaign in Mpumalanga. During the time of the installation of this initial wind mast, mainstream belief was that there were insufficient wind resources in Mpumalanga for a Wind Energy Facility to be viable. Data from the wind measurement mast located near Hendrina has shown that the wind resource is viable for wind farm development in the region. Other IPPs are now following suit and securing land for Renewable Energy Facilities (REFs) throughout Mpumalanga.

ENERTRAG's goal is to be a market leader in making the Just Energy Transition a reality for South Africa. It is within this context that the Developer proposes the development of the Camden and Hendrina Renewable Energy Complexes in the Mpumalanga province. These include the development of WEF and SEF projects as well as the associated development of the Camden and Hendrina Green Hydrogen and Ammonia Facilities, including grid infrastructure.

These projects are subject to separate applications to the relevant CAs.

ENERTRAG is therefore paving the way towards a Just Energy Transition in the Mpumalanga Province.

Figure 1-6: ENERTRAG Germany's Hybridkraftwerk

Although the Project Developer will be ENERTRAG, the Project Applicant seeking EA for the proposed Vhuvhili SEF is Vhuvhili Solar RF (Pty) Ltd.

1.7. EIA Project Team

In accordance with Regulation 12 (1) of the NEMA EIA Regulations, 2014, as amended, the Applicant has appointed the Council for Scientific and Industrial Research (CSIR) to undertake the EIA process for the proposed Vhuvhili SEF to determine the biophysical, social and economic impacts associated with undertaking the proposed development. Public participation forms an integral part of the S&EIA Process and assists in identifying issues and possible alternatives to be considered during the S&EIA Process. The CSIR is undertaking the Public Participation Process (PPP) for this S&EIA Process. Details on the PPP are included in Chapter 4 of this DSR.

The project team, which is involved in this S&EIA Process, is listed in Table 1-3 below. This team includes several specialists who have extensive experience in conducting specialist studies for renewable energy projects in South Africa.

Table 1-3: The EIA Project Team

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
Environmental Management Services (CSIR)		
Paul Lochner *(Registered EAP (2019/745))*	CSIR	Technical Advisor and Quality Assurance
Minnelise Levendal (*Pr.Sci.Nat.)*	CSIR	Project Manager and EAP
Dhiveshni Moodley *(Cand.Sci.Nat.)*	CSIR	Project Officer and GIS specialist
Specialists		
Johann Lanz (*Pr.Sci.Nat.)*	Private	Agriculture and Soils Assessment
Dr Noel van Rooyen *(Pr.Sci.Nat.)*	Ekotrust cc	Terrestrial Biodiversity and Species Impact Assessment
Lorainmari den Boogert (Pr.Sci.Nat.), Antoinette Bootsma Nee van Wyk (Pr.Sci.Nat.), Rudi Bezuidenhoudt (Pr.Sci.Nat.) and André Strydom	Iggdrasil Scientific Services & Limosella Consulting	Aquatic Biodiversity and Species Impact Assessment
Chris van Rooyen and Albert Froneman (*Pr.Sci.Nat.)*	Chris van Rooyen Consulting	Avifauna Impact Assessment
Kerry Schwartz	SiVEST SA (Pty) Ltd	Visual Impact Assessment
Dr Jayson Orton	ASHA Consulting (Pty) Ltd	Heritage Impact Assessment (Archaeology and Cultural Landscape)
Professor Marion Bamford	Private	Palaeontology Site Sensitivity Verification Report
Tony Barbour	Tony Barbour Environmental Consulting	Socio-Economic Impact Assessment
Avheani Ramawa and Iris Wink *(Pr Tech Eng)*	JG Afrika (Pty) Ltd	Traffic Impact Assessment
Debbie Mitchell *(Pr Eng)*	Ishecon cc	Battery Storage High Level Safety, Health and Environment Risk Assessment
Sandile Nkosi	WSP GOLDER	Geotechnical Desktop study
Minnelise Levendal (*Pr.Sci.Nat.*) and Rohaida Abed *(Pr.Sci.Nat.)*	CSIR	Civil Aviation Site Sensitivity Verification and, where required, Compliance Statement **(**Note: TBC)
Minnelise Levendal (Pr.Sci.Nat.) and Rohaida Abed (Pr.Sci.Nat.)	CSIR	Defence Site Sensitivity Verification

It is important to note at the outset that the Risk Assessment to be undertaken by ISHECON is a technical study and serve to inform the layout, mitigation and management requirements of the proposed SEF (as required) and does not constitute specialist studies in terms of Appendix 6 of the NEMA EIA Regulations, 2014, as amended.

The list of specialist studies was discussed with the CA, the Mpumalanga DARDLEA, at the pre-application meeting held on 23 May 2022 (Appendix F). Feedback on the specialist studies commissioned as part of this S&EIA Process is also included in Chapter 3, Chapter 4, Chapter 6 and Chapter 7 of this DSR. Chapter 4 also includes motivation for not undertaking certain studies identified by the Screening Tool.

1.8. 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 EAPs.

Paul Lochner (EAP, Technical Advisor and Quality Assurance):

Paul Lochner is an EAP at the CSIR in Stellenbosch, with more than 28 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 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 & gas, wetlands & coastal zone management, and industrial & port development. He has been closely involved in the research and application of Strategic Environmental Assessment (SEA) in South Africa and has wide experience in Environmental & Social Impact Assessment, Environmental Management Programmes (EMPRs) and Environmental Screening Studies. He has been the project leader for over 40 SEAs and EIAs over the past 28 years. 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).

Minnelise Levendal *Pr. Sci. Nat*. (Project Manager and EAP):

Minnelise is a Senior EAP in the Environmental Management Services (EMS) Group of the CSIR and holds a Masters degree in Botany from the Stellenbosch University. She obtained her BSc (Education) and BSc (Honours) degrees at the University of the Western Cape. She has 15 years of experience in Environmental Management (which includes five years working as a case officer at the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP). Minnelise is currently managing various EIAs and BAs for wind and solar renewable energy projects in South Africa. She was the project manager of ten BAs for wind monitoring masts in South Africa as part of the National Wind Atlas Project of the Department of Energy (DoE). EAs for all the ten masts were obtained from DEA in 2010. Minnelise managed the Special Needs and Skills Development Programme of DEA (from 2014 to 2018) which provided *pro bono* environmental assessments (BAs) to applicants with special needs, i.e., applicants who do not have the financial means to appoint an EAP to undertake a BA for their small-scale projects. Under this programme, 30 BAs have been undertaken and received EA. Minnelise is currently managing four BAs for WEFs and associated EGI near Kleinsee in the Northern Cape Province. She is a registered Professional Natural Scientist (117078) with the South African Council for Natural Scientific Professions (SACNASP).

Dhiveshni Moodley *Cand.Sci.Nat* (Project Officer and GIS Specialist):

Dhiveshni Moodley is an EAP in the EMS group of the CSIR. Dhiveshni holds a BSc, BSc Honours (*cum laude*) and MSc (*cum laude*) degrees in Environmental Science from the University of KwaZulu-Natal. She has

about two year's work experience in flood risk, hydropedological- and wetland functional assessment specialist studies, as well as conducting BAs and Scoping/EIAs in the Renewable Energy sector. Her key interest lies in using GIS analyses to apply the formation of accurate, feasible solutions to complex environmental challenges.

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

1.9. 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 DEA (now operating as the DFFE) in 2017[21]. 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 1-4 includes a list of questions based on the DEA's Guideline to determine the need and desirability of the proposed project. It should be noted that this table will be informed by the outcomes of the S&EIA Process and will be updated once the Specialist Assessments are completed in the EIA Phase. The motivation for the project is included in Section 1.4 of this Chapter. Note that the Scoping Level Specialist Assessments are included in Appendix G of this Scoping Report, and where possible, the findings of these studies have been integrated into Table 1-4.

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

Table 1-4: 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 environmental sensitivities, in particular the aquatic and terrestrial biodiversity and ecological sensitivities, present within the study area have been assessed within the Terrestrial Biodiversity and Species and Aquatic Biodiversity Impact Scoping studies which are included in Appendices G.2 and G.3 respectively. Detailed assessments will be included in the EIA Report.** **The specialists identified terrestrial and aquatic biodiversity sensitive areas on site 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 of the areas is maintained.** **These findings will inform the revised project layout which will be included and assessed in the EIA Report.** **According to the Terrestrial Biodiversity Specialist:** ● **Protected Areas: The study area is not located in a protected area.** ● **National Protected Areas Expansion Strategy (NPAES): The development will not interfere with the protected areas expansion strategy according to the NPAES spatial data of 2010.** ● **Critical Biodiversity Areas (CBAs): According to the current layout, some solar arrays are located in the CBA area. These arrays need to be repositioned to avoid the CBA.**

NEED	
Question	**Response**
	• **Ecological Support Areas (ESAs): These are no ESAs within the boundary of the Vhuvhili site.** • **Freshwater Ecosystem Priority Area (FEPA): Although the entire site is classified as an upstream management area, the site assessment of the vegetation and the application of a sensitivity model rated most of the river FEPA area as being of low to medium sensitivity, with only the drainage lines having a high sensitivity. The wetland FEPAs were largely incorporated into the delineation of the CBAs (see above bullet).** **The specialist noted that in terms of an ecological point of view large portions of the site have been heavily modified. In terms of ecological processes, function and drivers the specialist noted overall that it is unlikely that the development will contribute to the disruption of broad-scale ecological processes such as dispersal, migration or the ability of fauna to respond to fluctuations in climate or other conditions.** **Based on the terrestrial Mpumalanga Biodiversity Sector Plan (MBSP) the majority of the site is classified as CBA I with medium to large areas classified as heavily or moderately modified.** **The preliminary sensitivity map is included in Chapter 3 of this DSR. The Terrestrial Biodiversity specialist noted that the wetland habitat (Habitat 7) was rated as highly sensitive in the current assessment. A small section of the current layout has to be amended to avoid Habitat 7. Therefore, the layout will be amended to incorporate the recommendations from the specialists and will be further refined during the EIA Phase following detailed assessments to be completed by the specialists on the EIA project team.**

NEED	
Question	**Response**
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 environmental sensitivities present on site were identified by the Terrestrial and Aquatic Biodiversity and Ecology specialists and are discussed in the Scoping inputs provided in Appendix G.2 and G.3 respectively of this DSR. Detailed Terrestrial Biodiversity and Aquatic Scoping studies were undertaken and will be further refined and full Assessment Reports will be included in the EIA Report.** **Based on the biodiversity screening and mapping that was done for the site during the Scoping Phase, the specialists confirmed that there are some highly sensitive features on site, which will be avoided in the revised layout to be included and assessed by the specialists in the EIA report.** **The current site layout for the SEF partially encroaches on the rocky outcrops (Habitat 3), which has a medium sensitivity and on one of the drainage lines with a high sensitivity (Habitat 7). The solar infrastructure in the east should be repositioned to avoid the high sensitivity drainage lines.** **The following buffers are proposed by the Aquatic specialist:** ● **Floodplain Wetlands - 37 m** ● **Channelled Valley Bottom Wetlands – 56 m** ● **Unchannelled Valley Bottom Wetlands – 50 m** ● **Seepage Wetland – 54 m** **It must be noted that the rocky outcrops of medium sensitivity above-mentioned buffers will be avoided by the final updated layout which will be included in the EIA Report.** **Please refer to Appendix G.2 and G.3 respectively for the Terrestrial and Aquatic Biodiversity Assessments.**

NEED	
Question	**Response**
	The Terrestrial and Aquatic Biodiversity specialists will identify all ecological sensitive areas on site that should be avoided by the proposed development and propose mitigation measures to reduce or minimise impacts to ensure that the ecological integrity of the areas is maintained. **The preliminary sensitivity map is included in Chapter 3 of this DSR and will be further refined during the EIA Phase.** **Measures to avoid, remedy, mitigate and manage impacts will be included in the Environmental Management Programme (EMPr) that will be compiled during the EIA Phase and included within the EIA Report.**
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?	**Measures to avoid, remedy, mitigate or manage biophysical impacts will be included in the EMPr that will be compiled during the EIA Phase and included within the EIA Report.**
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 project. Measures to avoid, remedy, mitigate or manage waste will be included within the EMPr that will be compiled during the EIA Phase and included within the EIA Report. Waste generated on site will be disposed of at a licenced landfill site.**
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) will be undertaken during the EIA Phase to assess potential archaeological and cultural impacts resulting from the proposed development during the EIA Phase. Scoping inputs have been provided by the heritage and palaeontological specialists and are included in Appendix G.7 and Appendix G.8 respectively of this DSR. A detailed, full HIA will be included in the EIA Report. The HIA will also be sent to SAHRA for approval during the EIA Phase.**

NEED	
Question	**Response**
	In terms of palaeontology, the specialist assessment (Appendix G.8) states that since the site visit by the archaeologist for this project confirmed that the land has been ploughed and planted in the last few decades, it is unlikely that any fossils will be seen before excavations commences. Therefore, a desktop study with a Fossil Chance Find Protocol that should be added to the EMPr, is strongly recommended.
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 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?	**Measures to avoid, remedy, mitigate or manage impacts on non-renewable natural resources will be included in the EMPr that will be compiled during the EIA Phase and included within the EIA Report.**
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)	**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 therefore a need to identify alternative resources that could promote sustainable energy sources 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 project may also provide electricity to the proposed electrolyser at the Sasol site which will produce green Hydrogen which can provide energy or fuel without emitting greenhouse emissions when used.** **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**

NEED	
Question	**Response**
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?	**impacts cannot be avoided, the footprint will be placed to minimise, mitigate or manage potential impacts to the receiving environment.**
1.8. How were a risk-averse and cautious approach applied in terms of ecological impacts?: 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?	**The precautionary approach has been adopted for this study, i.e., assuming the worst-case scenario will occur and then identifying ways to mitigate or manage these impacts.**

NEED	
Question	**Response**
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 will be included in the EIA Report. A preliminary socio-economic profile is included in Chapter 3 of this DSR and will be further refined during the EIA Phase. Scoping inputs have been provided by the Socio-Economic specialist and have been included in Appendix G.9 of the DSR.**
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 will be considered as part of the Socio-Economic Assessment undertaken for this project and will be included within the EIA Report.**
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 will be considered as part of the Terrestrial and Aquatic Biodiversity as well as the Avifauna Assessments undertaken for this project and will be included within the EIA Report.**

NEED	
Question	**Response**
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?	**Please refer to Chapter 5 of this DSR where the alternatives are discussed.**
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?	**Please refer to Chapter 6 of this DSR where the potential cumulative impacts are discussed for this project. Chapter 7 also contains a list of all the other renewable energy projects within a 50 km radius that has received EA and that is being proposed in the area.**
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 Vhuvhili SEF is entirely located in the Govan Mbeki Local Municipality which falls within the Gert Sibanda District Municipality of Mpumalanga.** **Both the local and District Municipalities' Integrated Development Plans (IDP) (2021/2022), recognises renewable energy projects as potential sustainable economic development opportunities. Supporting the development of clean forms of energy. The Gert Sibanda DM's IDP note that the municipality supports the development of clean forms of energy. It sees the renewable energy sector as a key area for intervention to facilitate growth and job creation in the manufacturing sector. The development of the Vhuvhili SEF will therefore also be in line with the vision of the Local and District Municipality to diversify the job market by creating and supporting sustainable economic growth and development opportunities.**

NEED	
Question	**Response**
	One of the economic priority issues identified within the IDPs (2021/22) is the high level of unemployment, especially amongst the youth. The IDPs identify low economic growth as one of the main reasons for the lack of new labour entrants into the economy. The Govan Mbeki's IDP states that the population number for 2019 is estimated at 374 883 people (4th highest and 8.2% of the Mpumalanga population in 2019) and in 2030 estimated at 535 796 (10.2%). Given the historic population growth per annum, it will put pressure on the infrastructure, service delivery and economic/employment opportunities. provincial average unemployment rate (SLM IDP, 2019/2020). **In the Govan Mbeki LM, the mining sector (39%) and manufacturing sector (24%) contributes the most in terms of GDP. One of the threats identified in its IDP (2021/2022) is the closure of the Mining and the Petro-chemical industry. It notes that "coal is a finite resource and exhausting coal deposits and reserves means Govan Mbeki will become a ghost town with very high unemployment, poverty and poor living conditions".** **The proposed Vhuvhili SEF will create job opportunities and economic spin offs during the construction and operational phases (if an EA is granted by the CA). It is estimated that up to 300 employment opportunities will be created during the construction phase and up to 60 during the operational phase. 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.** **Therefore, the proposed project would help to address the need for increased electricity supply to Sasol/Eskom while also providing advanced skills transfer and training to the local communities and creating contractual and permanent employment in the area. The proposed project will therefore be supportive of**

NEED	
Question	**Response**
	the IDP's objective of facilitating job creation to address the high unemployment rate.
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 a renewable energy project 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 current land use on the proposed site is agriculture, predominantly grain farming. Only soil that is not suitable for grain production is used for cattle grazing** **The impact of the proposed project on cultural or heritage areas (i.e., archaeology) will be assessed as part of the HIA in the EIA Phase. Scoping inputs have been provided by the heritage and palaeontological specialists and are included in Appendix G.7 and Appendix G.8 respectively of this DSR. A detailed, full HIA will be included in the EIA Report. The HIA will also be sent to SAHRA for approval during the EIA Phase.** **In terms of palaeontology, the specialist assessment (Appendix G.8) states that since the site visit by the archaeologist for this project confirmed that the land has been ploughed and planted in the last few decades, it is unlikely that any fossils will be seen before excavations commences. Therefore, a desktop study with a Fossil Chance Find Protocol that should be added to the EMPr, is strongly recommended.**

NEED	
Question	**Response**
	Should the proposed project proceed, approximately 650 hectares of the land will be developed on and it is not expected that this will significantly threaten the agricultural activities present on site. An Agricultural Assessment has been included in Appendix G.1 based on a Scoping Level and will be detailed, where necessary, during the EIA Phase. The Assessment considers the impact of the proposed project in terms of the land capability and agricultural potential. As noted in Appendix G.1: ● **The layout of the facility has been deliberately designed to avoid all field crops on the farm. The proposed development will therefore only occupy land that is of limited land capability and is not suitable for crop production. There is not a scarcity of such agricultural land in South Africa and its conservation for agriculture is not therefore a priority.** ● **The amount of agricultural land loss is within the allowable development limits prescribed by the agricultural protocol. These limits reflect the national need to conserve valuable arable land and therefore to steer, particularly renewable energy developments, onto land that is not suitable for crop production** **As noted, an EMPr will be 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 facility in a rural landscape.** **A Visual Scoping report is included in Appendix G.6 of this DSR. The visual study notes that the study area has a somewhat mixed visual character, transitioning from the heavily transformed urban / peri-urban landscape associated with the**

NEED	
Question	**Response**
	Secunda and Trichardt urban areas, the Sasol Secunda synthetic fuel plant (refinery) and associated infrastructure in the north / north-west to a more rural / pastoral character across the remainder of the study area. Hence, although a solar PV development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed SEF in relatively close proximity to Secunda, and Trichardt and the Sasol fuel plant will significantly reduce the level of contrast. The visual impact and considerations will be further assessed as part of the Visual Impact Assessment to be undertaken as part of the EIA Phase of this project. **A preliminary environmental sensitivity map was prepared during the Scoping Phase and is included in Chapter 3 of this Scoping Report based on the input obtained from the various scoping specialist studies. The map will be updated in the EIA Phase to ensure that sensitive features will be identified and avoided by the project layout, as best as possible.**
2.1.4. Municipal Economic Development Strategy ("LED Strategy").	**The LED Strategy will be considered and potential alignment will be discussed in the EIA Report.**
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 will be addressed within the Socio-Economic Impact Assessment that will be included in the EIA Report.**
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 will be addressed within the Socio-Economic Impact Assessment that will be included in the EIA Report. Issues raised by I&APs to this effect will also be addressed in the relevant Comments and Responses Report of the Scoping and the EIA Report.**

NEED	
Question	**Response**
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 will be addressed in the Socio-Economic Impact Assessment that will be included in the EIA Report.**
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 and 60 employment opportunities will be generated in the construction and operational phases, respectively.**
2.5.2. reduce the need for transport of people and goods,	**This is not applicable as the proposed project is a renewable energy project proposal.**
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 a renewable energy project proposal.**
2.5.4. compliment other uses in the area,	**The Agricultural Assessment (Appendix G.1) notes that the proposed development will only occupy land that is of limited land capability and is not suitable for crop production. There is not a scarcity of such agricultural land in South Africa and its conservation for agriculture is not therefore a priority. It states that the amount of agricultural land loss is within the allowable development limits prescribed by the agricultural protocol.** **The Visual Scoping Report (Appendix G.6) notes that the study area has a somewhat mixed visual character, transitioning from the heavily transformed urban / peri-urban landscape associated with the Secunda and Trichardt urban areas, the Sasol Secunda synthetic fuel plant (refinery) and associated infrastructure in the north / north-west to a more rural / pastoral character across the remainder of the study area.**
2.5.5. be 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 not an urban-related development and the site is zoned for agricultural use.**

NEED	
Question	**Response**
2.5.7. optimise the use of existing resources and infrastructure,	**One of the scenarios being investigated by the Project Developer is to feed the electricity from the proposed Vhuvhili SEF to the step-down substation at Sasol. Therefore, existing infrastructure will be used at Sasol as far as possible. The potential use of the existing servitudes of Sasol will be included in the separate assessment required for the EGI project. This is being considered as to minimise impacts and make use of existing infrastructure.** **The Project Developer will undertake a separate BA process for the EGI project.**
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 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 will be addressed in the Socio-Economic Impact Assessment that will be included in the 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,	**N/A - the proposed project is a renewable energy project that will be developed on a site that 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 friendly 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.),	**Please refer to Chapter 5 for a description of the process undertaken to identify the site as a preferred site for a 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 will be addressed within the Socio-Economic Impact Assessment that will be included within the 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, and	**The impact of the proposed project on cultural areas and heritage resources (archaeology and palaeontology), as well as on the sense of place will be assessed**

NEED	
Question	**Response**
	in the HIA and Visual Impact Assessment (VIA) which will be included in the EIA Report. **A Visual Scoping report is included in Appendix G.6 of this DSR. The visual study notes that the study area has a somewhat mixed visual character, transitioning from the heavily transformed urban / peri-urban landscape associated with the Secunda and Trichardt urban areas, the Sasol Secunda synthetic fuel plant (refinery) and associated infrastructure in the north / north-west to a more rural / pastoral character across the remainder of the study area. Hence, although a solar PV development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed SEF in relatively close proximity to Secunda, and Trichardt and the Sasol fuel plant will significantly reduce the level of contrast. The visual impact and considerations will be further assessed as part of the Visual Impact Assessment to be undertaken as part of the EIA Phase of this project.** **A Heritage Impact Assessment (HIA) will be undertaken during the EIA Phase to assess potential archaeological and cultural impacts resulting from the proposed development during the EIA Phase. Scoping inputs have been provided by the heritage and palaeontological specialists and are included in Appendix G.7 and Appendix G.8 respectively of this DSR. A detailed, full HIA will be included in the EIA Report. The HIA will also be sent to SAHRA for approval during the EIA Phase.** **In terms of palaeontology, the specialist assessment (Appendix G.8) states that since the site visit by the archaeologist for this project confirmed that the land has been ploughed and planted in the last few decades, it is unlikely that any fossils will be seen before excavations commences. Therefore, a desktop study with a Fossil Chance Find Protocol that should be added to the EMPr, is strongly recommended.**

NEED	
Question	**Response**
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 7 provides a list of other REFs that received EA or are being proposed (1 x solar PV project each) within 50 km from the Vhuvhili SEF site that will be included in the cumulative impact assessments that will be undertaken at the EIA phase.** **<u>Note</u> that the proposed Vhuvhili solar project site is not located within any of the gazetted REDZs.**
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 current assumptions are that the secondary data sources used to compile the economic baseline can be viewed as being indicative of broad trends within the study area (as per the socio-economic scoping inputs in Appendix G.9).** **In order to be risk-averse, these predictions are based on research and years of experience from the specialist, taking the specific set of circumstances into account.** **This will be further addressed within the Socio-Economic Impact Assessment that will be included in the EIA Report.**
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?	**Govan Mbeki is the most prominently 2nd fastest growing population with an annual population growth rate of 3.10% in the whole of the Mpumalanga Province (after Steve Tshwete with a population growth of 4.29%) (Govan Mbeki IDP (2021/2022)). A population growth of this proportion is likely to place strain on existing backlogs and the municipality's ability**
2.7.2. Positive impacts. What measures were taken to enhance positive impacts?	

NEED	
Question	**Response**
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.)?	**to effectively service the community. This, combined with the high unemployment rates and low-income levels implies the need for employment provision which would be provided during both the construction and operation phase of the proposed Vhuvhili SEF.** **As indicated, the proposed development aims to provide opportunities for economic growth and development through the provision of a SEF. Furthermore, the provision of temporary employment opportunities, improved income levels, and skills development, aligns the proposed development with several key aspects and objectives outlined in the national, provincial, district, and local policies.** **This will be further addressed within the Socio-Economic Impact Assessment that will be included in the EIA Report.**
2.9. What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	
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?	
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 Public Participation Process (PPP) that is undertaken as part of the Scoping Phase to date and is to be undertaken in the EIA Phase is included in Chapter 4 and 7 of this DSR. It provides a description of various methods to notify potential I&APs of the proposed project and the opportunity to comment on the DSR, namely, through notices in the local newspaper, sites notices, emails as well as sms text messages.**
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,	

NEED	
Question	**Response**
	Interested and Affected Parties will also be notified of the opportunity to comment on the Draft EIA Report which will be released for a 30-day commenting period.
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 will 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 S&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 PPP that is undertaken as part of the Scoping Phase to date and to be undertaken in the EIA Phase is included in Chapter 4 and Chapter 7 of the DSR. Various methods are employed to notify potential I&APs of the proposed project and the opportunity to comment on the DSR, namely, through notices in the local newspaper, sites notices, emails, as well as sms text messages.**
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 all interests, needs and values adopted by all 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 will be addressed within the Socio-Economic Impact Assessment that will be included within the EIA Report.**
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	**An EMPr will be developed to address health and safety concerns. 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.**

NEED	
Question	**Response**
taken to ensure that the right of workers to refuse such work will be respected and protected?	
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 will be addressed within the Socio-Economic Impact Assessment that will be included within the EIA Report.**
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.).	
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,	**The different government departments have been listed as I&APs and are given the opportunity to comment on the DSR and will be given the opportunity to comment on the Draft EIA Report during the 30-day public participation period.**
2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	**This will be determined during the EIA Phase (following the Public Participation Phase undertaken as part of the Scoping Phase).**
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. Measures taken to ensure adherence to the principles of NEMA will be determined during the EIA Phase.**
2.19. Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	**It would be premature to decide whether proposed mitigation measures of the project are realistic prior to the completion of the Impact Assessment Phase of this EIA process. Therefore, the practicality of mitigation measures will be determined during the EIA Phase. The proposed mitigation measures to be**

NEED	
Question	**Response**
	included in the EMPr that will be included in the EIA Report will be informed by the specialist studies undertaken. This will include a detailed assessment of the environment as well as the impacts associated with the proposed development.
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 (to be included in the EIA Report) of this proposed project must form part of the contractual agreement and be adhered to by both the contractors/workers and the Project Applicant.**
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 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?	**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 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 with the Project Applicant, and will also contribute to local socio-economic upliftment through job creation.**
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 can only be objectively determined at the end of the EIA process. These will be assessed as part of the EIA Phase. The cumulative impacts of similar types of projects that have received EA or whose EA status is pending (e.g. other renewable energy projects within 50 km of the proposed project) will be assessed in the EIA Report. Chapter 7 provides a list of other REFs that received EA or are being proposed within 50 km from the Vhuvhili SEF site that will be included in the cumulative impact assessments that will be undertaken at the EIA phase.**

1.10. Objectives for this Scoping Report

The Scoping Phase of the EIA refers to the process of determining the spatial and temporal boundaries for the EIA. In broad terms, the objectives of the Scoping Process in terms of the 2014 NEMA EIA Regulations (as amended) are to:

- Confirm the process to be followed and opportunities for stakeholder engagement;
- Clarify the project scope to be covered;
- Identify and confirm the preferred activity and technology alternative;
- Identify and confirm the preferred site for the preferred activity;
- Identify the key issues to be addressed in the impact assessment phase and the approach to be followed in addressing these issues; and
- Confirm the level of assessment to be undertaken during the impact assessment.

This is achieved through parallel initiatives of consulting with:

- The lead authorities involved in the decision-making for this EIA application;
- The public to ensure that local issues are well understood; and
- The EIA specialist team to ensure that technical issues are identified.

The Scoping Process is supported by a review of relevant background literature on the local area. Through this comprehensive process, the environmental assessment can identify and focus on key issues requiring further assessment during the EIA Phase.

The primary objective of the Scoping Report is to present key stakeholders (including affected organs of state) with an overview of the proposed project and key issues that require assessment in the EIA Phase and allows the opportunity for the identification of additional issues that may require assessment.

Issues that will be raised in response to the DSR that is being released for a 30-day comment period will be captured in the Issues and Responses Trail that will be included in the Final Scoping Report and Plan of Study for EIA. The Final Scoping Report will be submitted to the CA for decision-making (i.e., approval or rejection) in line with Regulation 21 (1) of GN R326. This approval is planned to mark the end of the Scoping Phase after which the EIA Process moves into the impact assessment and reporting phase.

In terms of legal requirements, a crucial objective of the Scoping Report is to satisfy the requirements of Appendix 2 of the 2014 NEMA EIA Regulations (as amended), as noted in Regulation 21 (3) of the GN R326. This section regulates and prescribes the content of the Scoping Report and specifies the type of supporting information that must accompany the submission of the Scoping Report to the authorities. An overview of where the requirements of Appendix 2 of the 2014 NEMA EIA Regulations (as amended) are addressed in this Scoping Report is presented at the beginning of this report.

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 I&APs.

DRAFT SCOPING REPORT

Draft Scoping Report for the proposed development of the Vhuvhili Solar Photovoltaic (PV) Facility near Secunda in the Mpumalanga Province.

CHAPTER 2:

Project Description

ENERTRAG

CSIR
Touching lives through innovation

CONTENTS

TABLES

FIGURES

2. PROJECT DESCRIPTION

This chapter provides an overview of the conceptual project design and technology for the proposed Vhuvhili Solar Energy Facility (SEF) and associated infrastructure.

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

As noted in Chapter 1 of this Draft Scoping Report, the Project Applicant, Vhuvhili Solar RF (Pty) Ltd (hereafter referred to as the "Project Applicant"), is proposing to develop the Vhuvhili SEF and associated infrastructure, south-east of the town of Secunda in the Govan Mbeki Local Municipality and Gert Sibande District Municipality, in the Mpumalanga Province.

The proposed power line and associated electrical grid infrastructure (EGI), to connect the proposed Vhuvhili SEF to the grid at Sasol (or to the national grid), will be subject to a separate Basic Assessment (BA) Process which will be undertaken by the Project Applicant.

It is important to note that the project description and specification details are preliminary at this stage. It is likely that some of the specification details presented herein may change during the detailed design phase and upon further engineering investigations, however, the information provided below is seen as the worst-case scenario for the project. The Scoping Specialist Assessments have also been based on the worst-case scenario in terms of the project specifications (such as the development footprint, dimensions, height etc.).

2.1 Project development

The footprint of the proposed Vhuvhili SEF with a capacity of up to 300 MW will cover an approximate area of 650 hectares (ha). This excludes access roads leading to the site. It should also be noted that the project footprint may be refined as part of the detailed specialist studies to be undertaken in the EIA phase. Hence, an updated, refined footprint may be presented in the EIA Report. The total study area for the proposed Vhuvhili SEF is approximately 3 115 ha. The proposed Vhuvhili SEF will therefore comprise approximately 21 % of the total study area. Several specialists assessed larger areas on the affected farm portions to avoid environmental constraints and sensitivities (highlighted by the specialists), during the siting and final design of the facilities and associated infrastructure.

As part of this Scoping Phase, the specialists assessed and considered the Original Scoping Buildable Area which falls within the study area. Findings of the Scoping Level Specialist Assessments are included in Appendix G and integrated in relevant sections of the Draft Scoping Report. The sensitivities identified and verified by the specialists during the scoping phase will be used to develop the Revised Buildable Area which will be included and assessed by the specialists in the EIA phase. Refer to Chapter 3 (Figure 3-99) for a Sensitivity Map (showing the no-go areas) overlain with the Original Scoping Buildable Area.

2.2 Key components of the proposed Vhuvhili Solar Facility

The proposed Vhuvhili SEF will consist of the key components listed below in Table 2.1. The construction phase for the proposed project is expected to be up to 36 months. Once the commercial operation date is achieved, the proposed facility will generate electricity for a minimum period of 20 years.

It is important to note at the outset that the exact specifications of the proposed project components will be determined during the detailed engineering phase (subsequent to the issuing of the EA, should such authorisation be granted for the proposed project). In line with the precautionary approach and in order to ensure that any environmental impacts which may arise as a result of the project are adequately assessed during the EIA Phase, worst-case scenarios and estimates have been provided in this section as indicated above.

The proposed Vhuvhili SEF will comprise a maximum capacity of 300 MW. Associated infrastructure includes a construction laydown area (which includes the Operation and Maintenance (O&M) buildings), a Battery Energy Storage System (BESS) comprising of batteries within shipping containers or a suitable housing structure on a concrete foundation and an on-site Substation. The on-site Substation and BESS complex will be located within a complex of approximately 10 ha to allow for micro-siting of the BESS components and to accommodate internal roads (as required), a temporary construction laydown area and a firebreak around the BESS footprint.

The proposed Vhuvhili SEF and associated infrastructure include the main components and associated specifications as tabulated in Table 2-1.

Table 2-1: Description of the key components of the Vhuvhili Solar PV Project

Component	Description
Solar Field	
Type of Technology	PV Technology
Generation Capacity (Maximum Installed)	300 MW
Approximate area of the PV Array (i.e., Area occupied by the PV Modules)	Approximately 600 ha
Total developable area that includes all associated infrastructure within the fenced off area of the PV facility	Approximately 650 ha
PV Panel Structure (with the following possible tracking and mounting systems): ▪ Single Axis Tracking structures (aligned north-south); ▪ Fixed Axis Tracking (aligned east-west); ▪ Dual Axis Tracking (aligned east-west and north-south); ▪ Fixed Tilt Mounting Structure; or ▪ Bifacial Solar Modules.	Height: Approximately 3.5 m (maximum)
Building Infrastructure	
Warehouses/Workshops	▪ Footprint: Approximately 1000 m^2 ▪ Height: Up to 10 m
Site Offices and meeting room	▪ Footprint: Approximately 250 m^2 ▪ Height: Up to 10 m
Operational and Maintenance (O&M) Control Centre	▪ Footprint: Approximately 250 m^2 ▪ Height: Up to 10 m This will form part of the construction laydown area
Guard Houses	▪ Number of guard houses: Up to 6 ▪ Footprint of each guard house: Approximately 35 m^2 ▪ Height of each guard house: Up to 6 m

Component	Description
Ablution facilities	▪ Number of ablution facilities: Up to 6 ▪ Footprint of each ablution facility: Approximately 250 m^2 ▪ Height of each ablution facility: Up to 6 m
Inverter/Transformer Stations	▪ Preliminary total number of stations: 249 ▪ Footprint: Approximately 220 m^2 each ▪ Height: Approximately 3 m each
On-site Substation Complex	▪ Footprint: Approximately 4 ha ▪ Height: Up to 10 m ▪ Capacity: This varies according to the detailed design and requirements from potential clients. A transformation capacity of 200 - 250 MVA is assumed, and generally stepped up from 22 kV or 33 kV to 132 kV for connection to the Eskom grid (or to the Sasol grid via the proposed 150 MW Hydrogen electrolyser). ▪ The on-site Substation will accommodate 1 x 132 kV incoming feeder bay, 1 x 132 kV outgoing feeder bay and a motorised isolator with protection and metering.
Associated Infrastructure	
Battery Energy Storage System (BESS)	▪ Technology: It is proposed that Lithium Battery Technologies, such as Lithium-Ion Phosphate, Lithium Nickel Manganese Cobalt oxides or Vanadium Redox flow technologies will be considered as the preferred battery technology, however, the specific technology will only be determined following Engineering, Procurement and Construction (EPC) procurement. ▪ Footprint: Approximately 5 ha ▪ Height of BESS: Up to 10 m ▪ Capacity of BESS: Up to 300 MW/1200 MWh
On-site medium voltage (22 or 33 kV) internal power lines/underground cables	Depth: Maximum depth of 1.5 m
Underground low voltage cables or cable trays	Depth: Maximum depth of 1.5 m

Component	Description
Access roads (including upgrading and widening of existing roads)	Current width: Approximately 5 m Upgraded width: Approximately 10 m Two site access points are recommended for the site. The access points are proposed off the gravel sections of the D823 and D619 road.
Internal roads	Internal roads to be widened to approximately 10 m, including turning circle/bypass areas of up to 20 m at some sections during the construction phase. As such, the roads and cables will be positioned within a 20 m wide corridor. Existing roads will be upgraded wherever possible, although new roads will be constructed where necessary.
Length of internal access roads	To be determined based on final layout
Fencing around the PV Facility Perimeter	Type: Palisade or mesh or fully electrified Height: 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. A detailed stormwater management plan would need to be developed.
Work area during the construction phase (i.e., laydown area)	Temporary Laydown area: Approximately: 4.5 ha. The need for a permanent laydown area will be confirmed during the EIA Phase.
Water Requirements	▪ Approximately 30 000 m^3 of water is estimated to be required for the construction phase, over an estimated up to a 36-month construction period. ▪ Approximately 5 000 m^3 of water is estimated to be required per annum for the operational phase for a minimum of 20-year operational lifespan. ▪ Water be sourced from the following potential sources: Local municipality, third-party water supplier (e.g., Sasol) or existing or drilled boreholes on site.

2.2.1 Solar PV Facility – Solar Field

The total area of the PV Array (i.e., area occupied by the PV Modules) for the proposed Vhuvhili SEF is approximately 600 ha.

The total developable area that includes all associated infrastructure within the fenced off area of the PV facility i.e., including the solar field, foundations, buildings and associated infrastructure but excluding access roads leading to the fenced off area, is approximately 650 ha.

The exact number of solar panels arrays, confirmation of the foundation type and detailed design will follow as the development progresses.

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 2-1). An example of a Solar PV Facility is provided in Figure 2-2.

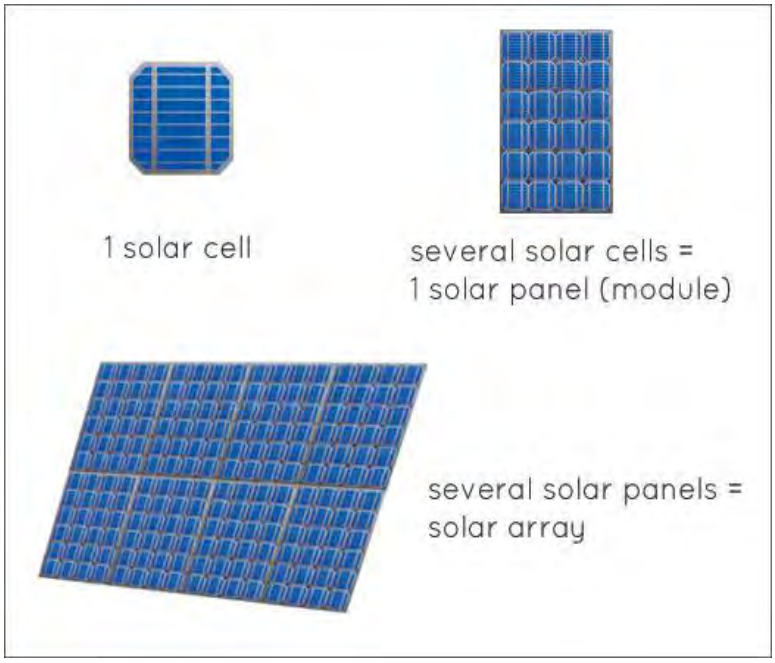


Figure 2-1: Components of the Proposed PV Installation

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 is not expected to exceed 3.5 m in height (measured from the ground). This system may be fixed, or may track the movement of the sun, either by adopting Fixed Axis Tracking (aligned east-west), Single Axis Tracking (aligned north-south), Dual Axis Tracking (aligned east-west and north-south), Fixed Tilt Mounting Structures or Bifacial Solar Modules as explained above. 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.

Figure 2-2: Example of PV Technology (DEFF, 2019)

2.2.2 Infrastructure within the PV Facility

2.2.2.1 Converters/Inverters, Low Voltage Cables, and Medium Voltage Cables

As mentioned above, 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 0.022 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, cable trays or AC cables which will be below ground or pole-mounted depending on voltage level and site conditions.

The inverter stations will in turn be connected to the proposed on-site Substation and BESS complex, via medium voltage (22 or 33 kV) internal underground cables. It is highly unlikely that above-ground 22 or 33 kV power lines will be utilised due to the shading created to the PV plant from the overhead lines. It is more likely that the 22 or 33 kV internal cables will be underground to a maximum depth of 1.5 m. This has also been recommended by the Avifaunal Specialist (as discussed in Chapter 6 and Appendix G.4 of this Draft Scoping Report).

As indicated above and in Chapter 1, the electrical connection from the on-site Substation and BESS complex to the step-down Substation at Sasol or the collector station and national grid will be discussed and assessed in a separate BA Report.

2.2.2.2 On-site Substation

The proposed project will also include an on-site Substation and BESS complex. The on-site Substation and BESS complex will comprise an area of approximately up to 10 ha and will have a height of up to 10 m.

A transformation capacity of 200 - 250 MVA is assumed, and generally stepped up from 22 kV or 33 kV to 132 kV for connection to the Eskom grid (or to the Sasol grid via the proposed 150 MW Hydrogen electrolyser).

The on-site substation will comprise the following components:

- On-site Independent Power Producer (IPP) or Facility Substation (+-2 ha). This will include the relevant section that will be maintained by the IPP or the Project Developer, and/or
- Switching Station and Collector Station (+-2 ha), and/or
- Battery Energy Storage System (BESS) (+-5 ha).

2.2.2.3 Battery Energy Storage Systems

The proposed project will also include a BESS which will form part of the on-site substation complex at the proposed Vhuvhili SEF site. The proposed BESS will cover an approximate area of up to 5 ha and a height of up to 10 m, with a capacity of 300MW/ 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.

It is proposed that Lithium Battery Technologies, such as Lithium-Ion Phosphate, Lithium Nickel Manganese Cobalt oxides or Vanadium Redox flow technologies will be considered as the preferred battery technology, however, the specific technology will only be determined following EPC procurement.

Additional information on the some of the BESS technologies that are being considered is provided below.

- **Lithium-Ion Batteries**

Lithium-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. The negative electrode for a lithium-ion cell is typically carbon. The positive electrode can be lithium iron phosphate or a lithium metal oxide. The electrolyte is usually a lithium salt dissolved in an organic solvent (CSIR, 2014).

It is proposed that the Lithium-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. The BESS will be located adjacent to the on-site or step-down substation complexes. Based on various discussions with the national Department of Forestry, Fisheries and the Environment (DFFE) on previous

occasions, it has been confirmed that Lithium-Ion BESS's are not classified as containers or structures for the development and related operation of facility 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 2-3 is an illustration of a 25MW / 50MWh Lithium-Ion BESS located at the 60 MW Gannawarra Solar Farm in Australia.

Figure 2-3: Example of PV Technology with Lithium-Ion BESS (ARENAWIRE, 2018[1])

- **<u>Redox Flow Batteries (RFB): Vanadium Redox Flow Battery (VRFB)</u>**

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, 2017).

A schematic representation of a typical RFB is provided in Figure 2.4.

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 the VRFB 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, 2017).

[1] 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.

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).

The risk of spillage tends to be higher for an RFB than a Lithium-Ion BESS. Solid State Batteries carry less of a potential short-term risk to the environment in terms of potential spillages.

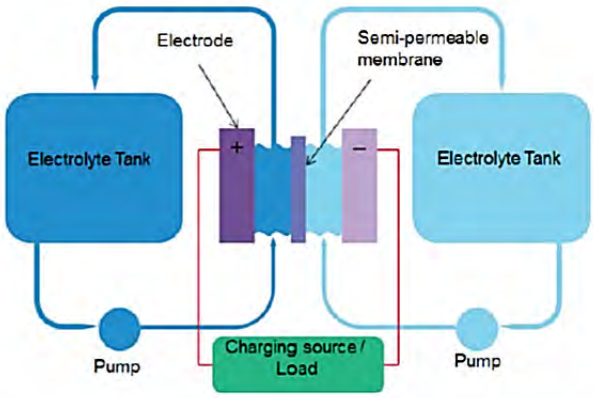


Figure 2-4: Schematic diagram of a typical Redox Flow Battery (Source: Parsons, 2017)

Refer to Appendix G.11 of this Draft Scoping Report for a High-Level Safety, Health and Environment Risk Assessment Scoping Input Report (ISHECON (2022).

The supplier of the BESS will be confirmed during the detailed design phase. The potential risks associated with the various BESS technology being considered, and the required mitigation measures will be included in the EIA Report, as well as the EMPr.

2.2.2.4 Panel Maintenance and Cleaning Area

During the operational phase, the accumulation of dust on solar panels generally negatively influences the productivity of the solar facility. As such the panels require regular cleaning. It is proposed that panel cleaning will take place quarterly; however, this may be revised should the site conditions warrant more frequent cleaning. 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.

2.2.2.5 Storm water

It is proposed that the area where the solar panels will be installed will not be 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. It is important to verify that the on-site Substation and BESS complex and other building infrastructure are not located in an area of stormwater accumulation.

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. It is proposed that a detailed storm water management plan 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 promote the dissipation of storm water run-off. Recommendations for the management of stormwater will be discussed in the EMPr during the EIA Phase.

2.2.2.6 Building Infrastructure

As indicated in Table 2.1, there will be a warehouse/workshop, office, O&M control centre, guard houses and ablution facilities at the proposed Vhuvhili SEF site as indicated below:

- Warehouses/workshops for storage of equipment (height up to 10 m and footprint approximately 1000 m^2);
- Site Office and meeting room (height up to 10 m and footprint approximately 250 m^2);
- Operational and Maintenance (O&M) control centre which will form part of the construction laydown area (height up to 10 m and footprint approximately 250 m^2);
- Guard Houses / security enclosures (height up to 10 m, footprint approximately 35 m^2).
- Ablution facilities (height up to 6 m and footprint approximately 250 m^2);
- Inverter/Transformer stations (height of approximately 3 m and footprint approximately 220 m^2); and
- On-site substation building (height of up to 10 m and footprint approximately 4 ha).

A temporary construction laydown area with a maximum footprint of approximately 4.5 ha will also be constructed. The need for a permanent laydown area will be confirmed during the EIA Phase.

Note that the details provided above in terms of heights and footprint are estimates and will be confirmed during the detailed design.

2.2.2.7 Additional Infrastructure

2.1.1.1.1 Fencing

For various reasons such as security, public protection and lawful requirements, the proposed built infrastructure on site and the entire Vhuvhili SEF, will be secured via the installation of appropriate fencing. The PV facility 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 farms portions may be upgraded in places deemed insufficiently secure, whereas permanent fencing will be required around the O&M area and on-site substation and BESS 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.

2.1.1.1.2 Concrete batching plant

The Project Applicant may establish a concrete batch plant on site (within the laydown area) for purposes of the construction phase. Only a limited amount of water will be utilised during construction for the batching of concrete. Details of the concrete batching plant, including the footprint will be confirmed by the EPC contractor during the detailed design phase as the development progresses.

2.1.2Internal Roads

It is proposed that existing roads will be upgraded wherever possible, although new roads will be constructed where necessary. Existing internal roads will be widened to approximately 10 m, including turning circle/bypass areas of up to 20 m at some sections during the construction phase. As such, the roads and cables will be positioned within a 20 m wide corridor. The length of the internal road network is largely dependent on the revised project layout and will therefore be confirmed during the EIA phase. The internal roads will provide access to the solar panels and will accommodate cable trenches and stormwater channels, as required. The total internal road length will be determined by the EPC contractor. The total internal road length may vary slightly, depending on the final design.

The geometric design and layout for the internal roads from the access points needs to be established at a detailed design stage. Existing structures and services, such as drainage structures, signage, street lighting and pipelines will need to be evaluated if impacting on the roads. It needs to be ensured that gravel sections remain in good condition and will need to be maintained during the additional loading of the construction phase and then reinstated after construction is completed. The geometric design constraints encountered due to the terrain should be taken into consideration by the geometric designer. Preferably, the internal roads need to be designed with smooth, relatively flat gradients (recommended to be no more than 8%) to allow a larger transport load vehicle to ascend to the respective laydown areas (Wink, 2021).

2.1.3External Access Roads

Traffic inputs (Scoping Phase) have been provided by the traffic specialist and are included in Appendix G.10 of this Draft Scoping Report. The Traffic Scoping study will be expanded on and finalised during the EIA Phase. The following information has been obtained from the Traffic study (Wink, 2021).

The proposed Vhuvhili SEF site is located near Secunda, Mpumalanga Province. The road network surrounding the site includes the D772 to the north, the D619 to the east and south, and the D823 to the west as shown in Figure 2-4 below. Based on an access investigation conducted for the site (Iris, 2021), two site access points are proposed off the gravel sections of the D823 and D619 road (Figure 2-5). The current width of these roads is approximately 5 m. It is proposed that these existing roads will be upgraded and widened to a maximum width of 10 m. The access points are located off existing gravel access roads thus access spacing restrictions are not envisaged. Sight lines along the access points are within the recommended limits. The final site access points will be based on the access investigation findings, geometric considerations and site layout restrictions.

Exact specifications of the widening and upgrading of the farm gravel roads will be confirmed during the detailed design phase. Such upgrading and widening have been accommodated in the relevant listed activities applicable to the proposed project. Refer to Chapter 4 of this Draft Scoping Report.

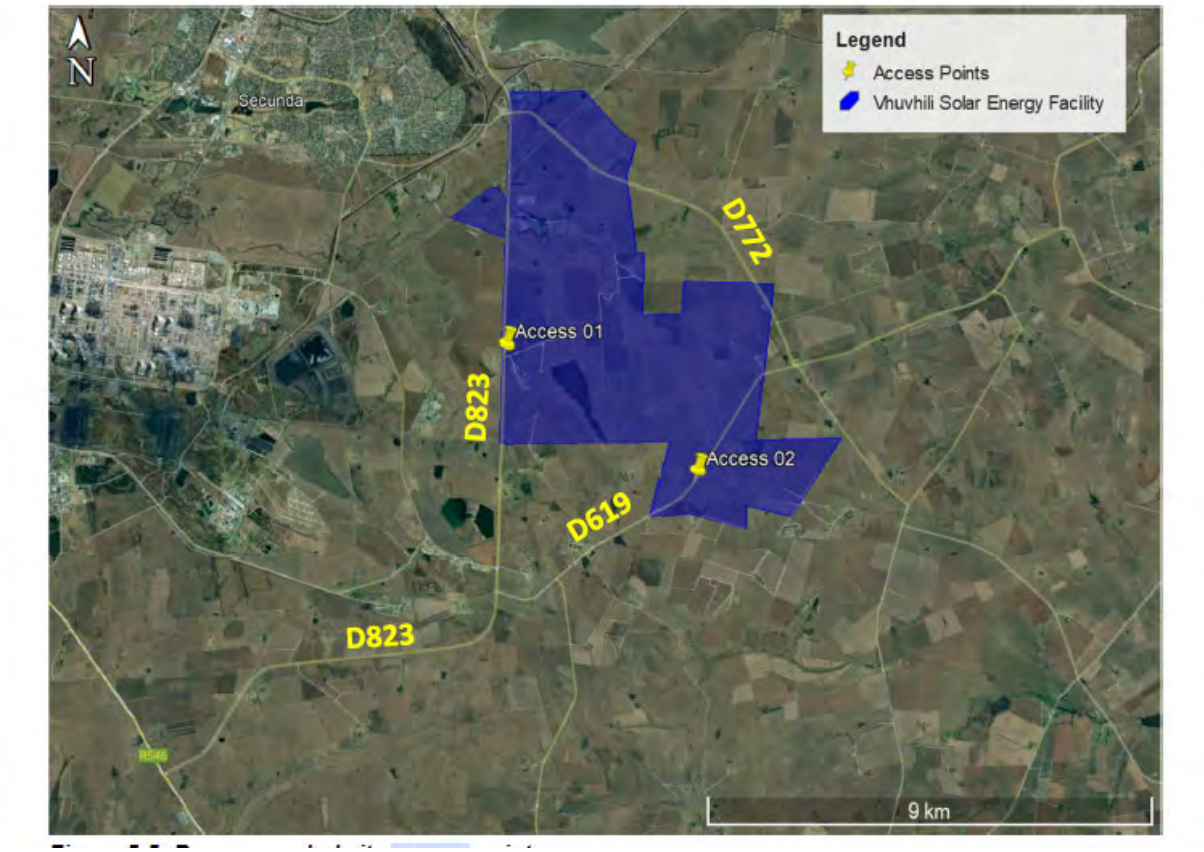


Figure 2-5: Proposed site access points to the proposed Vhuvhili Solar PV Facility (Wink, 2021)

It must however be noted that the layout of the solar panels has not been finalised, as such, the access points may need to be adjusted to accommodate the needs of the site. There are additional existing farm access gates that can potentially be utilised to access the site (Figure 2-6). The access points have good site lines in both directions.

The access points to the site will need to be able to cater for construction and abnormal load vehicles. A minimum road width of 8 m is recommended for the access points and the internal roads can have a minimum width of 5 m. The radius at the access point needs to be large enough to allow for all construction vehicles to turn safely. It is recommended that the site access be controlled via a boom and gatehouse. It is also recommended that security staff be stationed on site at the access booms during construction. A minimum stacking distance of 25 m is recommended between the road edge of the external road and the boom. All road markings and signage need to be in accordance with the South African Road Traffic Signs Manual (SARTSM) (Wink, 2021).

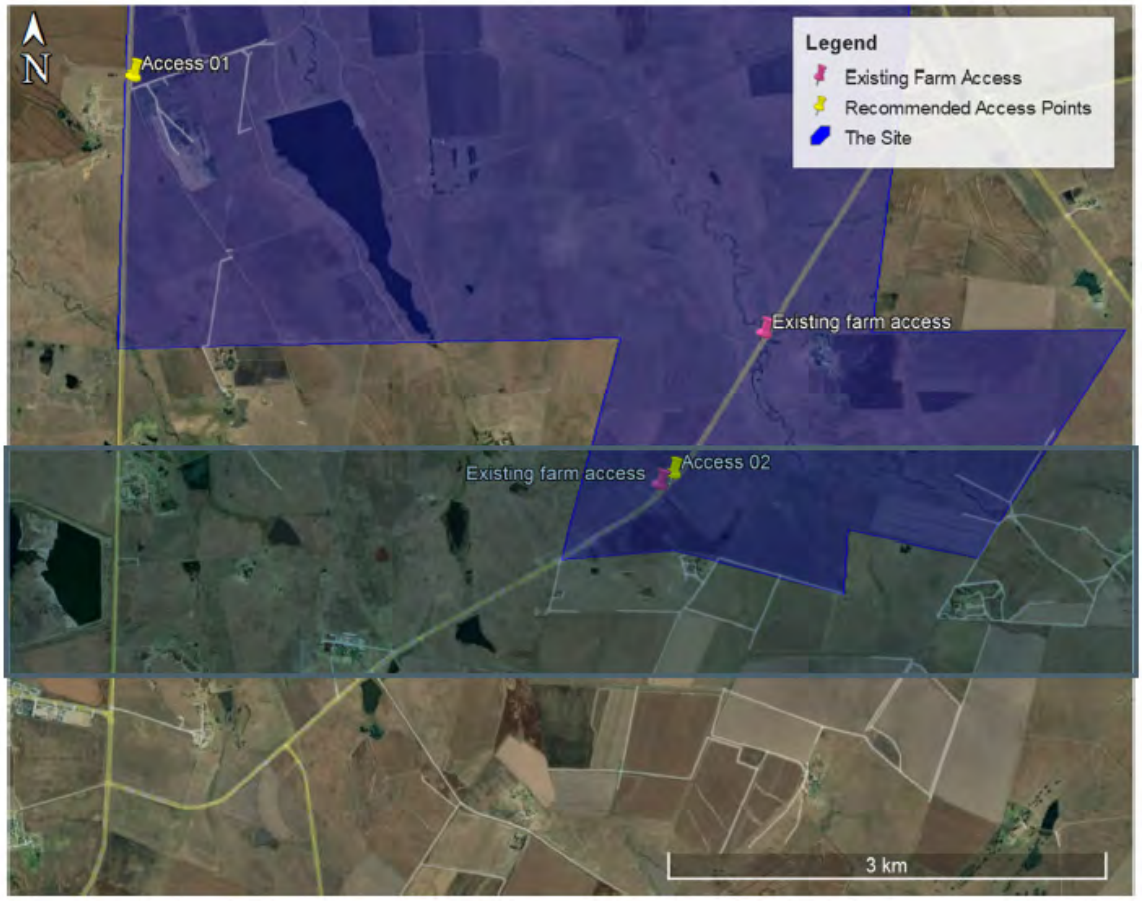


Figure 2-6: Potential access points to the proposed Vhuvhili Solar PV facility (Wink, 2021)

2.1.4 Port of Entry

It is envisaged that the components will be imported to South Africa via the Port of Durban or the Port of Richards Bay as the closest ports to the site. The Port of Durban is located approximately 524 km south-east of the site and the Port of Richards Bay is located approximately 488 km south-east of the site. The travel routes to the site from the ports comprise mostly high order routes and the solar PV panels are expected to be delivered by vehicles within the freight limitations. Road geometry limitations are thus not envisaged. Due to the shorter travel distance to site, the Port of Richards Bay is considered the preferred port of entry. It must however be noted that the availability at any of the considered ports will need to be confirmed with the Transnet Port authority.

The Port of Durban

The Durban container terminal is the busiest container terminal in Africa and operates as two terminals Pier 1 and Pier 2, handling 65% of South Africa's container volumes. It is ideally located to serve as a hub for containerised cargo from the Indian Ocean Islands, Middle East, Far East and Australia. The Durban Container Terminal is Africa's biggest and busiest - home to the state of the art, twin lift ship-to shore

cranes. Various capacity creation projects are currently underway, including deepening of berths and operational optimization. The terminal currently handles 65% of South Africa's container volumes. (Transnet Port Terminals, n.d.) (Wink, 2021). The proposed route from the Port of Durban to the project site is indicated in Figure 2-7.

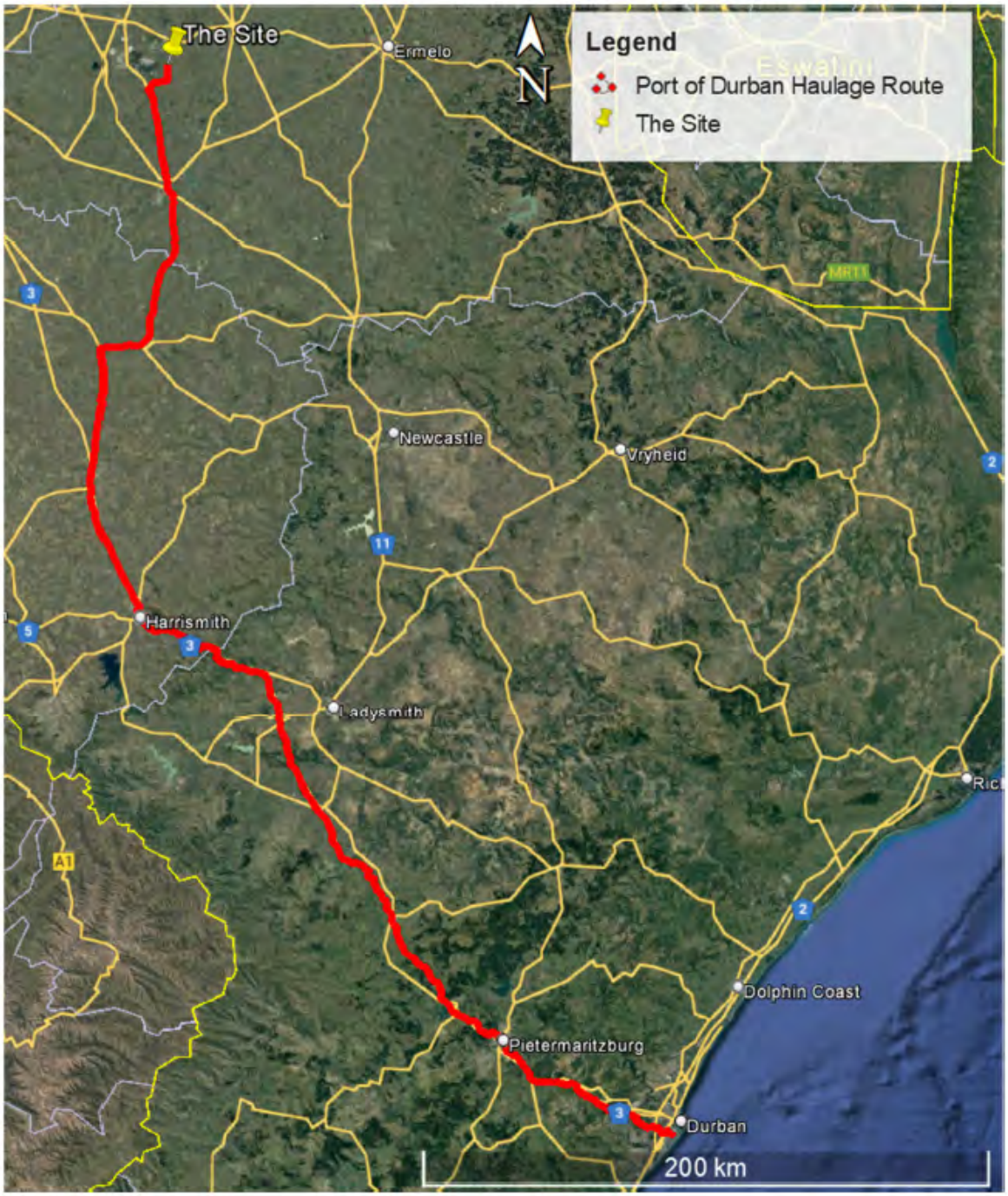


Figure 2-7: Route from the Port of Durban to the proposed Vhuvhili SEF site (Source: Wink, 2021).

The Port of Richards Bay

The Port of Richards Bay is situated in the northern industrial hub of KwaZulu-Natal and accessible via rail and road. The port is a deep-sea water port with 13 berths. The Port can handle dry bulk ores, minerals and break bulk with a draft that easily accommodates Cape size and panamax vessels. The Port is currently creating capacity, investing in new equipment and undergoing extensive refurbishments. The Richards Bay port will not only be a deep-sea water port, but South Africa's premium bulk mineral port within the next six years. The Richards Bay Expansion Programme is currently in progress, adding new berths and extending rail capacity within the port (Transnet Port Terminals, n.d.). The proposed route from the Port of Richards Bay to the project site is indicated in Figure 2-8.

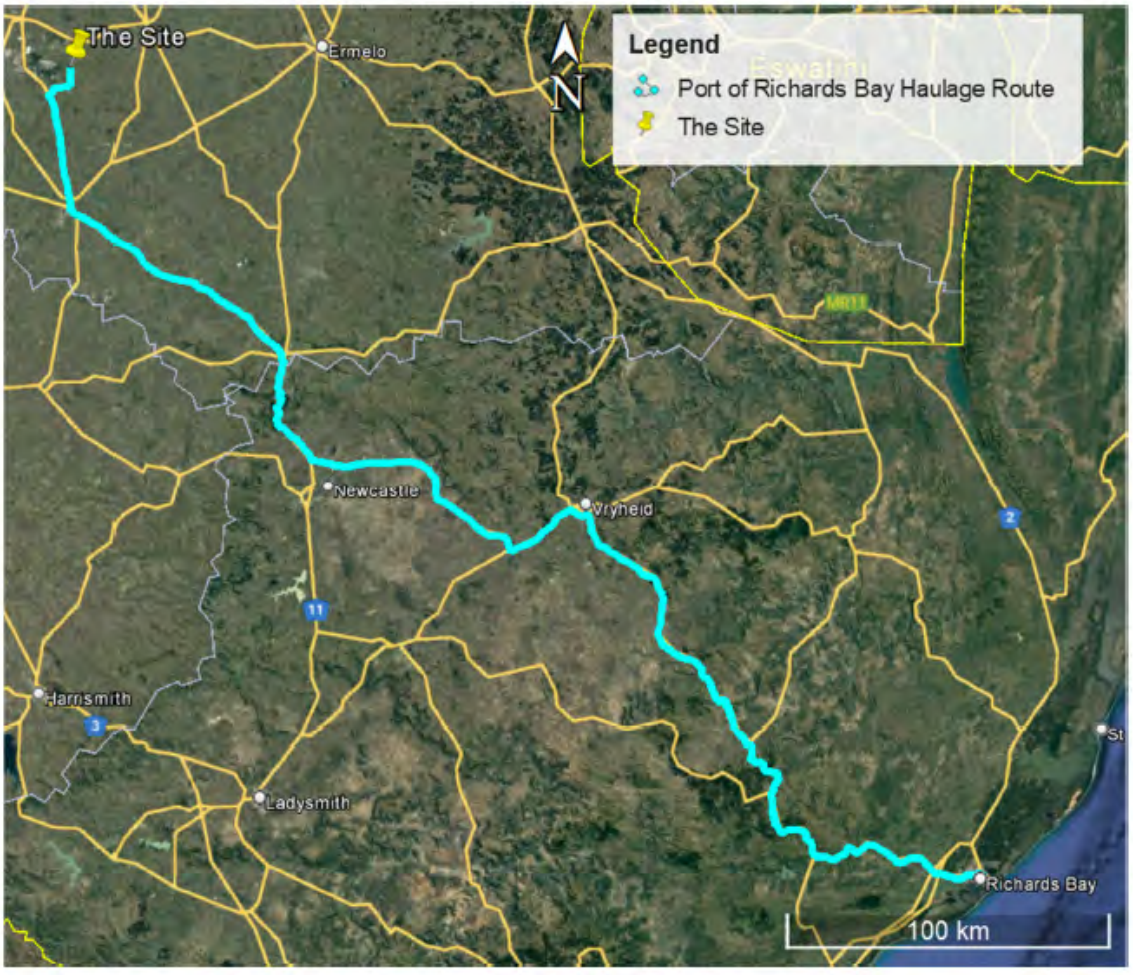


Figure 2-8: Route from the Port of Richards Bay to the proposed Vhuvhili SEF site (Source: Wink, 2021).

2.1.5 Transportation of materials and workers to site

The closest major commercial centre to the proposed development for domestically supplied and manufactured components is located in the greater Johannesburg area.

It is proposed that the materials, plant and workers will be sourced from the surrounding towns as far as possible. The closest towns to the site are Secunda, Trichardt, Evander, Embalenhle, Kinross and Bethal (Figure 2-9).

Should concrete batch plants or quarries not be available in the surrounding areas, mobile concrete batch plants and temporary construction material stockpile yards could be commissioned on vacant land near the proposed Vhuvhili SEF site. Delivery of materials to the mobile batch plant and the stockpile yard could be staggered to minimise traffic disruptions.

Figure 2-9: The surrounding towns from the proposed Vhuvhili SEF site (Source: Wink, 2021).

Refer to the Traffic Scoping inputs included in Appendix G.10 of this Draft Scoping Report for additional information.

2.1.6 Service Provision: Water Usage, Sewage, Solid Waste and Electricity Requirements

The Project Developer will consult with the Govan Mbeki Local Municipality during the EIA Phase 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 will also be consulted as part of the 30-day public review period of the Draft Scoping Report and the Draft EIA Report.

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.

2.1.6.1 Water Usage

During the construction phase, approximately 30 000 m^3 of water will be required over an estimated 36-month construction period. This equates to approximately 833 m^3 of water per month during the construction phase. Water will be required for human consumption and construction activities. 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 expected to have a water usage less than the construction phase. It is estimated at half the usage.

During the operational phase, it is estimated that the panel washing process, and human consumption as well as other operational phase activities will require approximately 5 000 m^3 of water per year for a minimum 20-year operational lifespan. This equates to approximately 416 m^3 of water per month during the operational phase of the proposed Vhuvhili SEF project. 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.

Water required for the construction, operational and decommissioning phases will either be sourced from the following sources (in order of priority and likelihood):

- The **Govan Mbeki Municipality** - specific arrangements will be agreed with the local municipality in a Service Level Agreement (SLA). The water will most likely 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 will be considered in the Traffic Impact Assessment during the EIA Phase. Should the water be transferred from the Local Municipal Water Treatment Plant via a pipeline, the relevant listed activities, as discussed in Chapter 4 of this Draft Scoping Report, will need to be considered. The route of this pipeline will be confirmed during the detailed design.
- Investigation into a third-party water supplier which may include the nearby Sasol refinery or other private services companies.
- An existing borehole or a new borehole will be drilled on site. The borehole 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 these current EA Application for the Vhuvhili SEF.

2.1.6.2 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. More specifically, it is estimated that a peak of approximately 28,000 l per month of sewage will be generated during the construction phase. During the operational phase, it is estimated that 10,000 l of sewerage per month will be generated.

Liquid effluent will be limited to the ablution facility 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 on a regular basis. A permanent ablution facility may be installed during the operational phase, as indicated above. It is intended that sewage will be disposed of in the municipal waterborne sewage system. However, should this not be

possible, the effluent will be stored on site in watertight concrete structures (conservancy tanks) and thereafter transported to and disposed of at the Local Municipal sewerage treatment works or similar facility by a registered service provider. As noted above, the Project Developer will consult with the Govan Mbeki Municipality during the EIA Phase to confirm the provision of services.

2.1.6.3 Solid Waste Generation

The quantity of waste generated will depend on the construction phase, which is estimated to extend over 36 months. However, it is estimated that approximately 2 000-5 000 kg of general waste will be generated every month during the construction phase. During the construction phase, the following waste materials are anticipated:

- 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 EMPr during all project phases. The EMPr will be provided in the Draft EIA Report, which will incorporate 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 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 (for less than 90 days) 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 office). It is estimated that approximately 2.5 m^3 of waste will be generated every month during the operational phase.

2.1.6.4 Electricity Requirements

In terms of electricity supply for the construction and operational phase, the Project Developer will make use of existing Eskom or municipal infrastructure supply services or Sasol infrastructure in the area. Should this not be available the developer will make use of generators on site during construction.

2.2 Socio-Economic

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

2.2.1 Employment during Construction

During the construction phase, skilled, medium-skilled and low-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 employment opportunities are expected to be created during the construction phase at peak conditions. The skill breakdown of employment opportunities is estimated as 50% low-skilled (construction labourers, security staff etc.), 30 % medium-skilled (Patterson B and above) (drivers, equipment operators etc.) and 20 % skilled personnel (engineers, land surveyors, project managers etc.).

Employees will most likely be housed in local nearby towns and villages. Workers will only be housed in worker camps on-site if suitable accommodation is available. However, this will still be confirmed. 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.

All efforts will be made to ensure that all construction work will be undertaken in compliance with local, provincial and national legislation, local and international best practice, as well as the compiled EMPrs which are to be included in the EMPr in the EIA Reports. An independent Environmental Control Officer (ECO) will be appointed during the construction phase and will monitor compliance with the recommendations and conditions of the EMPrs and EA respectively.

2.2.2 Employment during Operations

Approximately 60 full time employment opportunities will be created over the 20-year lifespan of the proposed facility. The employment breakdown is estimated as 60 % low-skilled, 30 % medium-skilled and 10 % skilled. The low and medium-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 other bidding process at the time as well.

2.2.3 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 or any other bidding requirements 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 and entrepreneurship through socio-economic and enterprise development initiatives.

2.3 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 Vhuvhili SEF is expected to be approximately 20 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 at a high-level in the specialist studies for the Scoping Phase (summarised in Chapter 6 and in specialist scoping inputs provided in Appendix G of this Scoping Report), and will be detailed further during the EIA Phase.

2.3.1 Planning and Design Phase

The project layout, including the exact placement of building infrastructure and the proposed internal road network will be finalised in the EIA Phase. The project layout will be informed by the findings of the specialist assessments. The specialists will be requested to comment on the final project layout. The panel mounting system will only be confirmed during the detailed design phase.

2.3.2 Construction Phase

The construction phase will take place subsequent to the issuing of an EA (should such EA 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 up to 36 months for the proposed Vhuvhili SEF project. 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;
- Stockpiling of topsoil and cleared vegetation, where necessary;
- Excavations for infrastructure and associated infrastructure;
- Establishment of a temporary laydown area to enable the storage of construction equipment and machinery and will include the establishment of the construction site camp (including site offices and other temporary facilities for the appointed contractors);
- Construction of the solar field, and additional infrastructure;
- Creation of employment opportunities;
- Transportation of material and equipment to site, and personnel to and from site; and
- 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 will be compiled and included in 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, respectively.

2.3.3 Operational Phase

The following activities will occur during the operational phase of the project:

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

As indicated above, the operational lifespan of the proposed Vhuvhili SEF is expected to be approximately 20 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 that will be compiled and included in the EIA Report will include 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.

2.3.4 Decommissioning Phase

At the end of the operational phase, the Vhuvhili SEF may be decommissioned, or may be repowered i.e. redesigned and refitted so as 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 the approved EMPr and relevant legislation at the time, and the site will be rehabilitated and returned to its pre-construction state.

Various components of the proposed Vhuvhili SEF which are decommissioned will be reused, recycled or disposed of in accordance with the relevant regulatory requirements. All of the components of the solar PV facility panels are considered to be reusable or recyclable. The decommissioning phase of the project is also expected to create skilled and low-skilled employment opportunities.

DRAFT SCOPING REPORT

Draft Scoping Report for the proposed development of the Vhuvhili Solar Photovoltaic (PV) Facility near Secunda in the Mpumalanga Province.

CHAPTER 3:

Description of the Environment

ENERTRAG

CSIR
Touching lives through innovation

CONTENTS

TABLES

FIGURES

3. DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter of the Scoping Report provides a broad overview of the affected environment for the proposed Vhuvhili SEF and the surrounding area. The receiving environment is understood to include biophysical, socio-economic and heritage aspects, which could be affected by the proposed development or which in turn might impact on the proposed development.

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:

- Scoping inputs from the specialists that form part of the project team (Appendix G of this Draft Scoping Report);
- Feedback from 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) and the Agricultural Geo-Referenced Information System (AGIS), amongst others;
- The Govan Mbeki Local Municipality Integrated Development Plan (IDP) (2020/2021);
- The Gert Sibande District Municipality IDP (2020/2021); and
- The Mpumalanga Spatial Development Framework (2019).

It is important to note that this chapter intends to provide a broad overview of the affected environment based primarily on the scoping inputs provided by the specialists. The description may be further refined based on the relevant specialist assessments that will be undertaken during the EIA Phase that is focused on significant environmental aspects of the proposed project. It should also be noted that the project footprint may be refined as part of the detailed specialist studies to be undertaken in the EIA phase. Hence, an updated, refined footprint may be presented in the EIA Report.

3.1 Background

The proposed Vhuvhili SEF is situated south-east of Secunda in the Govan Mbeki Local Municipality and the Gert Sibande District Municipality in the Mpumalanga Province.

The proposed Vhuvhili SEF will be developed on the farm portions as indicated in Table 3-1.

Table 3-1: The farm portions to be affected by the proposed Vhuvhili SEF project

Farm name	Farm No.	Farm Portion	SG code
GROOTVLEI	584	RE	T0IS00000000058400000
GROOTVLEI	293	23	T0IS00000000029300023
GROOTVLEI	293	18	T0IS00000000029300018
GROOTVLEI	293	20	T0IS00000000029300020
GROOTVLEI	293	19	T0IS00000000029300019
POVERTY ACRES	585	RE	T0IS00000000058500000
VLAKSPRUIT	292	22	T0IS00000000029200022
VLAKSPRUIT	292	21	T0IS00000000029200021

The total farm properties cover an area of approximately 3115 ha ha and the preferred development footprint of the proposed Vhuvhili SEF will occupy approximately 650 ha.

Figure 3-1 below provides the regional context of the proposed Vhuvhili SEF project site.

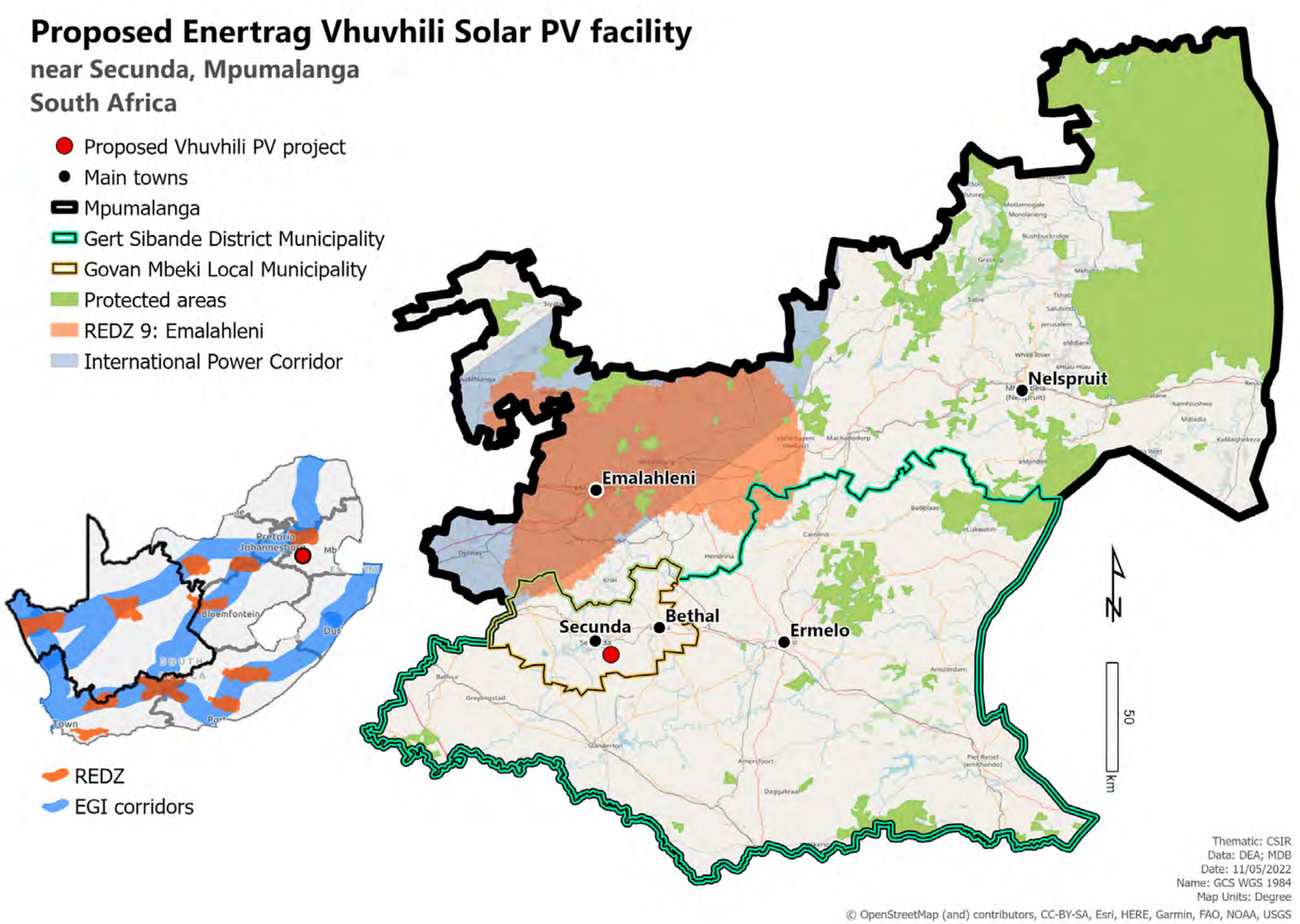


Figure 3-1: Regional context map for the proposed Vhuvhili SEF situated near Secunda in the Mpumalanga Province

3.2 Biophysical Environment

3.2.1 Climate and Climate Change

Some of the information described below on climate is based on scoping inputs provided by the Terrestrial Biodiversity Specialist, which are included in Appendix G.2 of this Scoping Report.

3.2.1.1 General Context

The site falls in a strongly seasonal summer-rainfall, cool-temperate region, with very dry winters. The mean annual precipitation of the Soweto Highveld Grassland is 662 mm.

Rainfall

The mean annual rainfall as measured at Secunda is 693 mm (Table 3-2; Figure 3-2) with a peak in rainfall from November to January. The annual precipitation coefficient of variation is 27%. Mean annual potential evaporation is 2 060 mm, while the mean annual soil moisture stress is 75%. The total annual rainfall at Secunda during dry and wet years respectively may range from 558 mm to 965 mm, indicating a moderate variation in the annual rainfall. The rainy season at Secunda is predominantly from October to March when about 86% of the annual rainfall occurs. December and January are the wettest months, and the driest period is from May to August, when less than 15 mm of rain per month is recorded. Maximum rainfall measured over a 24-hour period at Secunda was 82 mm, recorded in November. The highest monthly rainfall recorded was 241 mm, also measured in November.

Table 3-2: Maximum rainfall (mm) in 24 hours, highest maximum and lowest monthly minimum rainfall at Secunda: 26° 30' S; 29° 11' E; 1628 m (Weather Bureau 1998)

	Rainfall (mm)			
Month	Mean per month	24 h max	Max per month	Min per month
Jan	114	66	168	50
Feb	93	69	142	41
Mar	64	55	121	31
Apr	35	56	119	2
May	8	12	18	0
June	14	41	75	0
July	2	6	13	0
Aug	8	24	24	0
Sep	33	26	107	0
Oct	82	59	146	0
Nov	104	82	241	0
Dec	136	76	200	89
Year	693	82	965	558

Temperature

The mean annual temperature for Secunda is 15.8°C (Table 3-3) with the extreme maximum and minimum temperatures 33.0°C and -4.3°C respectively (Figure 3-3). The mean daily maximum for January is 27.2°C

and for July it is 18.1°C, whereas the mean daily minimum for January is 13.5°C and for July it is 0.9°C. Frost may occur anytime from April to October with a mean of 41 days frost per annum.

Table 3-3: Temperature data for the Secunda region: 26° 30' S; 29° 11' E; 1628 m (Weather Bureau 1998)

	Temperature (°C)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Max	27.2	25.9	25.2	23.0	20.8	17.3	18.1	21.5	22.3	24.3	23.8	26.0	27.2
*Ext. Max	33.0	32.5	30.0	30.6	25.5	25.3	25.3	27.0	31.0	32.0	31.0	31.5	33.0
Min	13.5	12.9	12.0	9.8	5.9	2.3	0.9	4.1	6.9	10.0	11.1	13.6	0.9
*Ext. Min	10.1	10.5	7.1	4.2	2.0	-2.6	-4.3	-1.5	1.1	4.3	6.3	8.8	-4.3
Mean	20.4	19.3	18.6	16.3	13.4	9.8	9.5	12.8	14.6	17.1	17.5	19.9	15.8

Max = mean daily maximum temperature for the month
*Ext. Max = extreme maximum temperature recorded per month
Min = mean daily minimum temperature for the month
*Ext. Min = extreme minimum temperature recorded per month
Mean = mean monthly temperature for each month and for the year

Cloudiness and relative air humidity

At Bethal weather station, located about 25 km east of Secunda, the cloud cover at 14:00 is the highest from November to January (5.1 – 5.3 eights) and the lowest in June, July and August (1.5 – 1.9 eights) (Table 3-4). The highest mean relative air humidity (%) at 08:00 occurs during the late summer and autumn months (February to April; 83 – 84%) and the lowest relative air humidity at 14:00 (31%) occurs in early spring (August) (Weather Bureau 1998).

Figure 3-2 provides an indication of mean annual rainfall whereas Figure 3-3 provides the average monthly distribution of rainfall and the average monthly maximum and minimum temperature.

Table 3-4: Cloud cover at 14:00 and percentage relative air humidity at 08:00 and 14:00 at Bethal: 26° 27' S; 29° 29' E; 1663 m (Weather Bureau 1998)

	Cloud (0-8)	Relative air humidity %	
	14:00	08:00	14:00
Jan	5.2	80	51
Feb	4.9	83	48
Mar	4.9	83	44
Apr	4.1	84	41
May	2.4	80	34
June	1.6	81	34
July	1.5	79	33
Aug	1.9	75	31
Sept	3.1	74	33
Oct	4.6	75	41
Nov	5.3	77	49
Dec	5.1	77	48
Year	3.7	80	41

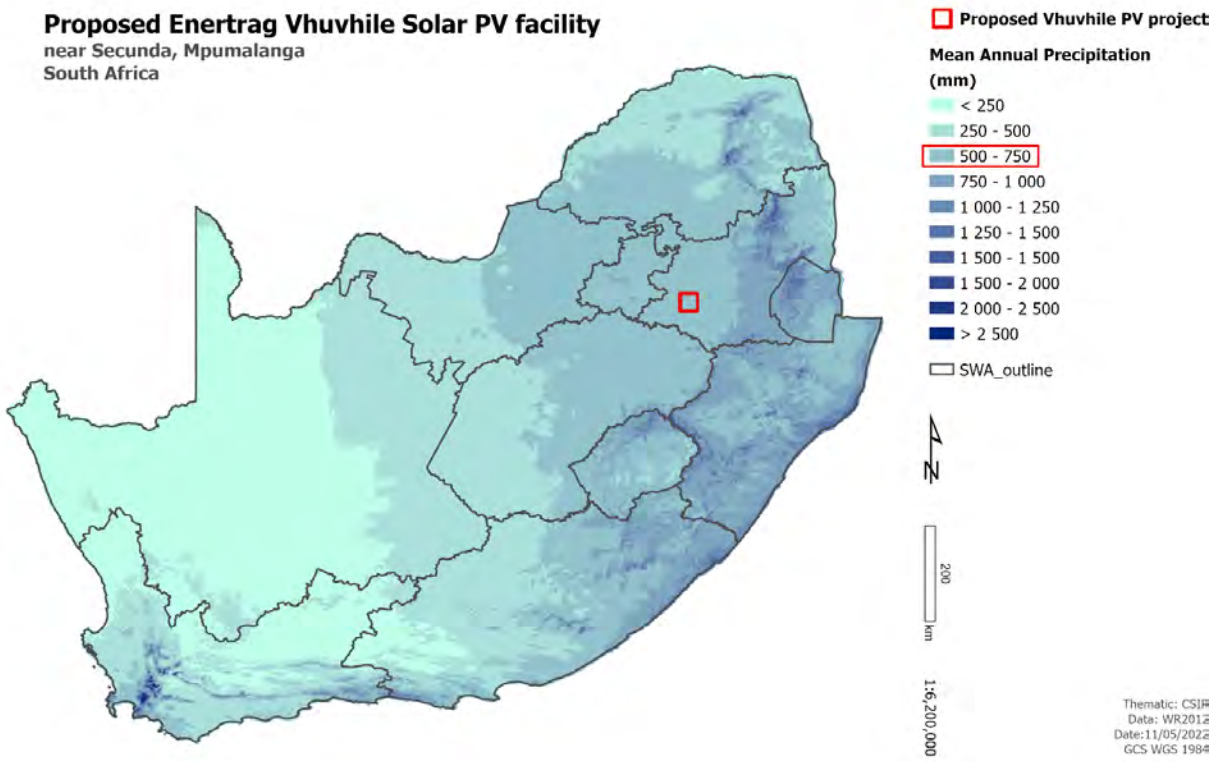


Figure 3-2: The average annual precipitation (mm) of South Africa, with the study area indicated by the red square (Source: https://www.worldweatheronline.com/, 2021)

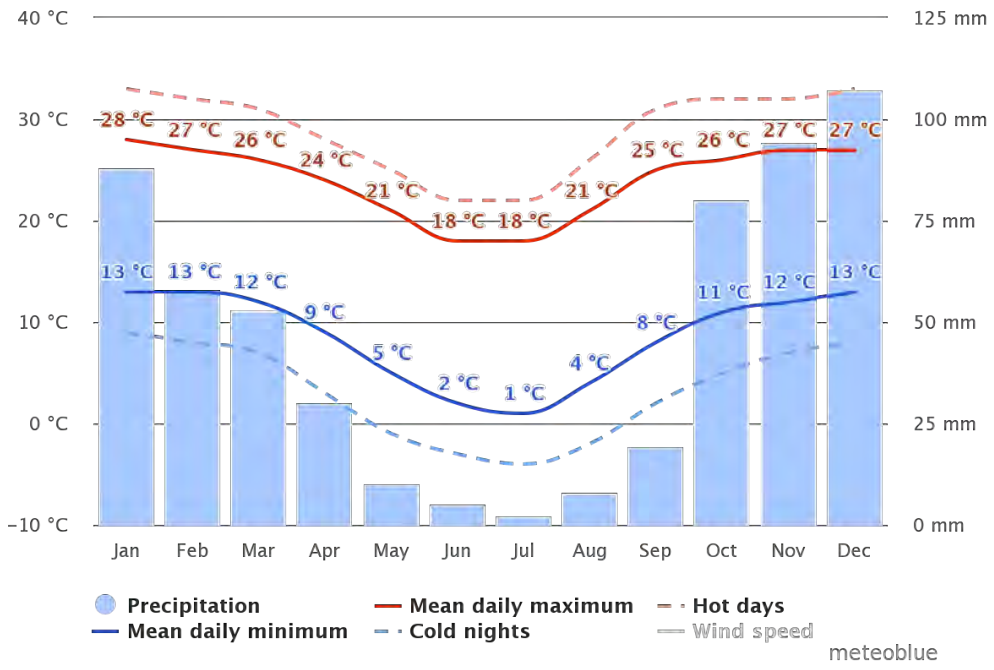


Figure 3-3: The average monthly distribution of rainfall and the average monthly maximum and minimum temperature within the Secunda area (Source: https://www.worldweatheronline.com/, 2021)

3.2.1.2 Climate Change

Climate change is identified as a key challenge in the Mpumalanga Spatial Development Framework (2019). In this regard the activities in the province, specifically the generation of coal powered energy, account for 90% of South Africa's scheduled emissions. The province is also home to 50% of the most polluted towns in the country.

Temperatures in the Secunda region are anticipated to rise with resulting lower annual rainfall in the medium to long term, although it is uncertain what impact increasing climate change will have on rainfall patterns in the region. Lower rainfall will also mean higher levels of evaporation and average wind velocities are expected to increase as well. As a result, these increasingly hot, arid conditions will cause the vegetation to become less resilient with an overall reduction in carrying capacity and a potential increase in veld fires. In addition, agricultural potential of the region is expected to be severely impacted with a further decline in productivity and yield. Climate change will also include the risk of droughts and flooding. This will ultimately require the adoption of more drought-tolerant farming practices or the implementation of alternative land uses such as renewable energy generation developments, in particular solar and wind to ensure economic growth.

3.2.2 Terrain morphology and drainage

The site is characterised by grassland on gently undulating plains. The altitude ranges from about 1 600 m a.s.l. in the west along the Klipspruit up to approximately 1653 m a.s.l. in the east and 1660 m a.s.l. in the northeast of the site (Figure 3-4). The site is drained from southeast to northwest by the Klipspruit and its tributaries (van Rooyen, 2022).

3.2.3 Topography and Landscape

The information described below is based on scoping inputs provided by the Visual Specialist, which are included in Appendix G.6 of this Scoping Report.

The project area for Vhuvhili SEF is characterised by areas plateaus at slightly higher elevations intersected by shallow river valleys. Although some of the PV arrays will be located on higher elevations, it is not anticipated that there will be significant impact on the skyline. In addition, topographic variations in the surrounding area are sufficient to limit views of the PV arrays from some parts of the study area, although across the remainder of the study area there would be little topographic shielding to reduce the visibility of the from many of the locally occurring receptor locations.

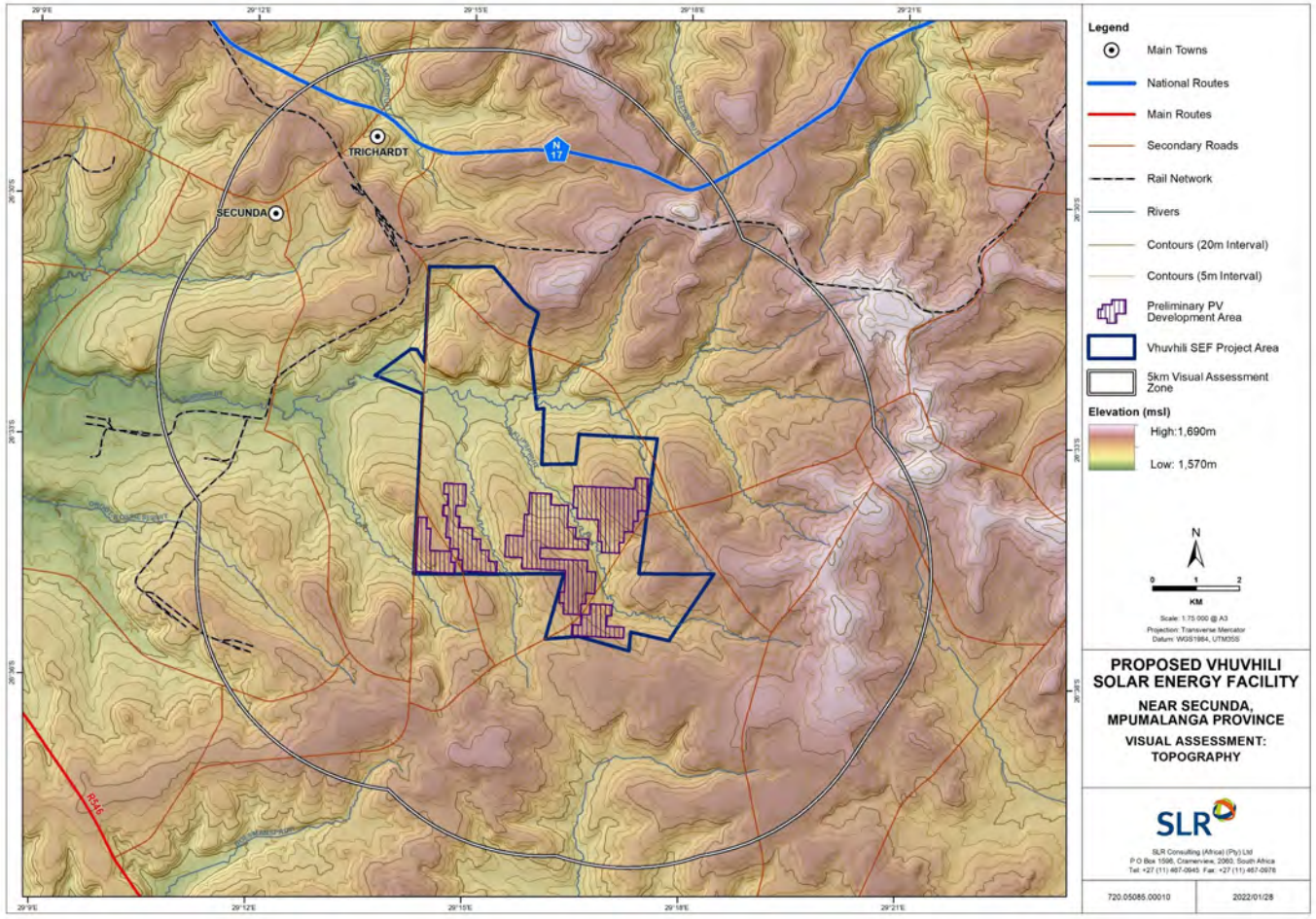


Figure 3-4: The landscape character and topography of the Vhuvhili SEF study area and surrounds (Source: Schwartz, 2022)

3.2.4 Geology

The information described below is based on scoping inputs provided by the Terrestrial Biodiversity Specialist which are included in Appendix G.2 of this Scoping Report. The geology of the site is depicted in the 1:250 000 geological map 2626 East Rand (1986) (Figure 3-5). Most of the site is underlain by sandstone, shale and coal beds (Pv) of the Vryheid Formation, Ecca Group. The northern and southern parts are partly covered by dolerite (Jd) with alluvium occurring along the drainage lines.

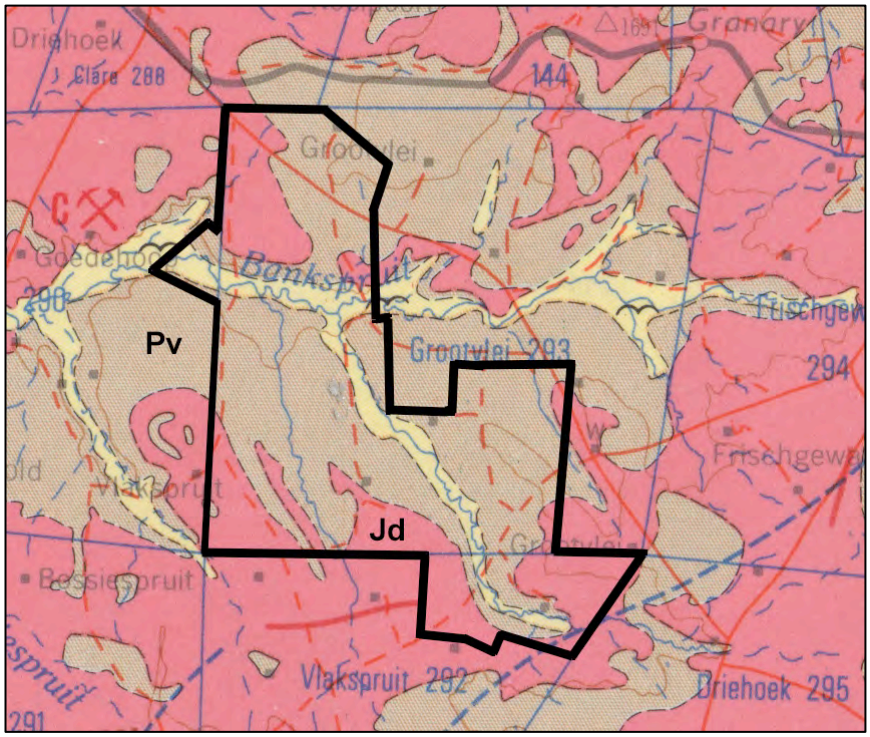


Figure 3-5: The Geology of the Vhuvhili SEF site (2628 East Rand Geological Survey 1986). Legend: Jd = Dolerite; Pv = Sandstone, shale and coal beds (Vryheid Formation, Ecca Group); Yellow= Alluvium

3.2.5 Land Capability and Agricultural Sensitivity

The information described below is based on scoping inputs provided by the Agricultural Specialist, which are included in Appendix G.1 of this Scoping Report.

3.2.5.1 General Context

Agricultural sensitivity, in terms of environmental impact, depicted on the Department of Forestry, Fisheries and the Environment (DFFE) National Web-Based Environmental Screening Tool (hereafter referred to as the Screening Tool), is a direct function of the capability of the land for agricultural production. This is because a negative impact, or exclusion of agriculture, on land of higher agricultural capability is more detrimental to agriculture than the same impact on land of low agricultural capability.

The general assessment of agricultural sensitivity that is employed in the national web-based environmental screening tool, identifies all arable land that can support viable crop production, 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 cultivated or not. All cultivated land is classified as at least high sensitivity, based on the logic that if it is under cultivation, it is indeed suitable for cultivation, 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. 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, or at the lowest extreme, not even suitable for grazing.

3.2.5.2 Screening Tool Descriptions and Site Verification

A map of the proposed development area overlaid on the screening tool sensitivity is given in Figure 3-6, below. The land capability of the site is 7 and 8. It includes a few, isolated pixels that are of a land capability value of 9, but because there are only 5 such pixels across the site, they are not significant. The differences in land capability values across the site are the result of how the land capability data is generated by modelling, rather than actual meaningful differences in agricultural potential on the ground. Values of 7 and 8 translate to a medium agricultural sensitivity for the site.

The high agricultural sensitivity in Figure 3-6 that covers part of the site is the result of those fields being classified as cropland. However, the data on croplands on the screening tool is outdated and not always accurate. The lands indicated as cropland are no longer or have never been used as cropland. Instead, as can be seen from photographs and the latest Google Earth image, they are used for pasture, with one minor exception. The exception is indicated in Figure 3-6 and Figure 3-7 as the field outlined in green. This is the only cropland which intersects the footprint of the SEF. It is recommended that this cropland be a no-go area. The rest of the high agricultural sensitivity attributed to the site by the Screening Tool is disputed by this assessment because that land is no longer cropland, or never was. It is grassland grazing that is burnt or mowed from time to time, so can appear on satellite images as cropland. It should therefore not be classified as cropland or allocated high sensitivity because of it.

A full Agricultural Assessment will be undertaken during the EIA Phase and included in the EIA Report.

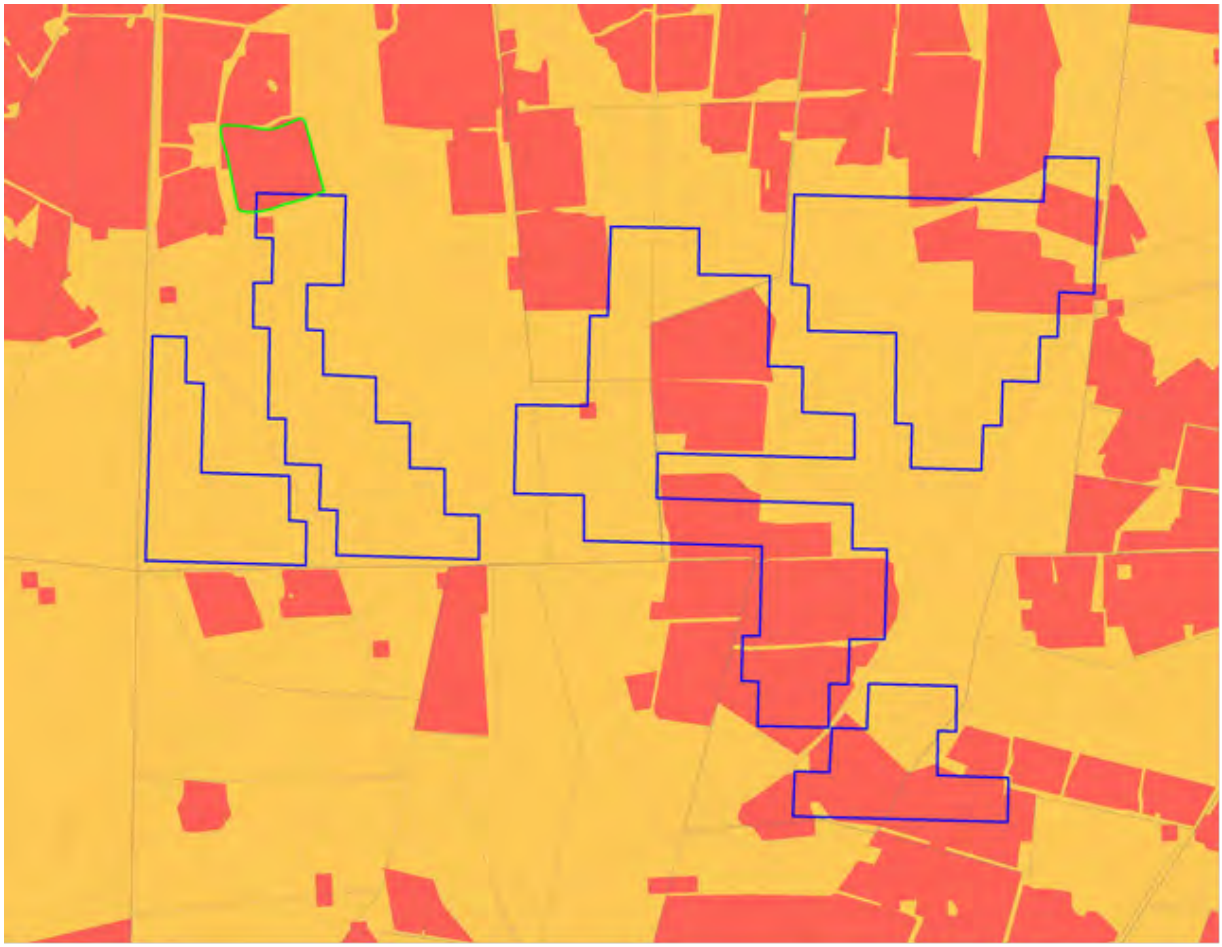


Figure 3-6: Agricultural sensitivity of the proposed Vhuvhili SEF study area (blue outline) as indicated by the Screening Tool (yellow = medium; red = high). The one area of high agricultural sensitivity cropland on which the agricultural footprint infringes is shown in green outline. It is recommended that this cropland be a no-go area (Source: Lanz, 2021).

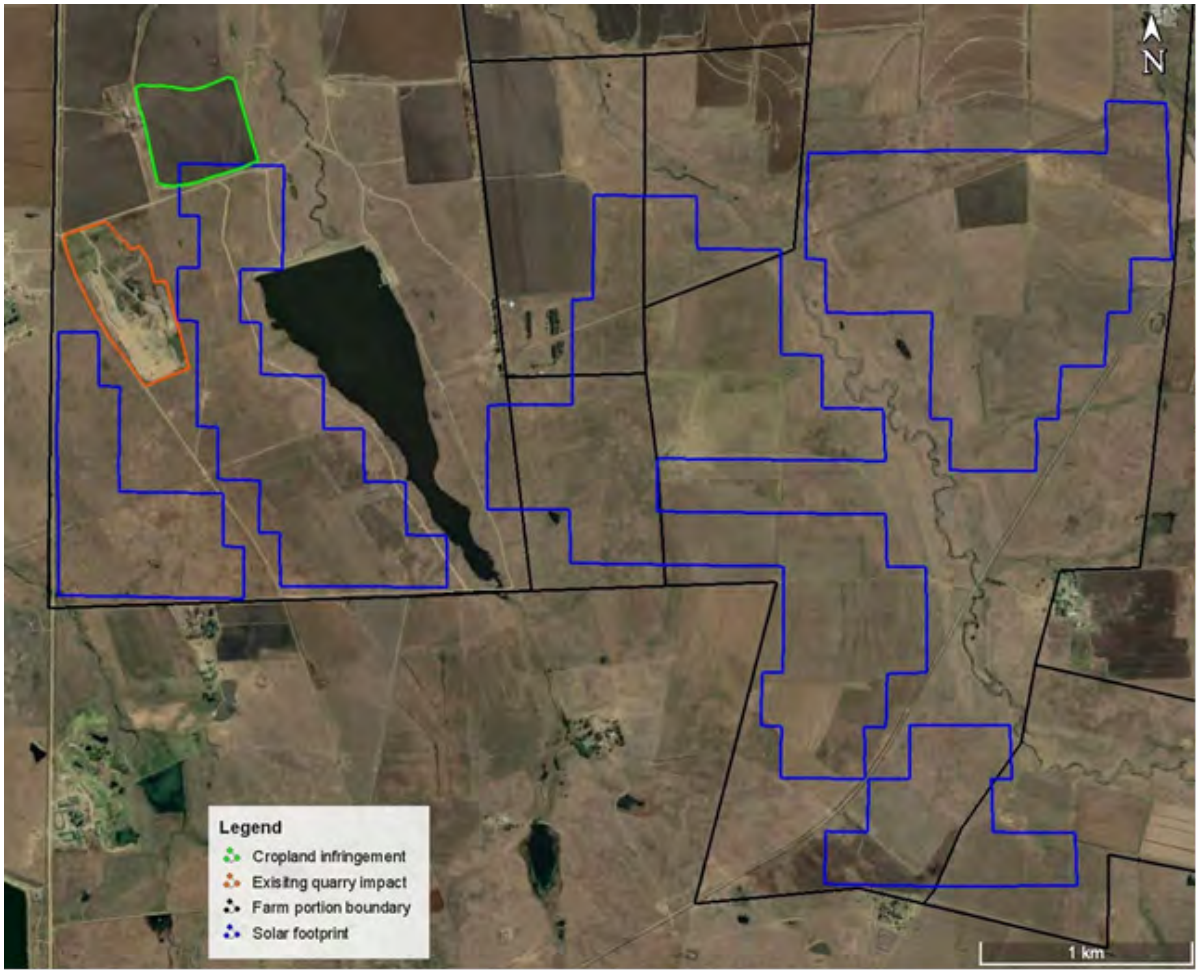


Figure 3-7: Satellite image map of the proposed footprint of the Vhuvhili SEF (Source: Lanz, 2021).

3.2.6 Terrestrial Biodiversity

Details pertaining to the terrestrial environment will be provided in the Terrestrial Biodiversity and Species Impact Assessment to be undertaken during the EIA Phase and included in the EIA Report. The information described below is based on scoping inputs provided by the Terrestrial Biodiversity Specialist, and which are included in Appendix G.2 of this Scoping Report.

3.2.6.1 Biodiversity Conservation Planning

Critical Biodiversity Areas and Ecological Support Areas

The presence of Critical Biodiversity Areas (CBA optimal or CBA2) is indicated across a large section of Vhuvhili SEF site, mostly in Habitats 4 & 5 (natural and disturbed grassland – low sensitivity rating in current survey) and on the rocky grassland habitat (Habitat 3 – medium sensitivity rating) in the southeast of the site. Large portions of the site are demarked as either 'Heavily modified' or 'Moderately modified – old lands'. These Mpumalanga Biodiversity Sector Plan (MBSP) categories do not have equivalent categories in

the SANBI CBA classification system and must be assumed to be degraded to such an extent that they cannot qualify as Ecological Support Areas (ESAs) or Other Natural Areas (ONAs).

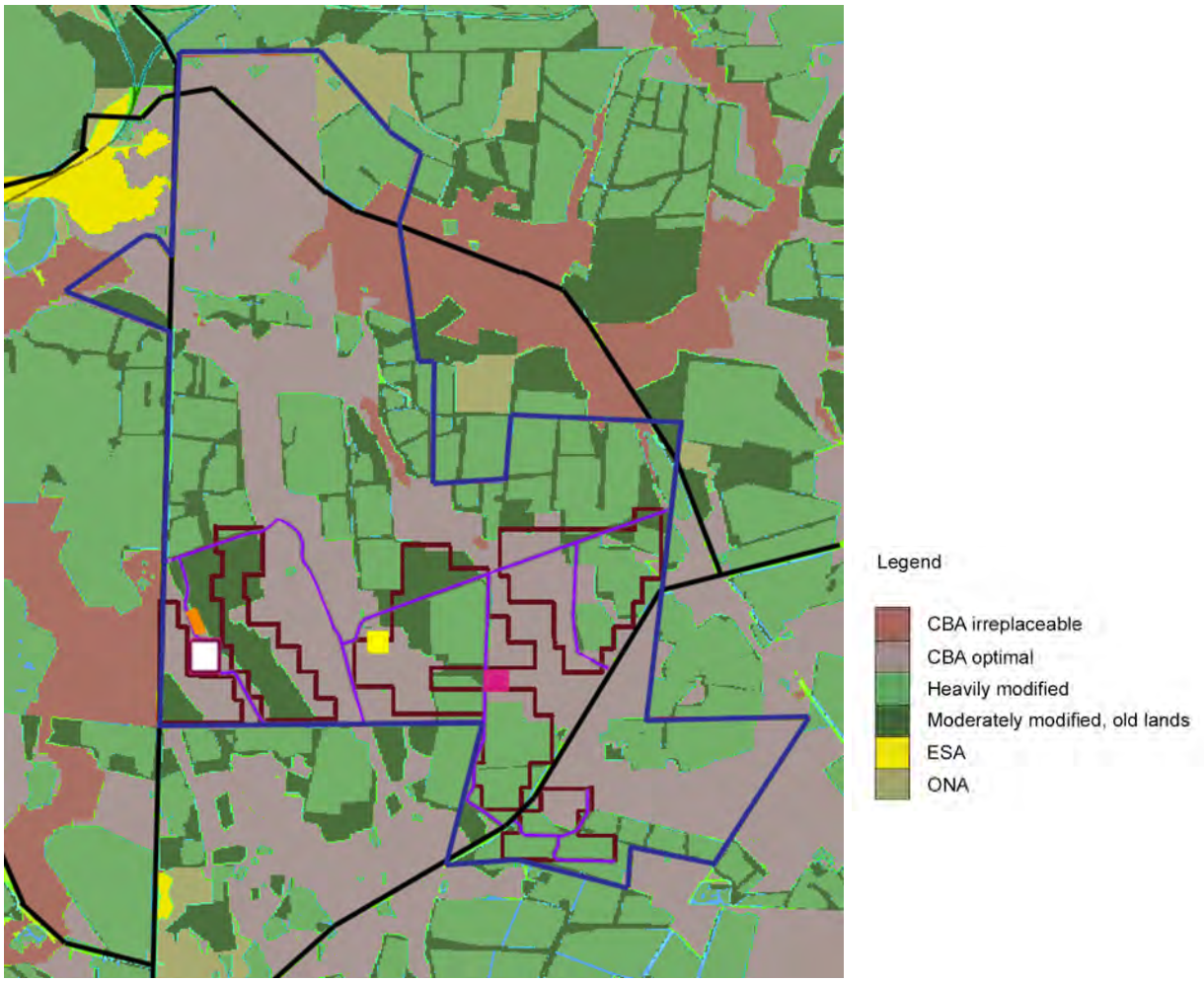


Figure 3-8: Critical Biodiversity Areas (CBAs) mapped for the Vhuvhili SEF study area and immediate surrounds (Source: van Rooyen, 2022)

3.2.6.2 Broad-scale Vegetation Types

Soweto Highveld Grassland (Gm 8)

The Vhuvhili SEF site is located within the Soweto Highveld Grassland (Gm8) vegetation type (SANBI 2006-2018). This vegetation type covers 14 513 km^2 of Mpumalanga and Gauteng (and to a very small extent also in the neighbouring Free State and North-West provinces) and occurs at an altitude ranging from 1 420 m to 1 760 m above sea level (Mucina & Rutherford 2006).

The landscape is gently to moderately undulating on the Highveld plateau, supporting dense tufted grassland dominated by *Themeda triandra*. Other common grass species include *Elionurus muticus,*

Eragrostis racemosa, Heteropogon contortus and *Tristachya leucothrix*. In undisturbed places, scattered wetlands, narrow stream alluvia, pans and occasional ridges interrupt the grassland cover. Frost and frequent grass fires during winter play an important role in limiting the occurrence of trees and shrubs in the region.

The most prominent grass species include *Andropogon appendiculatus, Brachiaria serrata*, *Cymbopogon pospischilii, Cynodon dactylon, Elionurus muticus, Eragrostis capensis, Eragrostis chloromelas, Eragrostis curvula, Eragrostis plana, Heteropogon contortus, Setaria sphacelata, Themeda triandra and Tristachya leucothrix.* The forb layer is characterised by *Hermannia depressa, Acalypha angustata, Berkheya setifera, Dicoma anomala, Haplocarpha scaposa, Helichrysum nudifolium, Helichrysum rugulosum, Justicia anagalloides, Selago densiflora, Senecio coronatus, Hilliardiella elaeagnoides* and *Wahlenbergia undulata.*

3.2.6.3 Description of habitats

During the field survey undertaken by the Terrestrial Biodiversity specialist, 26 sampling sites were surveyed at the proposed Vhuvhili SEF development site. However, a further 54 sample plots were surveyed on the proposed Mukondeleli and Impumelelo Wind Energy Facility (WEF) sites in the nearby region (as indicated above, these projects are proposed by the same Project Proponent, i.e. ENERTRAG, but are subject to separate applications for EIA). A total of 80 sample plots were used to improve the identification and description of habitat types in the area. Based on species composition, seven habitats (plant communities) were distinguished, described and mapped on the Vhuvhili SEF site (Figure 3-9). A further four units were also distinguished, i.e. croplands, infrastructure, disturbed areas and dams.

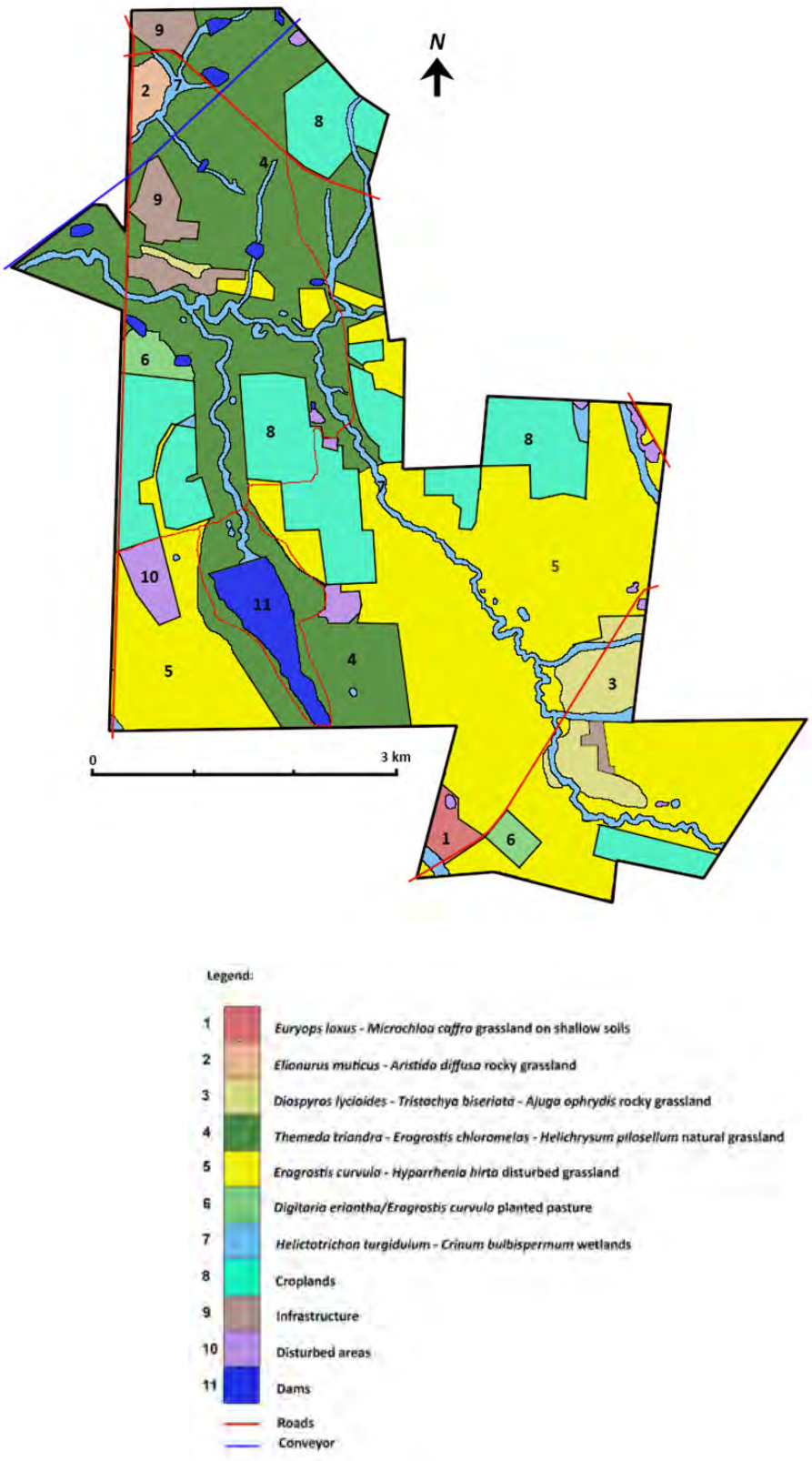


Figure 3-9: Vegetation map of the proposed Vhuvhili SEF site (Source: van Rooyen, 2022)

List of habitats (plant communities) and other units:

1.	*Euryops laxus - Microchloa caffra* grassland on shallow soils
2.	*Elionurus muticus - Aristida diffusa* rocky grassland
3.	*Diospyros lycioides - Tristachya biseriata - Ajuga ophrydis* rocky grassland
4.	*Themeda triandra - Eragrostis chloromelas - Helichrysum pilosellum* natural grassland
5.	*Eragrostis curvula - Hyparrhenia hirta* disturbed grassland
6.	*Digitaria eriantha/Eragrostis curvula* planted pasture
7.	*Helictotrichon turgidulum - Crinum bulbispermum* wetlands
	7a. *Helictotrichon turgidulum - Leersia hexandra* wetlands
	7b. *Andropogon appendiculatus - Cyperus longus* wetlands
	7c. *Typha capensis - Phragmites australis* wetlands
8.	Cropland
9.	Infrastructure
10.	Disturbed areas
11.	Dams

The section below describes these different habitats.

1. *Euryops laxus - Microchloa caffra grassland* on shallow soils

This rocky grassland occurs in a small area on the plains in the southern parts of the Vhuvhili SEF site (Figure 3-10). It occurs on shallow soils on rocky sheets. Surface rocks and gravel cover less than 10% of the area. The shallow, dark-brown, clayey soils are derived from dolerite. This habitat forms patches within the surrounding grassland and becomes waterlogged during the rainy season.

Figure 3-10: Community 1: *Euryops laxus - Microchloa caffra* grassland on shallow soils on the southern plains of the Vhuvhili SEF site.

The diagnostic species of this habitat (community) include *Euryops laxus*, *Microchloa caffra*, *Dipcadi ciliare*, *Panicum repens*, *Jamesbrittenia stricta*, *Colchicum striatum*, *Huernia hystrix* and *Oropetium capense* (species group 1, Appendix A of the Terrestrial Biodiversity and Species Assessment which is included in Appendix G.2 of this Scoping Report).

- The grass layer is well-developed and covers approximately 78% of the area. The dominant grass species include *Eragrostis plana, Eragrostis chloromelas, Themeda triandra* and *Eragrostis curvula*. Other common grass species include *Microchloa caffra, Panicum repens, Tragus berteronianus, Oropetium capense, Aristida diffusa* and *Setaria incrassata.*
- Herbaceous species have a mean canopy cover of approximately 15%. The most common species include *Euryops laxus, Jamesbrittenia stricta, Hermannia* cf. *coccocarpa*, *Tulbaghia acutiloba*, *Geigeria burkei*, *Monsonia angustifolia*, *Hibiscus trionum* and the sedges *Cyperus rupestris, Cyperus semitrifidus* and *Cyperus capensis.*
- The prominent succulent species include *Euphorbia clavarioides, Huernia hystrix* and *Crassula* cf. *setulosa*.
- The most prominent geophytes include *Dipcadi ciliare, Colchicum striatum, Gladiolus robertsoniae* and *Ledebouria* cf. *minima*.
- The following alien invasive plant species was recorded in this community: *Solanum elaeagnifolium.*

Threatened (red listed) and/or protected species recorded in plant community 1:

IUCN list:	*Gladiolus robertsoniae**
NEM:BA (ToPS):	None
NFA:	None
MNCA:	*Gladiolus robertsoniae**, *Crinum bulbispermum**, *Huernia hystrix**
CITES:	*Euphorbia clavarioides**
Endemic species:	None

*In community 1, but not recorded on the Vhuvhili SEF site.

2. *Elionurus muticus - Aristida diffusa* rocky grassland

This rocky grassland covers a small area in the northwest of the Vhuvhili SEF site (Figures 3-11). Surface rocks and gravel cover <10% of the area. The shallow to intermediate deep, dark-brown, clayey soils are derived from dolerite.

Figure 3-11: Community 2: *Elionurus muticus - Aristida diffusa* rocky grassland in the northwest of the Vhuvhili site.

The diagnostic species of this habitat (community) include *Melinis repens* and *Kohautia amatymbica* (species group 2, Appendix A of the Terrestrial Biodiversity and Species Assessment which is included in Appendix G.2 of this Scoping Report).

- Shrubs cover on average 1% of the area and the most prominent species are *Diospyros lycioides* and *Searsia rigida.*
- Dwarf shrubs cover less than 1% of the habitat and include *Erythrina zeyheri* and *Felicia muricata.*
- The grass layer is well-developed and covers approximately 93% of the area. The dominant grass species include *Elionurus muticus, Eragrostis chloromelas, Themeda triandra* and *Aristida diffusa*. Other grass species include *Eragrostis racemosa, Eragrostis capensis, Eragrostis curvula, Brachiaria serrata, Melinis repens* and *Cymbopogon pospischilii.*
- Herbaceous species have a mean canopy cover of approximately 6%. The most common species include *Dianthus mooiensis, Hermannia depressa, Hilliardiella elaeagnoides, Berkheya radula, Berkheya setifera, Helichrysum rugulosum, Haplocarpha scaposa* and *Conyza podocephala*.
- Prominent succulent species include *Euphorbia clavarioides* and *Aloe transvaalensis.*
- The most common geophytes include *Hypoxis rigidula, Boophone disticha* and *Dipcadi viride.*
- The following alien invasive plant species was recorded in this community: *Solanum elaeagnifolium.*

Threatened (red listed) and/or protected species recorded in plant community 2:

IUCN list:	None
NEM:BA (ToPS):	None
NFA:	None
MNCA:	*Aloe transvaalensis*, Boophone disticha*
CITES:	*Euphorbia clavarioides*, Aloe transvaalensis**

Endemic species: None

*In community 2, but not recorded at the proposed Vhuvhili SEF site.

3. *Diospyros lycioides - Tristachya biseriata - Ajuga ophrydis* rocky grassland

This rocky grassland occurs on the plains and gentle footslopes in the southeastern parts of the Vhuvhili SEF site (Figures 3-12). Surface rocks and gravel cover less than 10% of the area. The shallow to intermediate deep, dark-brown, clayey soils are derived from dolerite or sandstone and shale.

Figure 3-12: Community 3: *Diospyros lycioides - Tristachya biseriata - Ajuga ophrydis* rocky grassland on the plains and gentle footslopes in the south-eastern parts of the Vhuvhili SEF site.

The diagnostic species of this habitat (community) include *Diospyros lycioides, Ajuga ophrydis, Tephrosia capensis, Acalypha angustata, Tristachya biseriata* and *Erythrina zeyheri* (species group 4, Appendix A of the Terrestrial Biodiversity and Species Assessment which is included in Appendix G.2 of this Scoping Report).

- Shrubs cover on average 3% of the area and the most prominent species are *Diospyros lycioides, Searsia magalismontana* and *Searsia rigida*.
- Dwarf shrubs cover 2% of the habitat and include *Artemisia afra, Erythrina zeyheri, Ziziphus zeyheriana, Asparagus cooperi* and *Athrixia elata.*
- The grass layer is well-developed and covers approximately 81% of the area. The dominant grass species include *Eragrostis chloromelas, Themeda triandra, Setaria incrassata, Setaria nigrirostris, Brachiaria serrata* and *Setaria sphacelata*. Other grass species include *Tristachya biseriata, Hyparrhenia hirta, Eragrostis curvula* and *Cynodon dactylon.*
- Herbaceous species have a mean canopy cover of approximately 11%. The most common species include *Ajuga ophrydis, Tephrosia capensis, Acalypha angustata, Senecio othonniflorus, Dianthus mooiensis, Scabiosa columbaria, Helichrysum rugulosum, Berkheya setifera, Berkheya radula,*

Haplocarpha scaposa, Ipomoea crassipes, Commelina africana, Cyanotis speciosa, Asclepias stellifera and *Hermannia erodioides.*

- The only succulent species recorded was *Aloe ecklonis*.
- The most common geophytes include *Eucomis autumnalis, Ledebouria graminifolia, Ledebouria cooperi, Gladiolus crassifolius, Pelargonium alchemilloides* and *Hypoxis rigidula*.
- The following alien invasive species were recorded: *Opuntia ficus-indica* and *Solanum elaeagnifolium*.

Threatened (red listed) and/or protected species recorded in plant community 3:

IUCN list: None
NEM:BA (ToPS): None
NFA: None
MNCA: *Aloe ecklonis, Eucomis autumnalis, Gladiolus crassifolius, Gladiolus dalenii**
Mpumalanga Rare species list: *Hypoxis hemerocallidea*
CITES: *Aloe ecklonis*
Endemic species: None

*In community 3, but not recorded on the Vhuvhili SEF site.

4. *Themeda triandra - Eragrostis chloromelas - Helichrysum pilosellum* natural grassland

This natural grassland occurs on the plains and gentle footslopes and covers most of the central and northern parts of the Vhuvhili SEF site (Figures 3-13). Surface rocks and gravel are absent and the deep, dark-brown, clayey soils are derived predominantly from sandstone and shale.

Figure 3-13: Community 4: *Themeda triandra - Eragrostis chloromelas - Helichrysum pilosellum* natural grassland in the central section of the Vhurvhili site.

There is no diagnostic species group that differentiates this community. However, the presence of species groups 6, 7 & 8 and the absence of species groups 1 – 5 differentiates this community (Appendix A of the Terrestrial Biodiversity and Species Assessment which is included in Appendix G.2 of this Scoping Report).

- The grass layer is well-developed and covers approximately 88% of the area. The dominant grass species include *Themeda triandra, Eragrostis chloromelas, Setaria incrassata, Elionurus muticus* and *Brachiaria serrata.* Other common grass species include *Eragrostis curvula, Eragrostis planiculmis, Hyparrhenia hirta, Setaria nigrirostris, Eragrostis plana, Lolium perenne* and *Cynodon dactylon.*
- Herbaceous species have a mean canopy cover of approximately 8%. The most common species include *Helichrysum pilosellum, Gazania krebsiana, Scabiosa columbaria, Indigofera hedyantha, Berkheya radula, Berkheya setifera, Helichrysum rugulosum, Ipomoea crassipes, Asclepias stellifera, Jamesbrittenia aurantiaca, Oenothera rosea, Oenothera tetraptera, Senecio inaequidens, Conyza podocephala, Senecio erubescens, Hermannia erodioides, Pseudognaphalium luteo-album* and *Convolvulus saggitatus.*
- The succulent species recorded in this habitat were *Aloe transvaalensis* and *Euphorbia clavarioides*.
- The most common geophytes include *Hypoxis rigidula, Hypoxis acuminata, Hypoxis hemerocallidea, Pelargonium minimum* and *Ledebouria* cf*. revoluta.*
- Sedges include *Bulbostylis humilis, Cyperus esculentus, Kyllinga erecta* and *Abildgaardia ovata*.
- The following alien invasive plant species were recorded in this community: *Cirsium vulgare, Verbena bonariensis, Verbena brasiliensis, Solanum elaeagnifolium, Cuscuta campestris* and *Datura ferox*.

Threatened (red listed) and/or protected species recorded in plant community 4:

IUCN list:	None
NEM:BA (ToPS):	None
NFA:	None
MNCA:	*Aloe ecklonis*, Aloe transvaalensis*, Gladiolus crassifolius*, Gladiolus dalenii**
Mpumalanga Rare species list:	*Hypoxis hemerocallidea**
CITES:	*Euphorbia clavarioides*, Aloe transvaalensis*, Aloe ecklonis**
Endemic species:	None

*In community 4, but not recorded on the proposed Vhuvhili SEF site.

5. *Eragrostis curvula* - *Hyparrhenia hirta* disturbed grassland

This mixture of degraded natural grassland and old abandoned croplands cover most of the southern half of the proposed Vhuvhili SEF site. It is found on the plains, footslopes and midslopes of the undulating countryside (Figures 3-14). Surface rocks and gravel are absent and the deep, dark-brown, clayey soils are derived predominantly from sandstone and shale.

There is no diagnostic species group that differentiates this community. However, the presence of species groups 9, 10 & 11 and the absence of species groups 1 – 8 differentiates this community (Appendix A of

the Terrestrial Biodiversity and Species Assessment which is included in Appendix G.2 of this Scoping Report).

- Dwarf shrubs cover less than 1% of the habitat and include *Seriphium plumosum*.
- The grass layer is well-developed and covers approximately 83% of the area. The dominant grass species include *Eragrostis curvula, Hyparrhenia hirta, Themeda triandra, Setaria incrassata, Eragrostis plana, Eragrostis chloromelas* and *Paspalum dilatatum*. Other common grass species include *Setaria nigrirostris, Setaria sphacelata, Cynodon dactylon, Hyparrhenia tamba, Elionurus muticus, Brachiaria serrata, Aristida bipartita* and *Eragrostis planiculmis.*
- Herbaceous species have a mean canopy cover of approximately 14%. The most common species include *Senecio erubescens, Oenothera tetraptera, Hermannia erodioides, Solanum elaeagnifolium, Pseudognaphalium luteo-album, Schkuhria pinnata, Ranunculus multifidus, Senecio inaequidens, Oenothera rosea, Asclepias stellifera, Asclepias* cf. *gibba, Berkheya setifera, Berkheya radula, Helichrysum rugulosum, Helichrysum aureo-nitens, Leobordea divaricata* and *Scabiosa columbaria*.

Figure 3-14: Community 5: *Eragrostis curvula* - *Hyparrhenia hirta* disturbed grassland on an abandoned cropland.

- The only succulent species recorded was *Aloe transvaalensis*.
- Prominent geophytes include *Gladiolus crassifolius, Cyrtanthus stenanthus, Hypoxis rigidula, Hypoxis argentea, Ledebouria* cf. *revoluta, Haemanthus humilis, Pelargonium luridum* and *Boophone disticha.*
- Sedges include *Abildgaardia ovata, Kyllinga erecta* and *Cyperus esculentus*.
- The following alien invasive plant species were recorded in this community: *Cirsium vulgare, Verbena bonariensis, Verbena brasiliensis, Solanum elaeagnifolium* and *Cuscuta campestris.*

Threatened (red listed) and/or protected species recorded in plant community 5:

IUCN list:	None
NEM:BA (ToPS):	None
NFA:	None
MNCA:	*Aloe transvaalensis*, Crinum bulbispermum*, Cyrtanthus stenanthus*, Gladiolus crassifolius*, Boophone disticha*
Mpumalanga Rare species list:	*Hypoxis hemerocallidea*
CITES:	*Euphorbia clavarioides, Aloe transvaalensis**
Endemic species:	None

*In community 5, but not recorded on the proposed Vhuvhili SEF site.

6. *Digitaria eriantha/Eragrostis curvula* planted pasture

This planted pasture is found on the plains at two small sites, one in the south consisting mostly of *Digitaria eriantha* pasture and one in the west consisting of *Eragrostis curvula* pasture (Figures 3-15). Surface rocks and gravel are absent and the deep, dark-brown, clayey soils are derived from sandstone, shale or dolerite.

Figure 3-15: Community 6: *Digitaria eriantha/Eragrostis curvula* planted pasture indicating a planted pasture of *Eragrostis curvula*.

There is no diagnostic species group that differentiates this community. However, the presence of species groups 11 and the absence of species groups 1 – 10 differentiates this community (Appendix A of the Terrestrial Biodiversity and Species Assessment which is included in Appendix G.2 of this Scoping Report).

- The grass layer is dominated by either *Digitaria eriantha* or *Eragrostis curvula* and covers more than 90% of the community. Other grass species include *Eragrostis chloromelas, Hyparrhenia hirta, Setaria sphacelata* and *Paspalum dilatatum.*
- Herbaceous species have a mean canopy cover of approximately 3%. The most common species

include *Senecio erubescens, Pseudognaphalium luteo-album, Hibiscus trionum, Cosmos bipinnatus* and *Nasturtium officinale*.

- The following alien invasive plant species were recorded in this community: *Solanum elaeagnifolium* and *Cuscuta campestris.*

Threatened (red listed) and/or protected species recorded in plant community 6:

IUCN list:	None
NEM:BA (ToPS):	None
NFA:	None
MNCA:	None
CITES:	None
Endemic species:	None

7. *Helictotrichon turgidulum - Crinum bulbispermum* wetlands

These streams, wetlands, vleis and floodplains are associated mostly with the Klipspruit and its tributaries and occur across most of the proposed Vhuvhili SEF site (Figures 3-16). Surface rocks are present in some places along the streams. The alluvial soils are mostly deep, dark-brown to black, clayey soils.

Figure 3-16: Community 7: *Helictotrichon turgidulum - Crinum bulbispermum* wetlands.

The diagnostic species of this habitat include Ischaemum fasciculatum, Andropogon appendiculatus, Fingerhuthia sesleriiformis and Galium capense (species group 12, Appendix A of the Terrestrial Biodiversity and Species Assessment which is included in Appendix G.2 of this Scoping Report).

- The grass layer is well-developed and covers approximately 90% of the area. The dominant grass species include *Helictotrichon turgidulum, Leersia hexandra, Paspalum dilatatum, Setaria nigrirostris, Ischaemum fasciculatum* and *Andropogon appendiculatus*. Other grass species include *Eragrostis plana, Fingerhuthia sesleriiformis, Bromus catharticus, Themeda triandra,*

Eragrostis curvula, Harpechloa falx and *Pennisetum clandestinum.*

- Herbaceous species have a mean canopy cover of approximately 10%. The most common species include *Galium capense, Plantago lanceolata, Oenothera rosea, Oenothera tetraptera, Berkheya radula, Haplocarpha scaposa, Ranunculus multifidus, Gomphocarpus fruticosus, Cosmos bipinnatus* and *Lepidium africanum*.
- The most common geophytes include *Crinum bulbispermum, Ledebouria* cf. *revoluta* and *Hypoxis argentea.*
- Sedges include, amongst others, *Cyperus longus, Cyperus esculentus* and *Schoenoplectus* cf. *muricinux*.
- The following alien invasive plant species were recorded in this community: *Cirsium vulgare, Verbena bonariensis, Verbena brasiliensis, Solanum elaeagnifolium* and *Datura ferox*.

Threatened (red listed) and/or protected species recorded in plant community 7:

IUCN list:	None
NEM:BA (ToPS):	None
NFA:	None
MNCA:	*Boophone disticha*, *Crinum bulbispermum*, *Haemanthus humilis*
CITES:	None
Endemic species:	None

Two sub-communities are distinguished on the Vhuvhili SEF site (Appendix A of the Terrestrial Biodiversity and Species Assessment which is included in Appendix G.2 of this Scoping Report):

7a. *Helictotrichon turgidulum - Leersia hexandra* wetlands

The species that characterise this sub-community include *Helictotrichon turgidulum*, *Paspalum dilatatum*, *Bromus catharticus*, *Eragrostis curvula*, *Leersia hexandra* and *Ischaemum fasciculatum*.

7b. *Andropogon appendiculatus - Cyperus longus* wetlands

The dominant species in this subcommunity include *Andropogon appendiculatus*, *Fingerhuthia sesleriiformis*, *Setaria incrassata*, *Harpechloa falx*, *Dimorphotheca* caulescens, *Crinum bulbispermum* and *Haplocarpha scaposa*.

Other mapped units that were distinguished on the proposed Vhuvhili SEF site include the following:

8. Cropland

These croplands are currently utilised mainly for maize production.

9. Infrastructure

These include farmhouses and associated infrastructure as well as industrial areas.

10. Disturbed areas

These sites include areas that are used for ground-working activities, diggings, demolished building sites and areas disturbed by farming activities (Figure 3-17).

Figure 3-17: Cattle facilities and *Eucalyptus* woodlots.

11. Dams

There is one large dam and several smaller ones on the proposed Vhuvhili SEF site (Figure 3-18).

Figure 3-18: The main dam on the proposed Vhuvhili SEF site.

3.2.6.4 Vegetation and flora

As noted above, the proposed Vhuvhili SEF site falls in the Grassland Biome and more specifically in the Mesic Highveld Grassland Bioregion. It is located in the Soweto Highveld Grassland (Gm8) national

vegetation type which has a "Vulnerable" conservation status because almost half of it has been transformed mostly by cultivation, plantations, mining and urbanisation. Overall, the vegetation on the Vhuvhili SEF site is structurally a grassland. Based on species composition, seven habitats (plant communities) were distinguished, described and mapped for the Vhuvhili SEF site. A further four units were also distinguished, i.e. croplands, infrastructure, disturbed areas and dams. The site does not fall within any Centre of Endemism.

During the field surveys undertaken in December 2021, 290 plant species were recorded on the three sites ENERTRAG is proposing for the development of renewable energy projects, i.e. Vhuvhili SEF, Mukondeleli WEF and Impumelelo WEF. Combined, the checklist generated by the NewPosa database for the region, the red-list for Mpumalanga (Lötter 2015) and the list for the current field study yielded 396 species for the region of which 30 are protected species according to the MNCA (1998).

Twelve of the 30 Mpumalanga protected plant species (Schedule 11) were recorded during the site survey. Another five species are on the Mpumalanga Red list (Lötter 2015) although not included in the MNCA (1998) list for Mpumalanga. **None of the seven Species of Conservation Concern (SCC) listed for the region were recorded on the Vhuvhili SEF site.** No threatened or protected species (ToPS listed) under the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) is listed for the Vhuvhili SEF site, and none were found at the site. Thirteen (13) CITES Appendix II species are listed for the region including mostly (10) species of the Orchidaceae. *Aloe ecklonis* was the only CITES species recorded on site. No nationally protected tree species is listed for the proposed Vhuvhili SEF site and none were recorded during the site visit. No endemic species are listed for the Soweto Highveld Grassland Vegetation Type.

3.2.6.5 Fauna

Mammals

The site falls within the distribution range of 52 terrestrial mammal species. Three IUCN Threatened and seven Near Threatened mammal species were listed for the environs of the Vhuvhili SEF site. Mammals that were sighted include the Near Threatened Serval *Leptailurus serval*, Southern African hedgehog *Atelerix frontalis* and the Southern African vlei rat *Otomys auratus.* The following Schedule 2 mammal species were recorded on the proposed Vhuvhili SEF site (MNCA 1998):

Raphicerus campestris	steenbok
Atelerix frontalis	hedgehog

The following threatened or protected mammal species (ToPS) were recorded on the proposed Vhuvhili SEF site:

Leptailurus serval	serval
Atelerix frontalis	Southern African hedgehog

The following CITES listed mammal species was recorded on the proposed Vhuvhili site:

Leptailurus serval	serval

Reptiles

Thirty-two (32) reptile species are listed for the region. *Smaug giganteus*, the giant girdled lizard, has a Vulnerable IUCN status and is classified as Endangered in the NEMBA (2007c) ToPS list, but was not highlighted by the screening tool for the site. Provincially protected reptile species include 15 Schedule 2 Protected reptiles and 17 Schedule 5 reptiles. Two CITES listed species were recorded for the region:

Giant girdled lizard (Ouvolk)
Common girdled lizard

The only reptile that the landowners reported for the proposed Vhuvhili SEF site, is the Rinkhals, *Hemachatus haemachatus*.

The Screening Tool listed *Lepidochrysops procera* (Lepidoptera) as a SCC for the site. However, it was not listed in the ADU database, the Mpumalanga Nature Conservation Act (MNCA) (1998) provincial species lists or the NEMBA (2007c) ToPS lists. *Lepidochrysops procera* was not recorded on site and is unlikely to occur there because its host plant (*Ocimum obovatum*) was not present on site.

3.2.6.6 Conservation planning

Protected Areas and National Protected Areas Expansion Strategy

The proposed Vhuvhili SEF site is not located in a protected area, nor does it form part of the NPAES.

Ecological Support Areas

No ESAs are located within Vhuvhili SEF site, although an ESA is present on the north-western boundary of Vhuvhili SEF site.

Other Natural Area

A small Other Natural Area (ONA) is located on the northeastern boundary of Vhuvhili SEF site (Figure 3-8).

Strategic Water Source Area

The site does not fall in a Strategic Water Source Area (SWSA). There are no Local or Landscape Corridors demarcated within the Vhuvhili SEF site (MBSP 2014; biodiversityadvisor.sanbi.org) and the development will thus not impact on them.

Critical Biodiversity Areas and Ecological Support Areas

The presence of Critical Biodiversity Areas (CBA optimal or CBA2) is indicated across a large section of Vhuvhili SEF site, mostly in Habitats 4 & 5 (natural and disturbed grassland – low sensitivity rating in current survey) and on the rocky grassland habitat (Habitat 3 – medium sensitivity rating) in the southeast of the site (Figure 3-8). Large portions of the site are demarked as either 'Heavily modified' or 'Moderately modified – old lands'. These MBSP categories, do not have equivalent categories in the SANBI CBA classification system and must be assumed to be degraded to such an extent that they cannot qualify as ESAs or ONAs.

Freshwater Ecosystem Protected Areas

The screening tool made no mention of river or wetland FEPAs for the Vhuvhili SEF site. The entire site is contained in an Upstream Management Area River FEPA. However, the area mapped as river FEPA did not emerge as being highly sensitive in the current assessment and the sensitivity model that was applied, classified only the drainage lines on site as being of high sensitivity with most of the area classified as low sensitivity and a few spots of medium sensitivity. Several wetland FEPA categories are present in the Vhuvhili SEF site, with most of the seeps and channelled valley-bottom wetlands captured in the CBA delineation.

3.2.6.7 Screening Tool Descriptions and Site Verifications

Based on the screening report generated, the following sensitivities are applied:

Relative Biodiversity Theme

The screening tool rated the sensitivity of the Relative Terrestrial Biodiversity Theme as Very High based on the presence of Vulnerable ecosystem, CBAs and NPAES (Figure 3-19). The specialist's background study confirmed that the Soweto Highveld Grassland vegetation type on site is listed as Vulnerable. However, they could not find support that the study area is not located in an area earmarked for NPAES (NPAES 2011 being the only 'approved' database available on the BGIS.SANBI website). Their background study indicated the presence of CBAs on site. However, their sensitivity analysis rated large areas delineated as CBA as being of low sensitivity because they are degraded and under cropland/abandoned cropland and would thus not qualify as CBA. Nevertheless, solar panels should preferably not be located within the area demarcated as a CBA. River or wetland FEPAs were not flagged by the screening tool as reasons for the very high sensitivity.

If the same 4-tiered scale were to be applied to the Terrestrial Biodiversity Theme, as in the case of the other themes, the specialist concluded that they would downgrade the sensitivity to **Medium.**

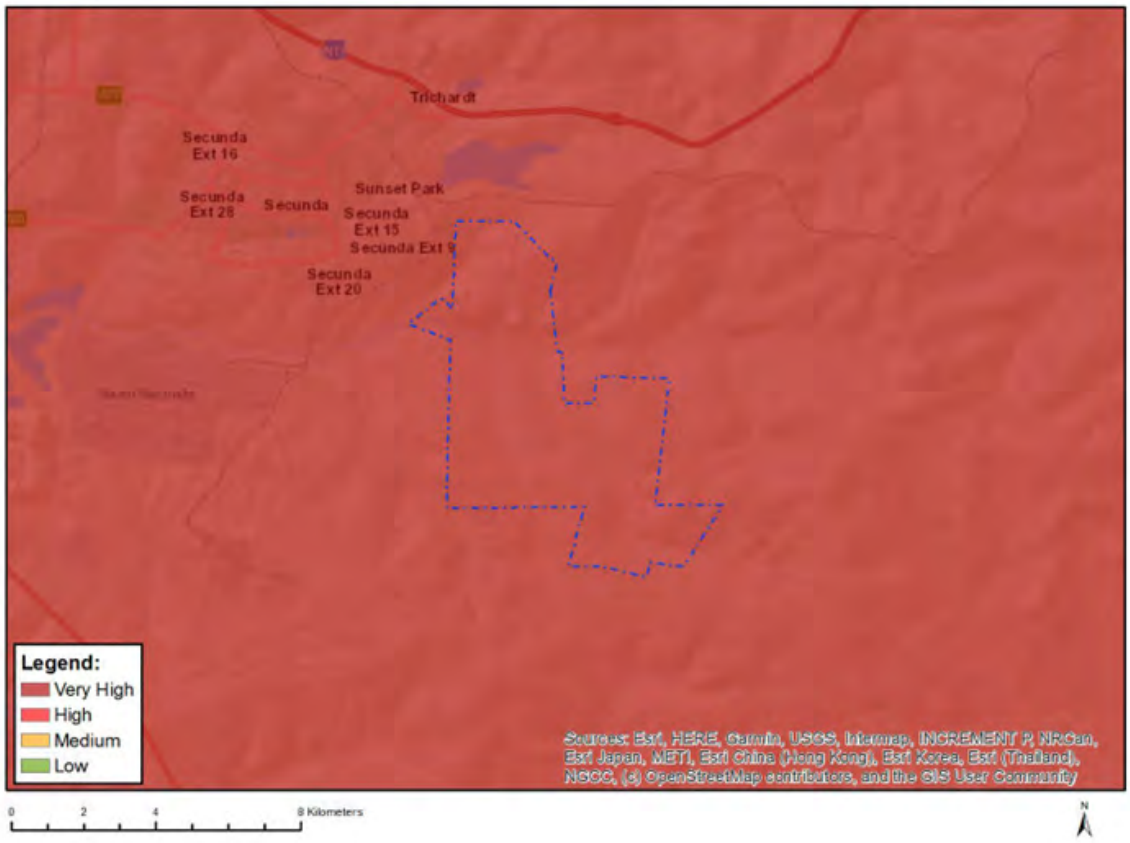


Figure 3-19: Map of relative Terrestrial Biodiversity theme sensitivity generated by the Screening Tool (Source: van Rooyen, 2022)

Plant Species Theme

The screening tool rated the sensitivity of the Plant Species Theme as Medium (Figure 3-20) and three species were highlighted as being of concern. **None of the SCC highlighted by the screening tool were recorded on site and the specialist's background study indicated that most of site had a low sensitivity**.

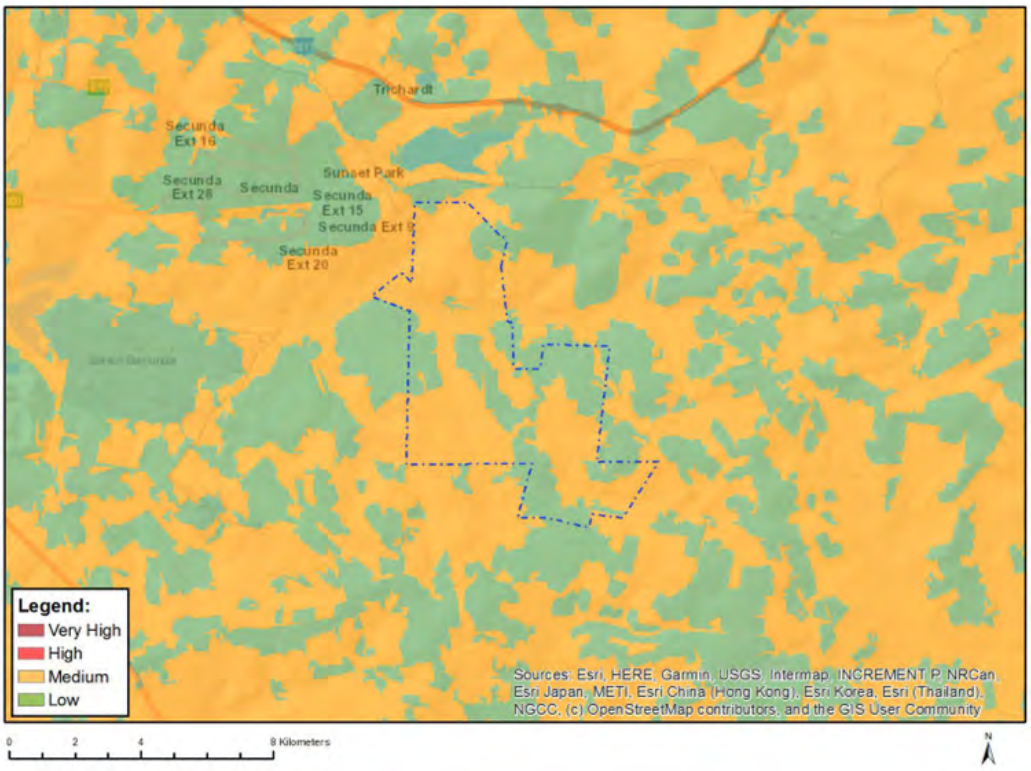


Figure 3-20: Map of relative Plant Species theme sensitivity generated by the Screening Tool (Source: van Rooyen, 2022)

Animal Species Theme

The screening tool rated the sensitivity of the Animal Species Theme as High (Figure 3-21). Animal species (excluding avifauna) highlighted by the screening tool for the region included *Crocidura maquassiensis* and *Hydrictis maculicollis.* Both were not listed in the ADU mammal species list or the MNCA (1998) lists for the Mpumalanga province. Neither of them was recorded on site during the survey although they may occur in the region.

The Screening Tool listed *Lepidochrysops procera* (Lepidoptera) as a SCC for the site. However, it was not listed in the ADU database, the MNCA (1998) provincial species lists or the NEMBA (2007c) ToPS lists. *Lepidochrysops procera* was not recorded on site and is unlikely to occur there because its host plant (*Ocimum obovatum*) was not present on site. What the screening tool did not highlight was the possible presence of the giant girdled lizard, a species with a Vulnerable IUCN status. However, the species was not recorded on site. Overall, the sensitivity of the animal species theme (avifaunal component excluded) is rated as **medium.** If the suggested mitigation measures are followed the animal SCC should not be negatively affected by the development.

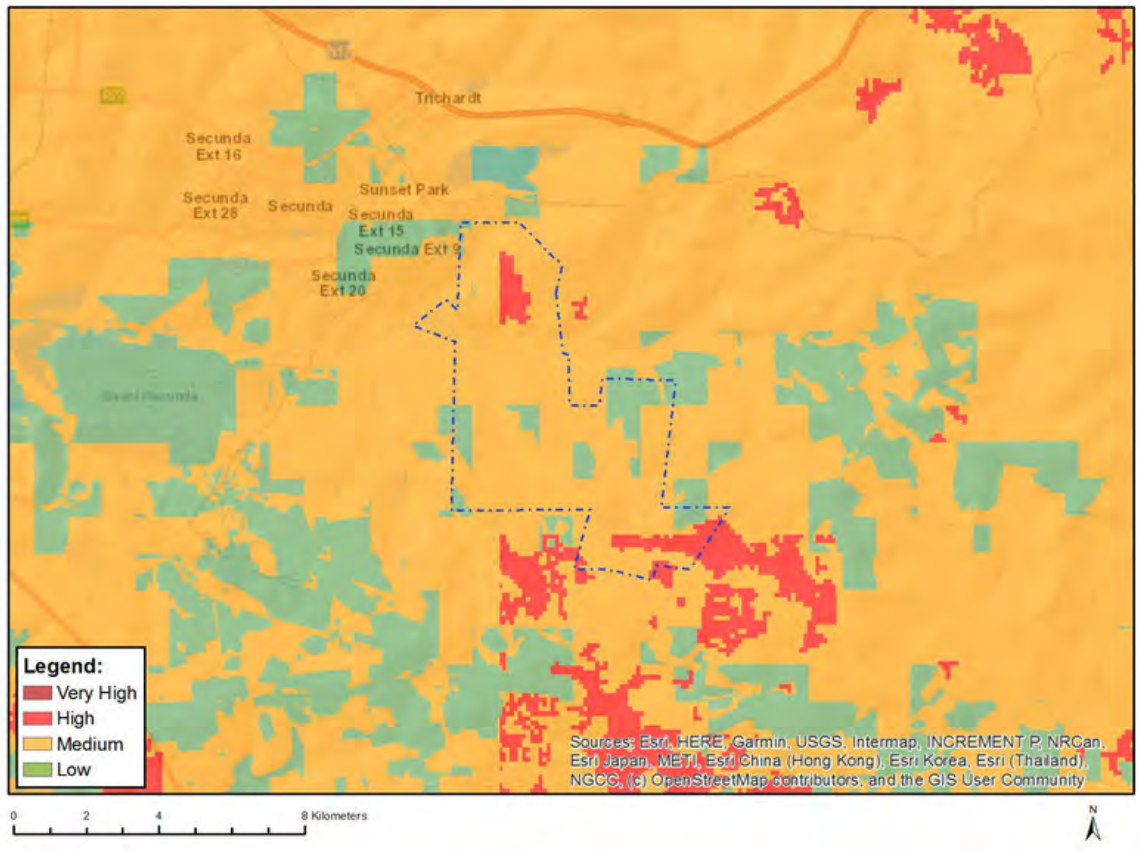


Figure 3-21: Map of relative Animal Species theme sensitivity generated by the Screening Tool (Source: van Rooyen, 2022)

3.2.7 Aquatic Biodiversity

The information described below is based on scoping inputs provided by the Aquatic Specialist, and which are included in Appendix G.3 of this Scoping Report.

3.2.7.1 General description of the Aquatic environment

A review of available literature and spatial data formed the basis of a characterisation of the biophysical environment Table 3-5 below provides a summary of the important aspects.

Table 3-5: Summary of the findings of the Aquatic Biodiversity Study relevant to the proposed Vhuvhili Solar PV Project Site

Level of significance	Information or Source	Significance specific to the study site	Figure and Reference
International		No World Heritage sites within 50km of site. The Blesbokspruit RAMSAR wetlands are approximately 100 km west of site.	(Ramsar)
	Water Management Area	Vaal and C12D quaternary catchment	(Figure 3-22, DWS)
	National Freshwater Priority Areas	The study site is situated within an upstream FEPA. Upstream FEPA's are areas in which human activities need to be managed to prevent damage to downstream FEPA's. The Klipspruit River and associated wetlands that drain into the Klipspruit River are all classified as NFEPA Wetlands.	(Nel et al., 2011)
	Strategic Water Resources Areas	Strategic Water Source Areas (SWSAs) surface and ground water areas have been identified for South Africa. Strategic Water areas. Strategic water areas are defined as follows: "Surface water SWSAs (SWSA-sw): Areas of land that supply a disproportionate (i.e. relatively large) quantity of mean annual surface water runoff in relation to their size. Groundwater SWSAs (SWSA-gw): Are areas which combine areas with high groundwater availability as well as where this groundwater forms a nationally important resource". (Le Maitre, 2018) The study site is not within a SWSA. Two of the Upper Vaal SWSA-sw are situated to the north-west (21 km) and to the south-east (3 km).	(**Error! Reference source not found.**, Le Maitre, 2018) Figures 3-23
	National Biodiversity Assessment (NBA) 2018	Critically Endangered, Endangered and Vulnerable ecosystems are collectively referred to as threatened ecosystems and may be listed as such in terms of the Biodiversity Act. In terms of rivers the Klipspruit River has a	(Figure 3-24 and Figure 3-25, Skowno *et al.,* 2018,

Level of significance	Information or Source	Significance specific to the study site	Figure and Reference
		Present Ecological State (PES) of B-F indicating they are largely natural to critically modified. The majority of the rivers have a PES of C therefore it is expected that the Klipspruit and its tributaries will be moderately modified. The Ecosystem Threat Status (ETS) is Critically Endangered, and the Ecosystem Protection Level (EPL) of the Klipspruit is poorly protected. The wetlands in and around the study site have been classified as Mesic Highveld Grassland Group 3 wetlands	Van Deventer, *et al., 2019)*
	PES 2014	The Present Ecological State (PES), Ecological Importance (EI) and Ecological Sensitivity (ES) was determined per Sub Quaternary Reaches (SQR) for Secondary Catchments in South Africa. The SQRs within close proximity to the site are as follows: • SQR 1614 (PES – C), (EI-Moderate), (ES-High) • SQR 1629 (PES – C), (EI-Moderate), (ES-High) • SQR 1634 (PES – C), (EI-Moderate), (ES-High) • SQR 1655 (PES – B), (EI-Moderate), (ES-High) • SQR 1660 (PES – B), (EI-Moderate), (ES-Moderate) • SQR 1668 (PES – C), (EI-Moderate), (ES-Moderate) • SQR 1664 (PES – C), (EI-Moderate), (ES-Moderate) • SQR 1663 (PES – C), (EI-Moderate), (ES-Moderate) A PES of C indicates the reach is moderately modified whilst a PES of B indicates the reach is largely natural.	(Figure 3-26, DWS, 2014).
Provincial	Mpumalanga Biodiversity Sector Plan (MBSP)	In 2014, the Mpumalanga Parks and Tourism Agency developed the MBSP. In essence the MBSP is a map guiding areas of conservation concern for the Mpumalanga Province. Two maps have been developed, namely one for terrestrial biodiversity, and the other for freshwater biodiversity. The MBSP maps the freshwater ecosystems of Mpumalanga into the following categories:	(Figure 3-27 and Figure 3-28, Lötter *et al.,* 2014))

Level of significance	Information or Source	Significance specific to the study site	Figure and Reference
		• Critical Biodiversity Areas (CBAs) – areas of high biodiversity value, needed to meet biodiversity targets. These areas should be maintained in natural or near natural state; • Ecological Support Areas – these areas support CBAs, but are not essential for meeting conservation targets; • Other Natural Areas – these areas have natural characteristics but have not been earmarked as priority areas for conservation but perform a range of biological as well as ecological functions; • Heavily Modified Areas – Areas that have been impacted and have had a significant or complete loss of natural habitat and ecological function. Based on the terrestrial MBSP the majority of the site is classified as CBA l with medium to large areas classified as heavily or moderately modified. Old lands also occupy some section especially in the south. A large section associated with the Klipspruit River is classified as CBA. The freshwater map indicated that the aquatic ecosystems in and around the study site are other natural areas. There is an ecological support area to the west of the study site.	

3.2.7.2 Hydrology and watercourse classification and delineation at the Vhuvhili SEF site

Several wetlands and rivers are located on the study site and all drain into the Klipspruit River in the middle of the study site (Figure 3-22).

Four types of wetlands (Hydro-Geomorphic Units) were identified during the site visit:

- 7 Floodplain Wetlands;
- 4 Channelled Valley Bottom Wetlands;
- 8 Unchannelled Valley Bottom Wetlands; and
- 1 Seepage Wetland.

It is important to note that all the aforementioned wetlands ultimately form part of the same hydrological system, and all the watercourses drain into the central Klipspruit River (which is classified as a floodplain wetland). The Klipspruit River drains into Trichardspruit and then into the Kleinspruit approximately 10 km west of the study site.

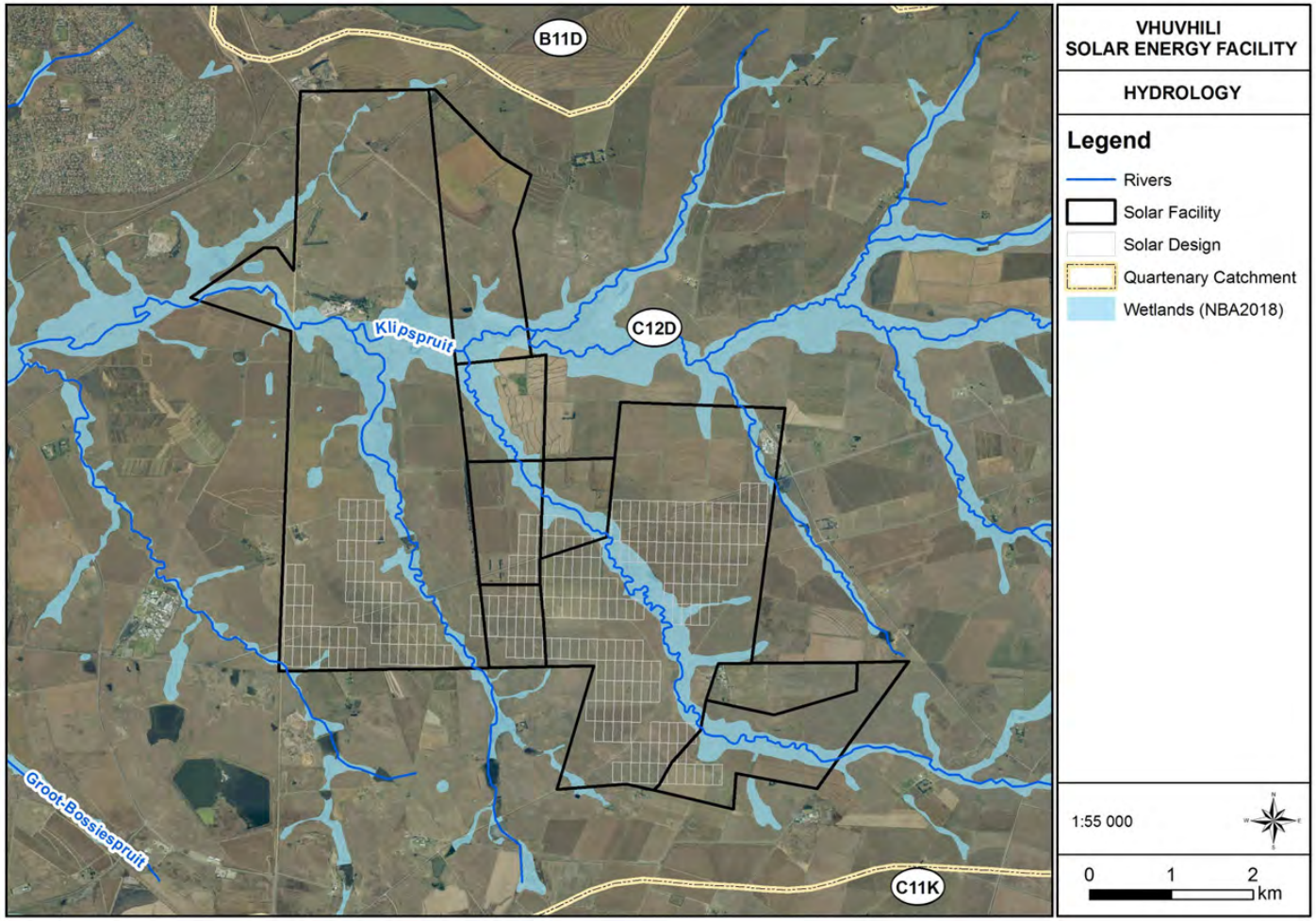


Figure 3-22: Hydrology of the study site and surrounds as per existing spatial layers (Source: den Boogert et al, 2022)

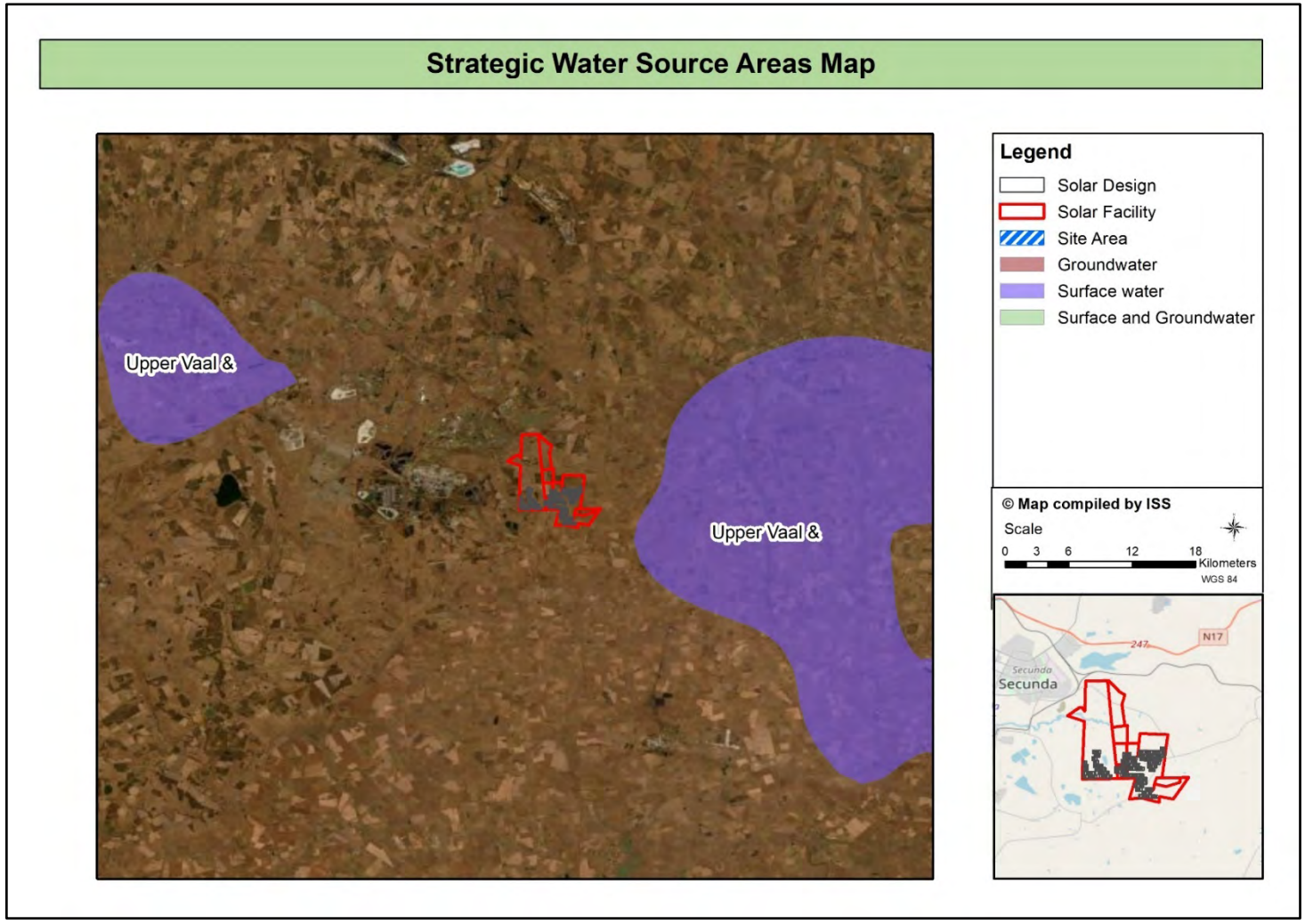


Figure 3-23: Locality of Strategic Water Source Areas relevant to the study site

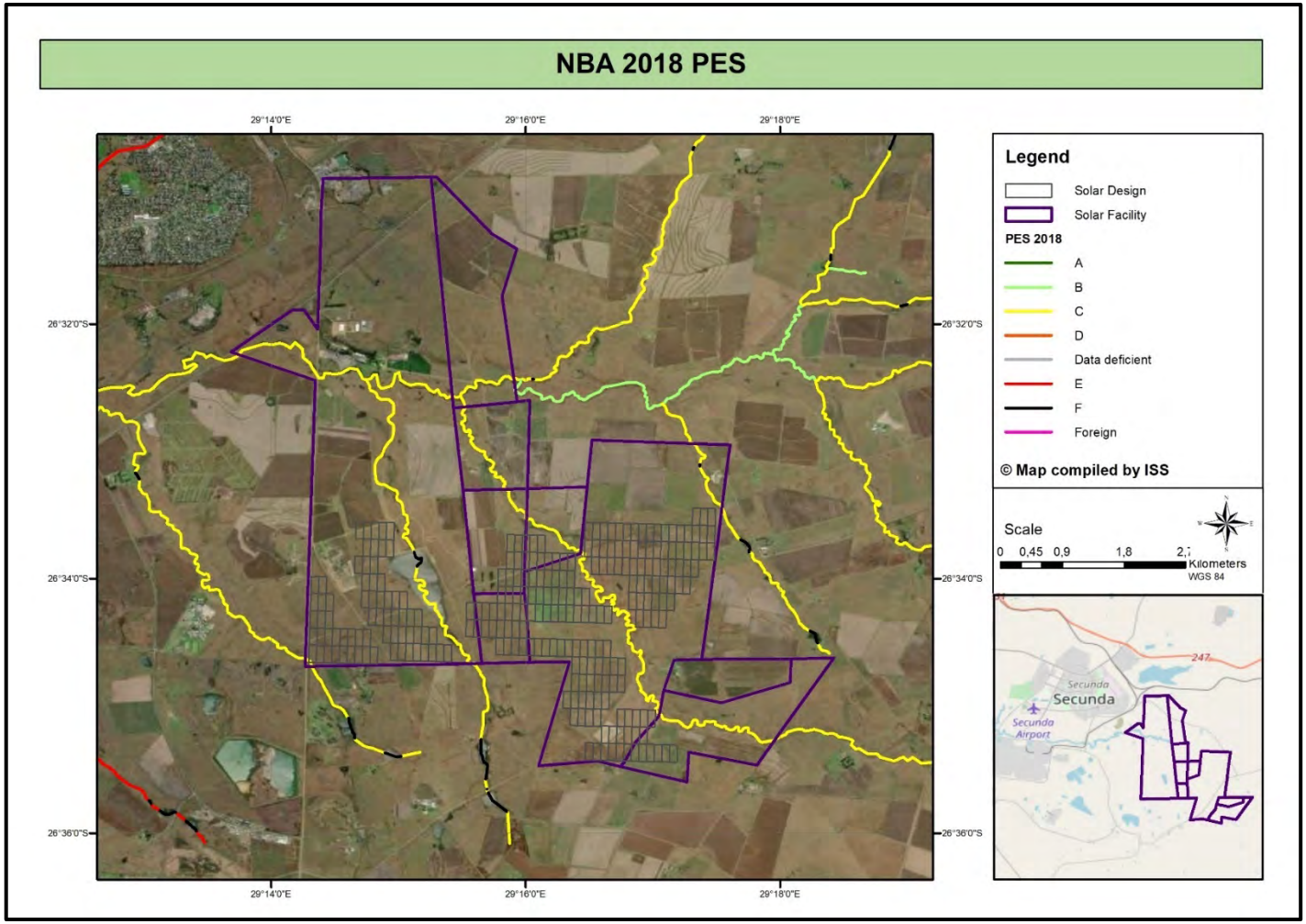


Figure 3-24: Present Ecological state of the rivers and streams surrounding the study site based on the 2018 National Biodiversity Assessment

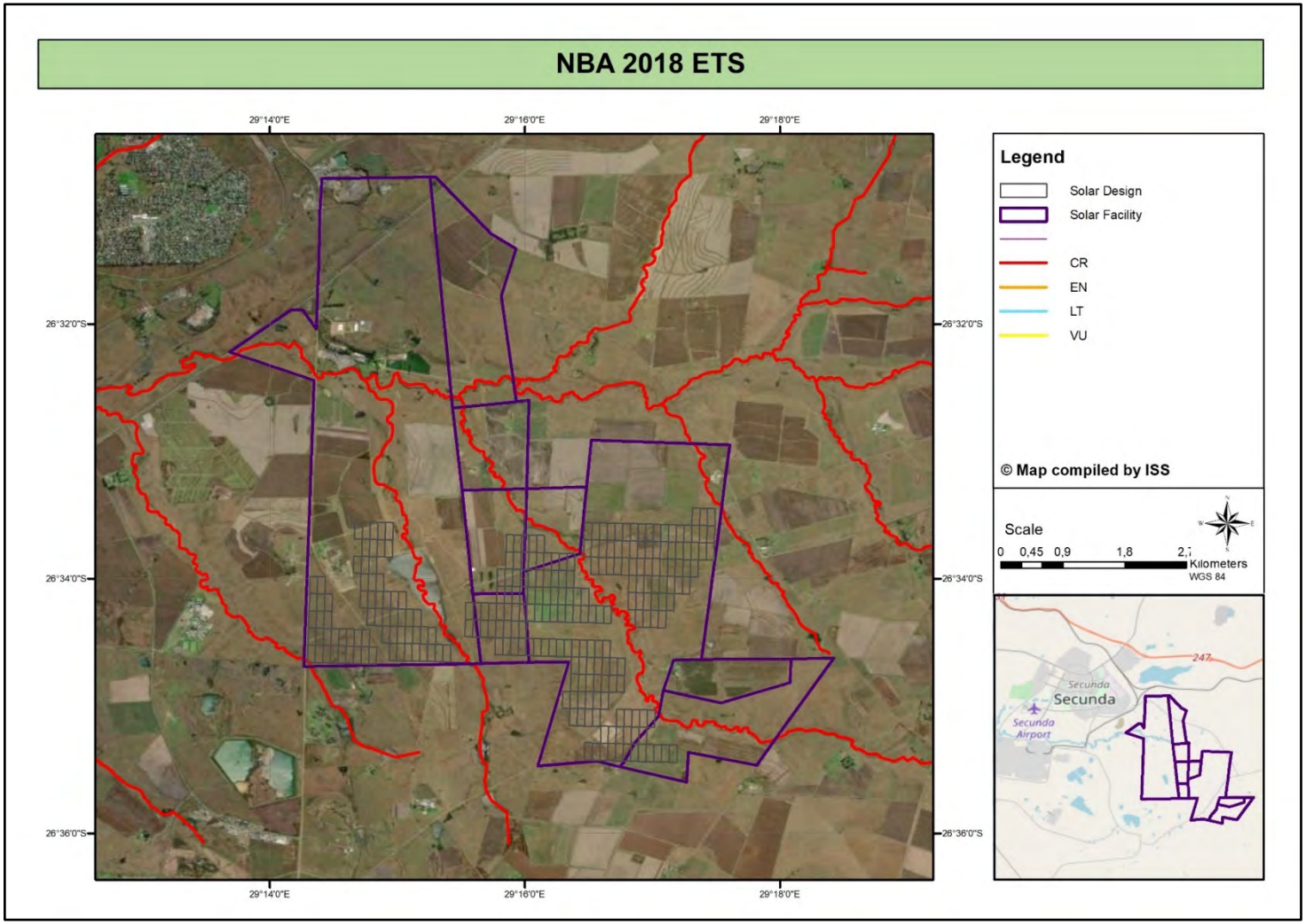


Figure 3-25: Ecosystem Threat Status of the rivers surrounding the study site based on the 2018 National Biodiversity Assessment

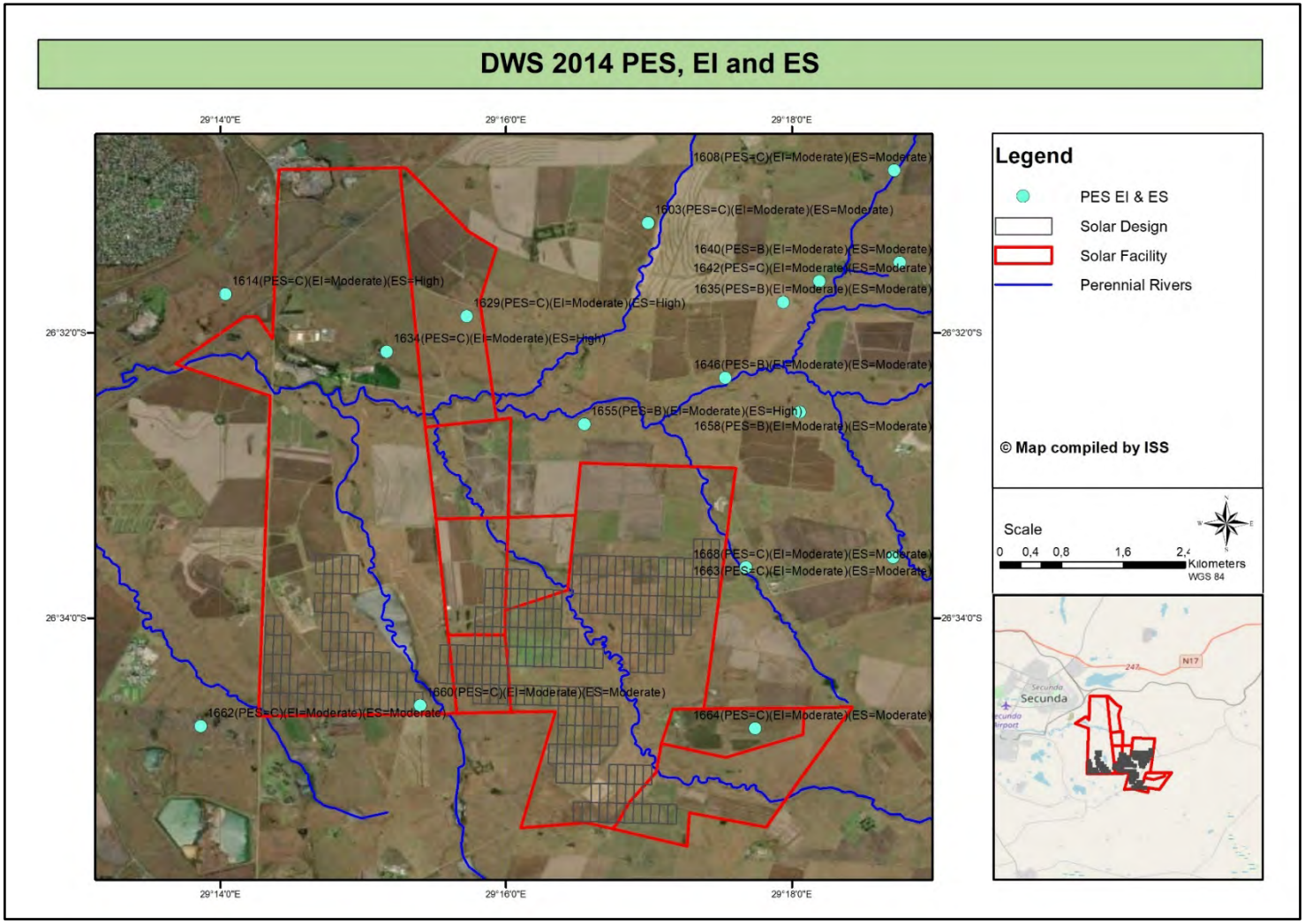


Figure 3-26: Associated SQR and corresponding PES, EI and ES Scores

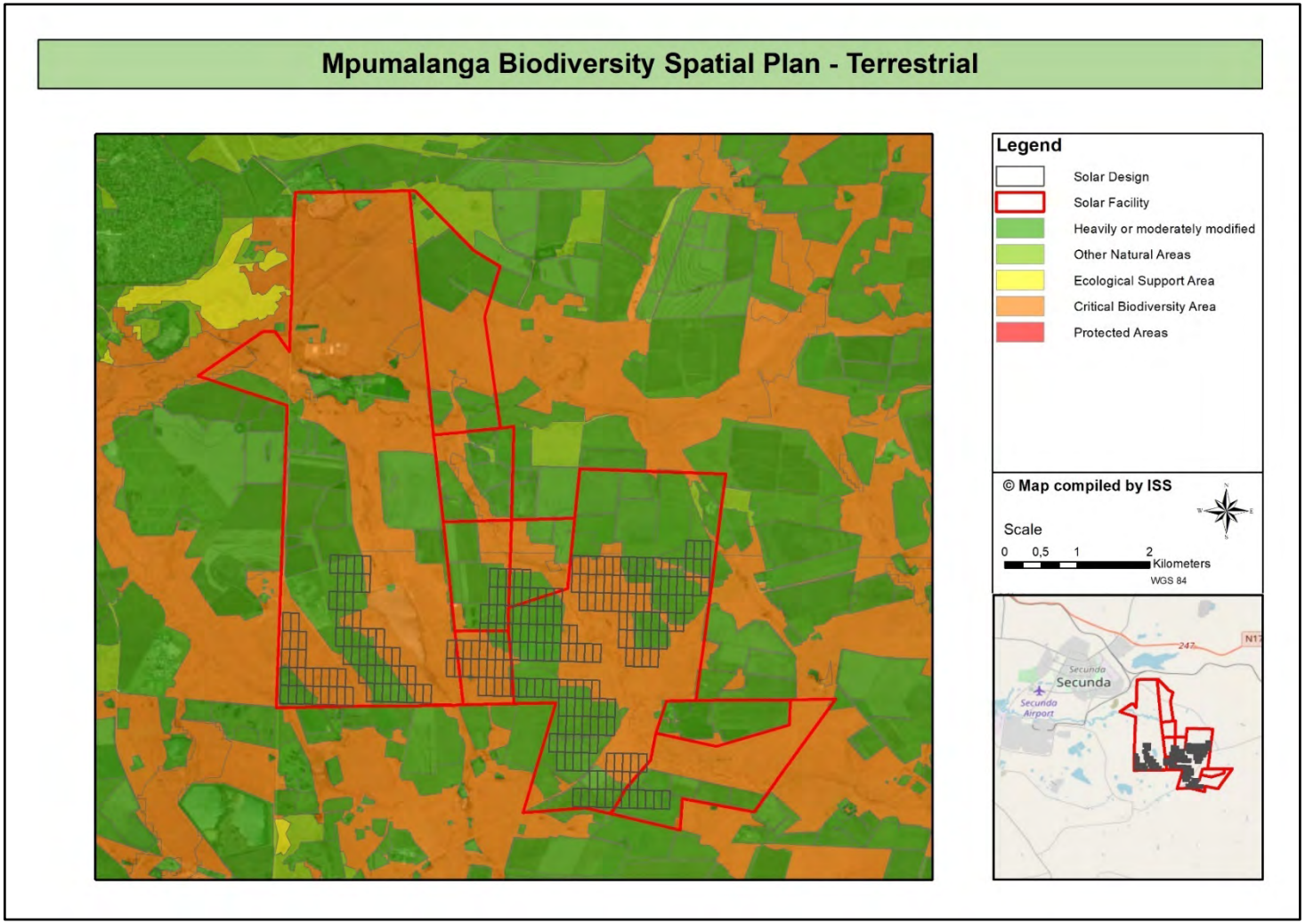


Figure 3-27: The proposed Vhuvhili SEF site in relation to the MBSP terrestrial

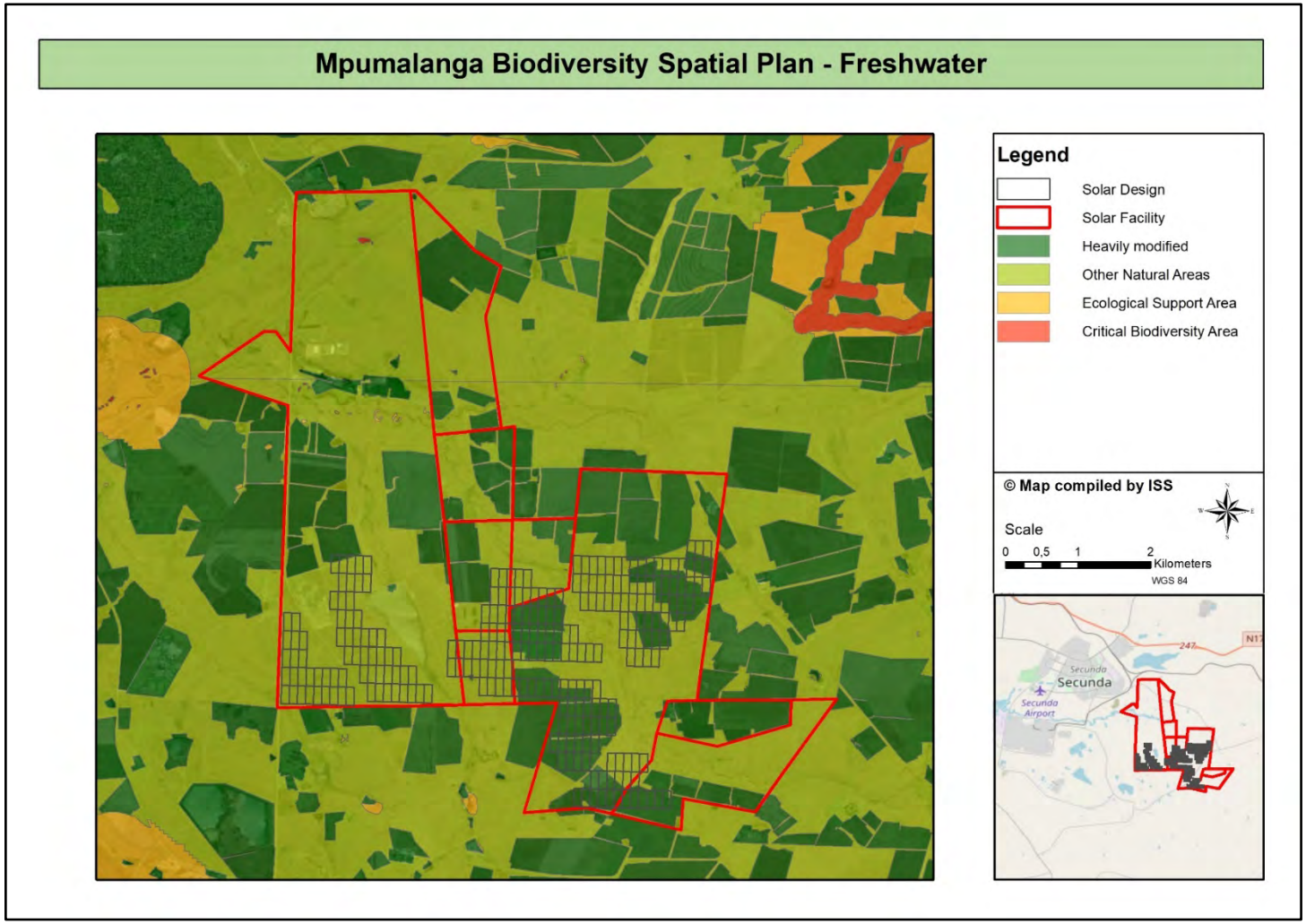


Figure 3-28: The proposed Vhuvhili SEF site in relation to the MBSP aquatic

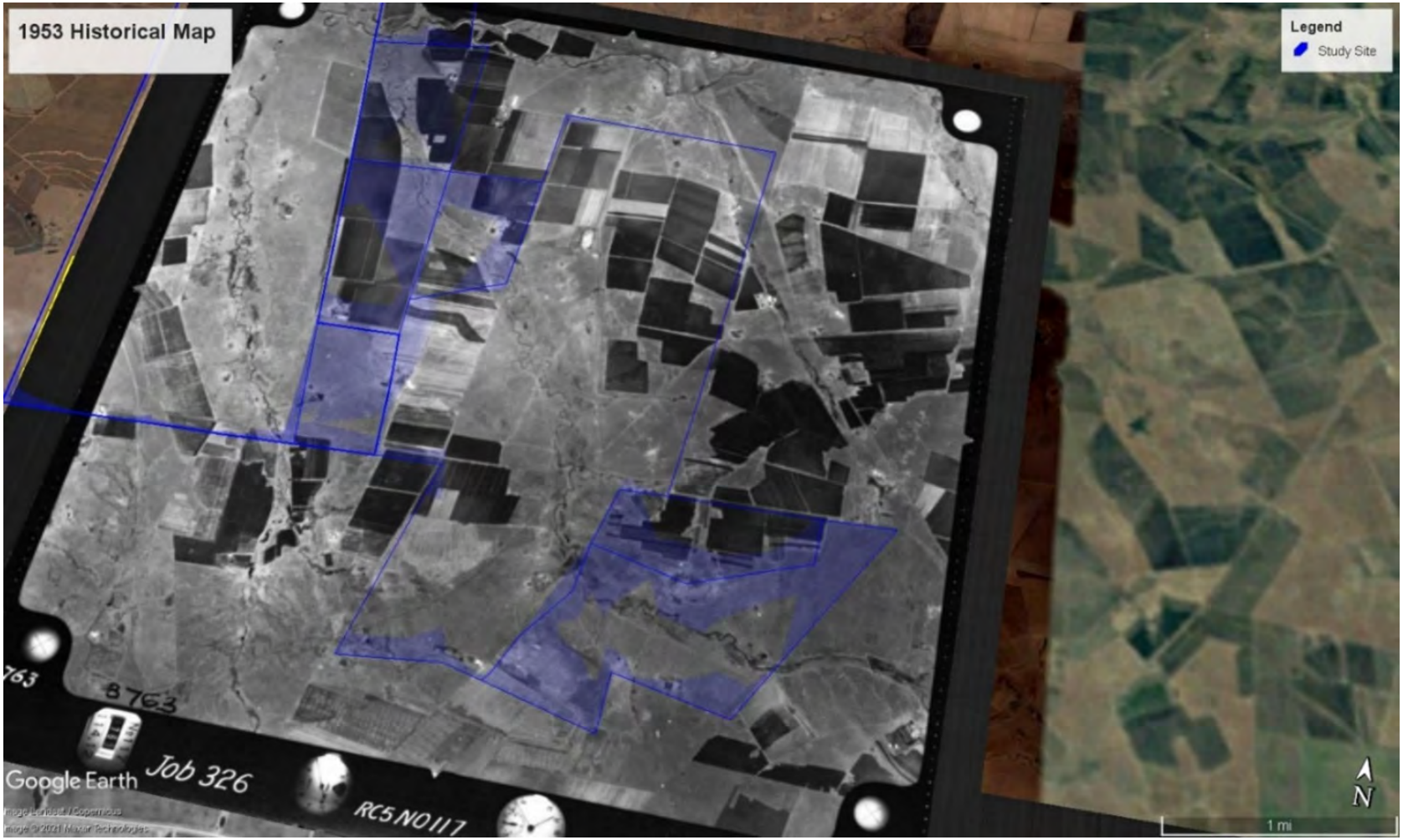


Figure 3-29: Historical image of 1953 indicating prolonged farming activities on the study site (Source: den Boogert et al, 2022)

3.2.7.3 Historical context of the study area

Historical imagery of the study site indicates that the area was historically impacted by farming including agriculture and grazing (Figure 3-31). Additionally, a dam located in one of the floodplain wetlands has increased significantly in size from a small dam of approximately 3 hectares in 2009 to a large dam of approximately 72 hectares today. Although historical images of 1953 indicate only small changes in the wetlands, it is known that wetlands and especially floodplain wetlands are not static and that they undergo changes especially with regard to the formation and loss of oxbows (an oxbow lake is a U-shaped lake or pool that forms when a wide meander of a channel is cut off, creating a free-standing body of water). Several oxbow lakes were recorded in the floodplain wetland areas. The majority of infrastructure including railway and roads already existed in 1953.

3.2.7.4 Watercourse Types

It should be noted that the study occurred during a particularly high rainfall season and the vegetation growth was robust and similar in composition in the wetlands with few exceptions. Due to the high rainfall a few hydrophytic wetland species occurred in areas with poor drainage and prolonged saturation (such as roadsides and small depressions) that would not normally sustain wetland species.

Common sedges and forbes include: *Cyperus congestus, Cyperus esculentus, Cyperus haematocephalus, Cyperus laevigatus, Cyperus longus, var. longus, Cyperus fastigiatus, Eleocharis spp. Rumex lanceolatus, Hypoxis obtuse, Berkheya spp., Typha capensis, Kyllinga erecta, Kyllinga melanosperma Phragmites australis, Schoenoplectus corymbosus, Senecio latifolius, Senecio coronatus Haplocarpha scaposa, Helichrysum nudifolium* var. *nudifolium, Helichrysum rugulosum* and *Schoenoplectus muricinux*.

The dominant grass species include: Andropogon appendiculatus, Setaria sphacelata, Themeda triandra, Paspalum dilatatum, Eragrostis plana, Eragrostis curvula, Eragrostis chloromelas, Leersia hexandra, Sporobolus africanus, Sporobolus fimbrianthus, Andropogon eucomus and *Cynodon dactylon.*

The dominant Alien Invasive Species (AIS) recorded in the study area include: *Solanum elaeagnifolium, Oenothera rosea, Pennisetum clandestinum, Verbena bonariensis, Conyza canadensis, Pseudognaphalium luteo-album, Plantago lanceolate, Cosmos bipinnatus, Cirisium vulgare, Persicaria lapathifolia, Tagaets minuta, Bidens pilosa, Bidens bipinnata, Oxalis latifolia, trifolium repens and the common woody AIS include: Populus x canescens, Eucalyptus spp, Salix babylonica, Sesbania punicea, Tamarix ramosissima* and *Pinus spp.*

It should also be noted that several plant species of conservation concern are known to occur in the area or have been recorded in the study site. These include: *Nerine gracilis, Gladiolus robertsoniae, Kniphofia typhoides, Boophone disticha, Hypoxis hemerocallidea, Crinum bulbispermum* and *Eucomis autumnalis.*

The soils of the wetlands differed and ranged from dark clay soil to loam soil.

3.2.7.5 Watercourse Functional Assessment

Some of the impacts recorded during the site visit include increased hardened surfaces, sedimentation, increased water input from artificial channels and slime dams, large densities of AIS, numerous furrows and trenches leading to and from the wetland, foreign material input such as sewerage, mine sediment, agriculture, grazing animals, infrastructure such as roads. Some of these impacts relate to reduced water quality such as slime dams and other mining infrastructure.

Integrity Scores

The integrity and function scores calculated for the wetlands are presented in the section below. Table 3-6 presents a summary of the assessment methodologies applied to determine scores for the components of watercourse function and integrity.

Table 3-6: Summary of the methodologies used to determine function and integrity scores for the watercourses associated with the study site.

Unchannelled Valley Bottom Wetland
WetHealth V2 (EC/PES) (Macfarlane et al., 2020)
Environmental Importance and Sensitivity category (EIS) (Kotze et al., 2020)
WetEcosystem Services V2 (ES) (Kotze et al., 2020)
Ecological Importance (EI) (Rountree & Kotze., 2013 and DWAF, 1999)
Recommended Ecological Category (REC) Rountree et al., (2013)

A summary of the integrity scores for each wetland is listed in Table 3-7 as well as in Figures 3-29, 3-30 and 3-34.

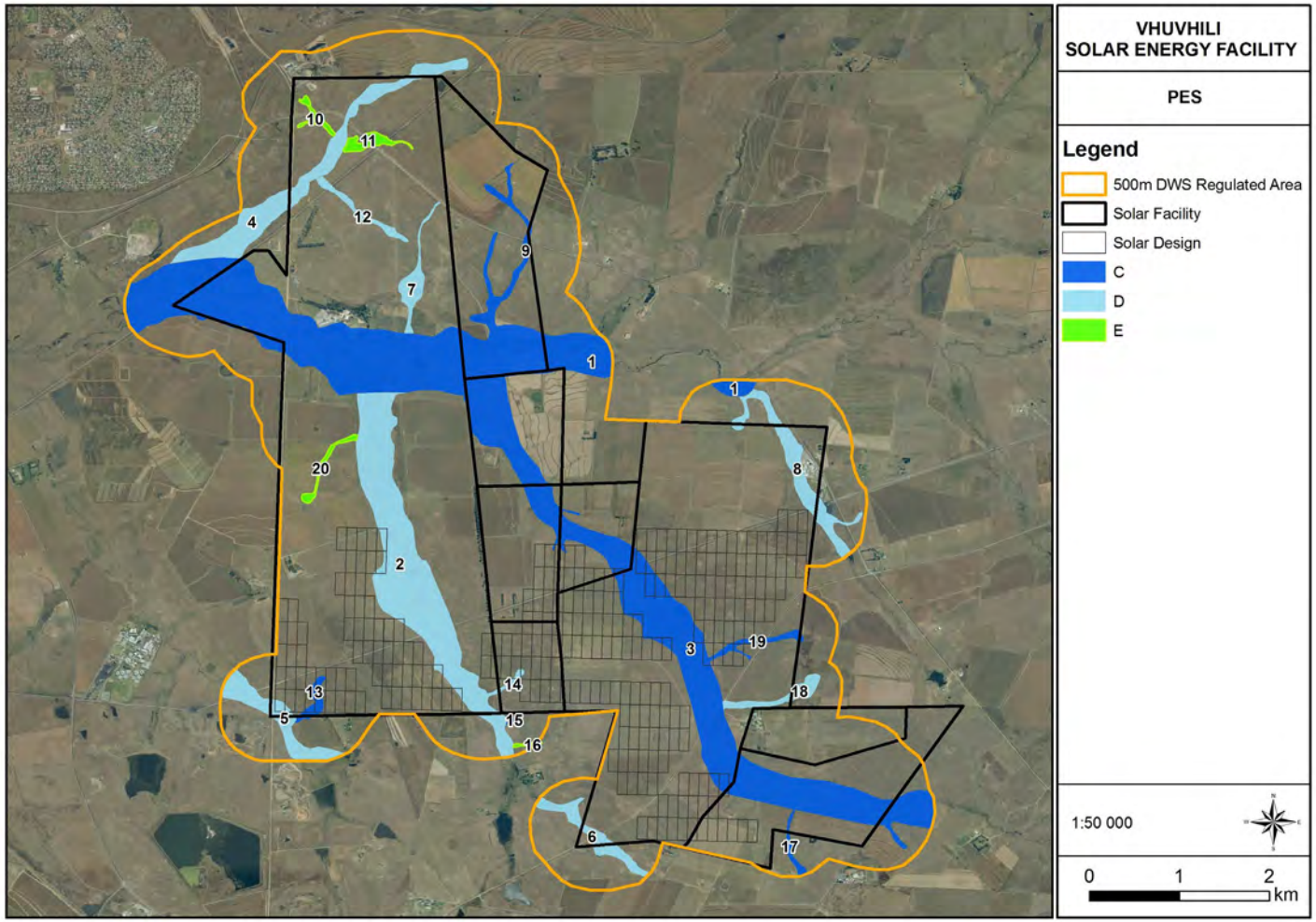


Figure 3-30: Present ecological state of each wetland unit in the proposed Vhuvhili SEF study area (Macfarlane et al., 2020)

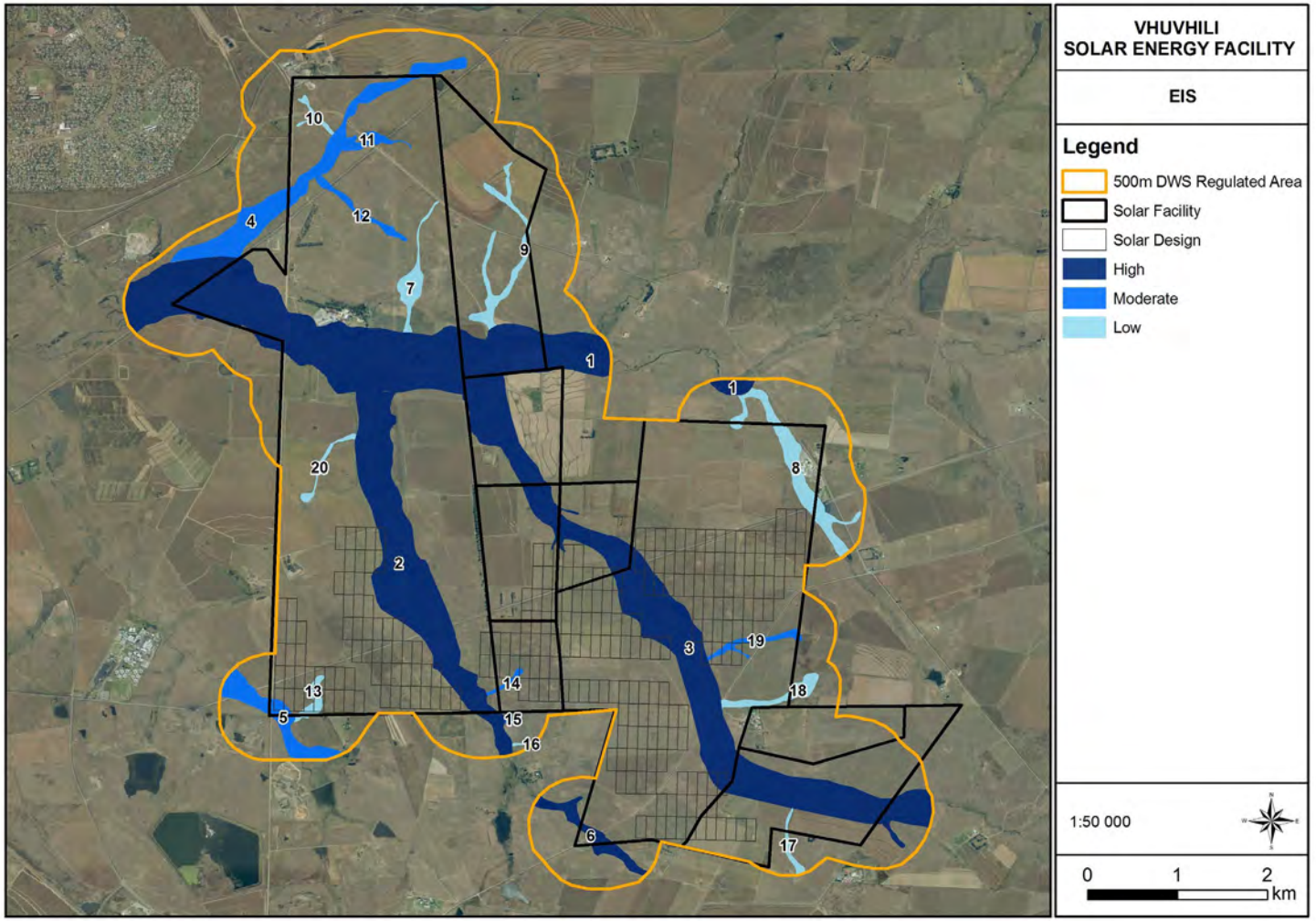


Figure 3-31: Environmental Importance and Sensitivity category (EIS) of the proposed Vhuvhili SEF study area (Kotze et al., 2020)

Table 3-7: Summary of the scores of the wetland units

Wetland number	Size (In hectares) excluding buffer	Wetland Type	WetHealth V2 (EC/PES) (Macfarlane *et al.*, 2020)	Ecological Importance (EI) (Rountree & Kotze., 2013 and DWAF, 1999)	WetEcosystem Services V2 (ES) (Kotze *et al.*, 2020)	Environmental Importance and Sensitivity category (EIS) (Kotze *et al.*, 2020)	Recommended Ecological Category (REC) Rountree *et al.*, (2013)
1	299	Floodplain	C- Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact. Condition is likely to remain stable over the next 5 years	*Ecological Importance & Sensitivity* - High *Hydro-Functional Importance* - High *Direct Human Benefits* - Moderate	*Biodiversity maintenance importance* – Very High *Regulating services importance* - High *Provisioning and cultural services importance* - *Moderate*	High	B/C - Improve to B
2	146	Floodplain	D- Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred. Condition is likely to remain stable over the next 5 years	*Ecological Importance & Sensitivity* - Moderately High *Hydro-Functional Importance:* - Moderately High *Direct Human Benefits:* - Low	*Biodiversity maintenance importance* –High *Regulating services importance* - High *Provisioning and cultural services importance* - *Moderate*	High	C/D - Improve to C
3	245	Floodplain	C- Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact.	*Ecological Importance & Sensitivity* - High *Hydro-Functional Importance* – Moderately High *Direct Human Benefits* - Moderate	*Biodiversity maintenance importance* – Moderately High *Regulating services importance* - High	High	B/C - Improve to B

Wetland number	Size (In hectares) excluding buffer	Wetland Type	WetHealth V2 (EC/PES) (Macfarlane *et al.*, 2020)	Ecological Importance (EI) (Rountree & Kotze., 2013 and DWAF, 1999)	WetEcosystem Services V2 (ES) (Kotze *et al.*, 2020)	Environmental Importance and Sensitivity category (EIS) (Kotze *et al.*, 2020)	Recommended Ecological Category (REC) Rountree *et al.*, (2013)
			Condition is likely to remain stable over the next 5 years		*Provisioning and cultural services importance - Moderate*		
4	60.4	Floodplain	D- Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred. Condition is likely to deteriorate slightly over the next 5 years	*Ecological Importance & Sensitivity* - High *Hydro-Functional Importance* - Moderate *Direct Human Benefits* - Low	*Biodiversity maintenance importance* – High *Regulating services importance* - Moderate *Provisioning and cultural services importance - Low*	High	D – Maintain at D
5	26.7	Floodplain	D- Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred. Condition is likely to remain stable over the next 5 years	*Ecological Importance & Sensitivity* - Moderate *Hydro-Functional Importance* – Moderately High *Direct Human Benefits* - Low	*Biodiversity maintenance importance* – Moderate *Regulating services importance* - Moderate *Provisioning and cultural services importance - Low*	Moderate	D – Maintain at D
6	16.5	Floodplain	D- Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred. Condition is likely to remain stable over the next 5 years	*Ecological Importance & Sensitivity* - High *Hydro-Functional Importance* - (Moderately High *Direct Human Benefits* – Moderate	*Biodiversity maintenance importance* – High *Regulating services importance* - High *Provisioning and cultural services importance - Moderate*	High	C/D - Improve to C

Wetland number	Size (In hectares) excluding buffer	Wetland Type	WetHealth V2 (EC/PES) (Macfarlane *et al.*, 2020)	Ecological Importance (EI) (Rountree & Kotze., 2013 and DWAF, 1999)	WetEcosystem Services V2 (ES) (Kotze *et al.*, 2020)	Environmental Importance and Sensitivity category (EIS) (Kotze *et al.*, 2020)	Recommended Ecological Category (REC) Rountree *et al.*, (2013)
7	11.2	Channelled Valley Bottom	D- Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred. Condition is likely to improve over the over the next 5 years	*Ecological Importance & Sensitivity* - Moderate *Hydro-Functional Importance* - Low *Direct Human Benefits* - Low	*Biodiversity maintenance importance* – Low *Regulating services importance* - Low *Provisioning and cultural services importance* – *Very Low*	Low	D – Maintain at D
8	30.6	Floodplain	D- Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred. Condition is likely to remain stable over the next 5 years	*Ecological Importance & Sensitivity - Moderate* *Hydro-Functional Importance* - Moderate *Direct Human Benefits* - Low	*Biodiversity maintenance importance* – Low *Regulating services importance* - Low *Provisioning and cultural services importance* – *Very Low*	Low	D – Maintain at D
9	18	Channelled Valley Bottom	C- Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact. Condition is likely to deteriorate slightly over the next 5 years	*Ecological Importance & Sensitivity* - Low *Hydro-Functional Importance* - Moderate *Direct Human Benefits* - Low	*Biodiversity maintenance importance* – Low *Regulating services importance* –Low *Provisioning and cultural services importance* – *Low*	Low	C – Maintain at C

Wetland number	Size (In hectares) excluding buffer	Wetland Type	WetHealth V2 (EC/PES) (Macfarlane *et al.*, 2020)	Ecological Importance (EI) (Rountree & Kotze., 2013 and DWAF, 1999)	WetEcosystem Services V2 (ES) (Kotze *et al.*, 2020)	Environmental Importance and Sensitivity category (EIS) (Kotze *et al.*, 2020)	Recommended Ecological Category (REC) Rountree *et al.*, (2013)
10	3.28	Channelled Valley Bottom	E- Seriously Modified. The change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable. Condition is likely to deteriorate slightly over the next 5 years	*Ecological Importance & Sensitivity* Low *Hydro-Functional Importance* - Moderate *Direct Human Benefits* Low	*Biodiversity maintenance importance* – Low *Regulating services importance* – Low *Provisioning and cultural services importance* – *Very Low*	Low	E/F –Maintain at E
11	6	Channelled Valley Bottom	E- Seriously Modified. The change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable. Condition is likely to deteriorate slightly over the next 5 years	*Ecological Importance & Sensitivity* -Low *Hydro-Functional Importance - Moderate Direct Human Benefits* Low	*Biodiversity maintenance importance* – Low *Regulating services importance* – Low *Provisioning and cultural services importance* – *Low*	Low	E/F –Maintain at E
12	7.47	Unchannelled Valley Bottom	D- Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred. Condition is likely to remain stable over the next 5 years	*Ecological Importance & Sensitivity - Moderate Hydro-Functional Importance - Moderate Direct Human Benefits* - Low	*Biodiversity maintenance importance – Moderate Regulating services importance – Moderate Provisioning and cultural services importance* – *Low*	Moderate	D – Maintain at D

Wetland number	Size (In hectares) excluding buffer	Wetland Type	WetHealth V2 (EC/PES) (Macfarlane *et al.*, 2020)	Ecological Importance (EI) (Rountree & Kotze., 2013 and DWAF, 1999)	WetEcosystem Services V2 (ES) (Kotze *et al.*, 2020)	Environmental Importance and Sensitivity category (EIS) (Kotze *et al.*, 2020)	Recommended Ecological Category (REC) Rountree *et al.*, (2013)
13	5.86	Seepage	C- Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact. Condition is likely to deteriorate slightly over the next 5 years	*Ecological Importance & Sensitivity* - Low *Hydro-Functional Importance*- -Moderate *Direct Human Benefits* - Low	*Biodiversity maintenance importance – Low* *Regulating services importance – Low* *Provisioning and cultural services importance – Low*	Low	C – Maintain at C
14	2.38	Unchannelled Valley Bottom	D- Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred. Condition is likely to remain stable over the next 5 years	*Ecological Importance & Sensitivity - Moderate* *Hydro-Functional Importance - Moderate* *Direct Human Benefits* - Low	*Biodiversity maintenance importance – Moderate* *Regulating services importance – Moderate* *Provisioning and cultural services importance – Low*	Moderate	D – Maintain at D
15	0.54	Unchannelled Valley Bottom	C- Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact. Condition is likely to remain stable over the next 5 years	*Ecological Importance & Sensitivity - Moderate* *Hydro-Functional Importance - Moderate* *Direct Human Benefits* - Low	*Biodiversity maintenance importance – Low* *Regulating services importance – Moderate* *Provisioning and cultural services importance – Low*	Moderate	C – Maintain at C

Wetland number	Size (In hectares) excluding buffer	Wetland Type	WetHealth V2 (EC/PES) (Macfarlane *et al.*, 2020)	Ecological Importance (EI) (Rountree & Kotze., 2013 and DWAF, 1999)	WetEcosystem Services V2 (ES) (Kotze *et al.*, 2020)	Environmental Importance and Sensitivity category (EIS) (Kotze *et al.*, 2020)	Recommended Ecological Category (REC) Rountree *et al.*, (2013)
16	0.76C	Unchannelled Valley Bottom	E- Seriously Modified. The change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable. Condition is likely to remain stable over the next 5 years	*Ecological Importance & Sensitivity* - Low *Hydro-Functional Importance*- -Moderate *Direct Human Benefits* - Low	*Biodiversity maintenance importance – Low* *Regulating services importance – Low* *Provisioning and cultural services importance – Low*	Low	E/F – Maintain at E
17	3.68	Unchannelled Valley Bottom	C- Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact. Condition is likely to remain stable over the next 5 years	*Ecological Importance & Sensitivity* - Low *Hydro-Functional Importance*- -Moderate *Direct Human Benefits* - Low	*Biodiversity maintenance importance – Moderate* *Regulating services importance – Low* *Provisioning and cultural services importance – Low*	Low	C – Maintain at C
18	9.91	Unchannelled Valley Bottom	D- Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred. Condition is likely to remain stable over the next 5 years	*Ecological Importance & Sensitivity* - Low *Hydro-Functional Importance*- -Moderate *Direct Human Benefits* - Low	*Biodiversity maintenance importance – Moderate* *Regulating services importance – Low* *Provisioning and cultural services importance – Low*	Low	D – Maintain at D

Wetland number	Size (In hectares) excluding buffer	Wetland Type	WetHealth V2 (EC/PES) (Macfarlane *et al.*, 2020)	Ecological Importance (EI) (Rountree & Kotze., 2013 and DWAF, 1999)	WetEcosystem Services V2 (ES) (Kotze *et al.*, 2020)	Environmental Importance and Sensitivity category (EIS) (Kotze *et al.*, 2020)	Recommended Ecological Category (REC) Rountree *et al.*, (2013)
19	6.60	Unchannelled Valley Bottom	C- Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact. Condition is likely to remain stable over the next 5 years	*Ecological Importance & Sensitivity* - Moderate *Hydro-Functional Importance*- -Moderate *Direct Human Benefits* - Low	*Biodiversity maintenance importance – Moderately High* *Regulating services importance – Moderate* *Provisioning and cultural services importance – Low*	Moderate	C – Maintain at C
20	3.77	Unchannelled Valley Bottom	E- Seriously Modified. The change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable. Condition is likely to deteriorate slightly over the next 5 years	*Ecological Importance & Sensitivity* - Low *Hydro-Functional Importance*- -Moderate *Direct Human Benefits* - Low	*Biodiversity maintenance importance – Low* *Regulating services importance – Low* *Provisioning and cultural services importance – Low*	Low	E/F – Maintain at E

3.2.7.6 Screening Tool Descriptions and Site Verifications

Based on the National Web-Based Environmental Screening tool most of the watercourses and aquatic ecosystems surrounding the study site is classified as high in terms of aquatic biodiversity (Figure 3-32).

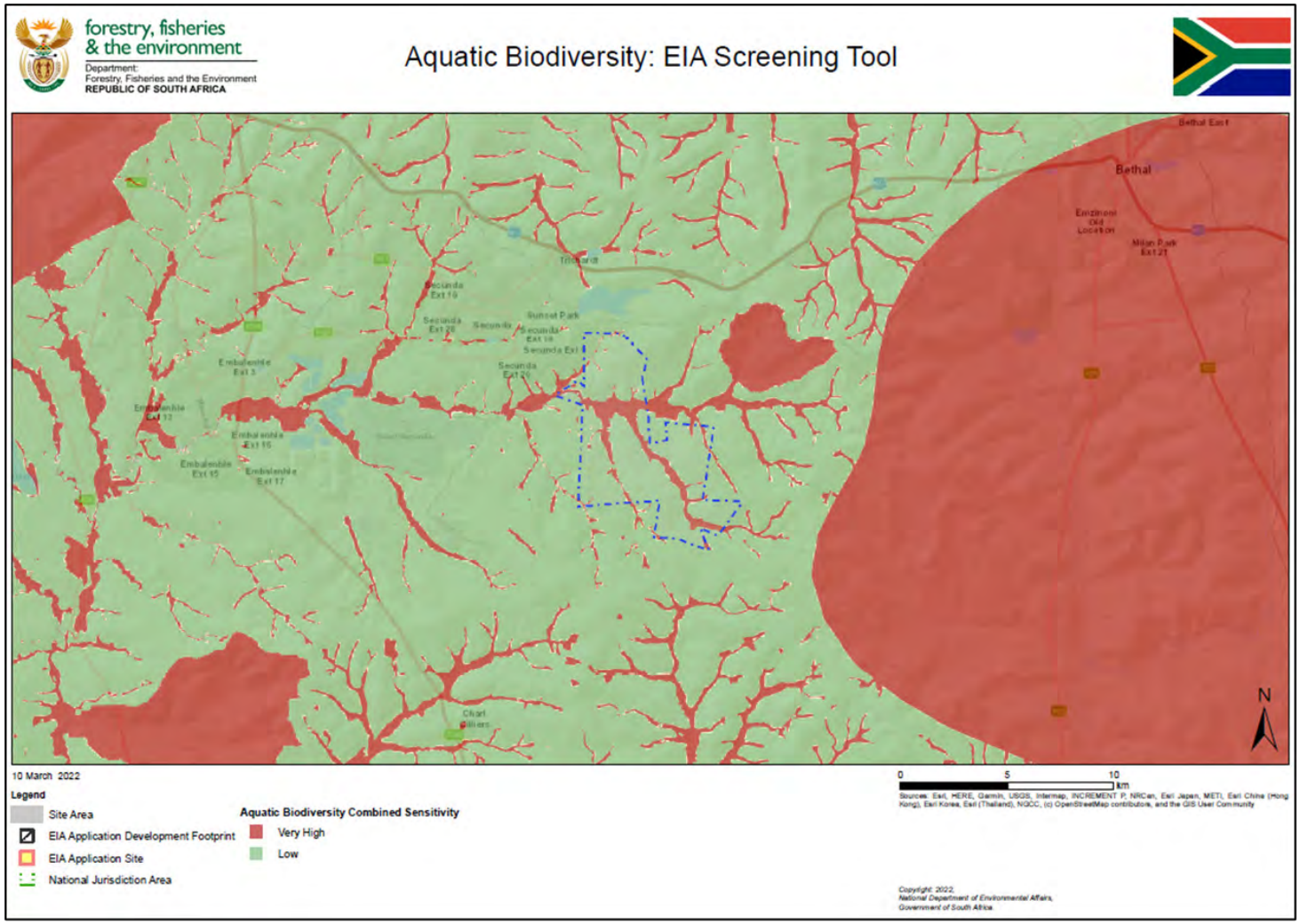


Figure 3-32: Results of the National Web Based Screening Tool in terms of Aquatic Biodiversity (Source: den Boogert et al, 2022)

3.2.7.7 Outcome of the Specialist Site Sensitivity Analysis and Verification

In terms of the desktop assessment the study site has conservation significance both in terms of national as well as provincial conservation planning. The site verification assessment indicated that the proposed layout encroaches on the wetlands and their associated buffer areas.

The desktop assessment conducted by DWS indicated that the sub quaternary reaches surrounding the study site are largely natural (B) to moderately modified (C). The site verification indicated that the wetlands are moderately (C) to seriously modified (E) whilst the aquatic macroinvertebrates indicated that the aquatic ecosystems are largely (D) to seriously/critically (E/F) modified. Therefore, the wetland and aquatic ecosystems surrounding the study site do not conform to the desktop assessment and are more impacted than expected.

Based on the field assessments, the wetland delineation and buffer indicate that the current layout encroaches on the wetlands as well as their respective buffer areas. Although the wetland and aquatic ecosystems are impacted, they still fulfil important ecosystem services and also form part of national and provincial conservation targets. It is therefore recommended that the layout plans should be updated to remove the footprint of the SEF out of the wetlands and buffer areas.

3.2.7.8 Site sensitivity for wetlands as per SANBI (2020) guidelines

The site sensitivity for wetlands were calculated as per SANBI (2020) guidelines. Annexure E of the Aquatic Assessment included in Appendix D.3 of this Scoping Report contains the detailed methodology used for the sensitive analysis.

The results of the sensitivity analysis are given in Table 3-8 and Figure 3-33.

Table 3-8: Sensitivity analysis for the wetlands

Habitat	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Wetland Area	High – Confirmed occurrence of wetlands within the development footprint	Medium – Some historical impacts and AIS recorded	Medium – Based on CI and FI	Very Low – Wetlands are not easily restored without significant rehabilitation. Many species are dependent on functional wetland habitat.	Based on BI – Medium and RR – Very Low = High

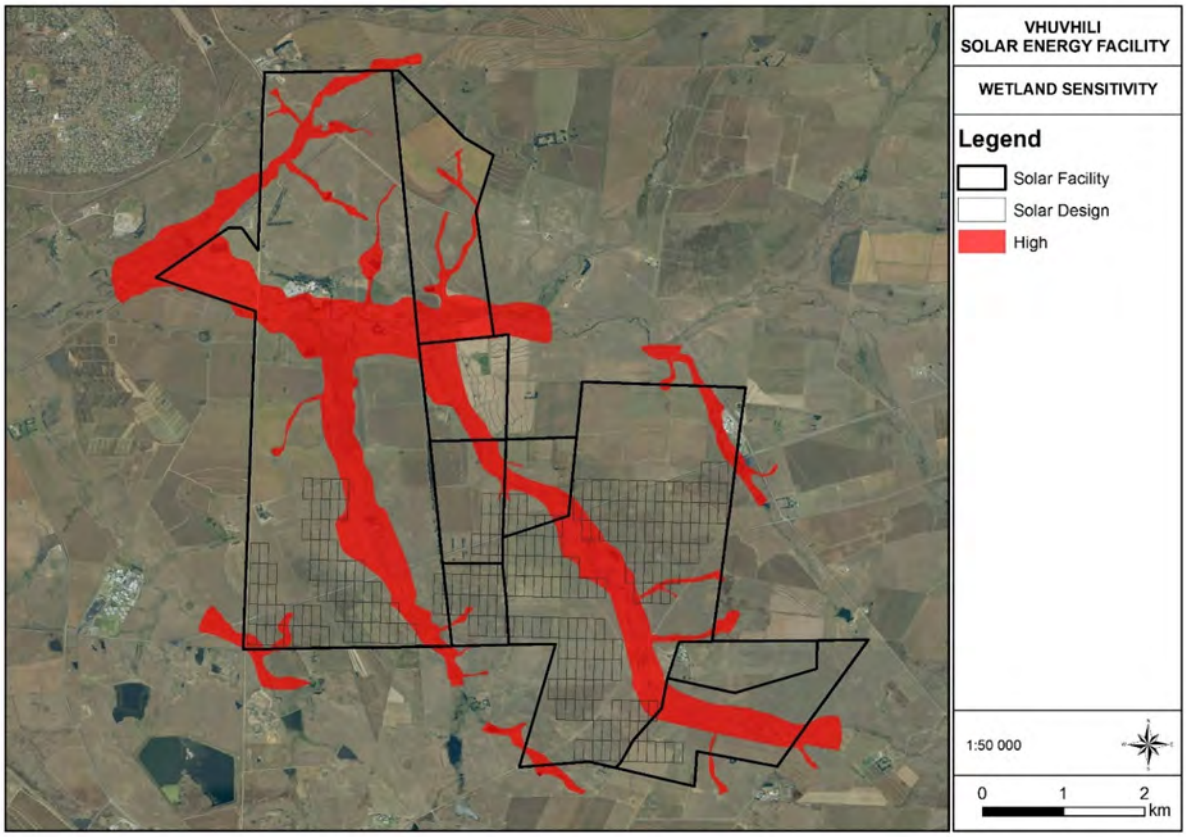


Figure 3-33: Wetland sensitivity based on the Site Ecological Importance (SANBI, 2020) (Source: den Boogert et al, 2022)

3.2.7.9 Site sensitivity identified by this Assessment

The areas where the SEF layout encroaches on the wetlands and their buffer areas are highlighted in Figure 3-34.

The recommended setback areas are shown below in Table 3-9.

It should be noted that sections of the Floodplain wetlands have identified to contain the two subpopulations of the Near Threatened *Kniphofia typhoides* and a recommended buffer zone of 400 m was therefore suggested (Wet-Earth, 2020).

Table 3-9: Summary of aquatic features, their sensitivities, and recommended buffers

Aquatic feature	Recommended buffer
Floodplain Wetlands	37 m
Channelled Valley Bottom Wetlands	56 m
Unchannelled Valley Bottom Wetlands	50 m
Seepage Wetland	54 m

Figure 3-34 shows the delineated watercourses relative to the study areas together with buffer zones and the 500m DWS regulated area.

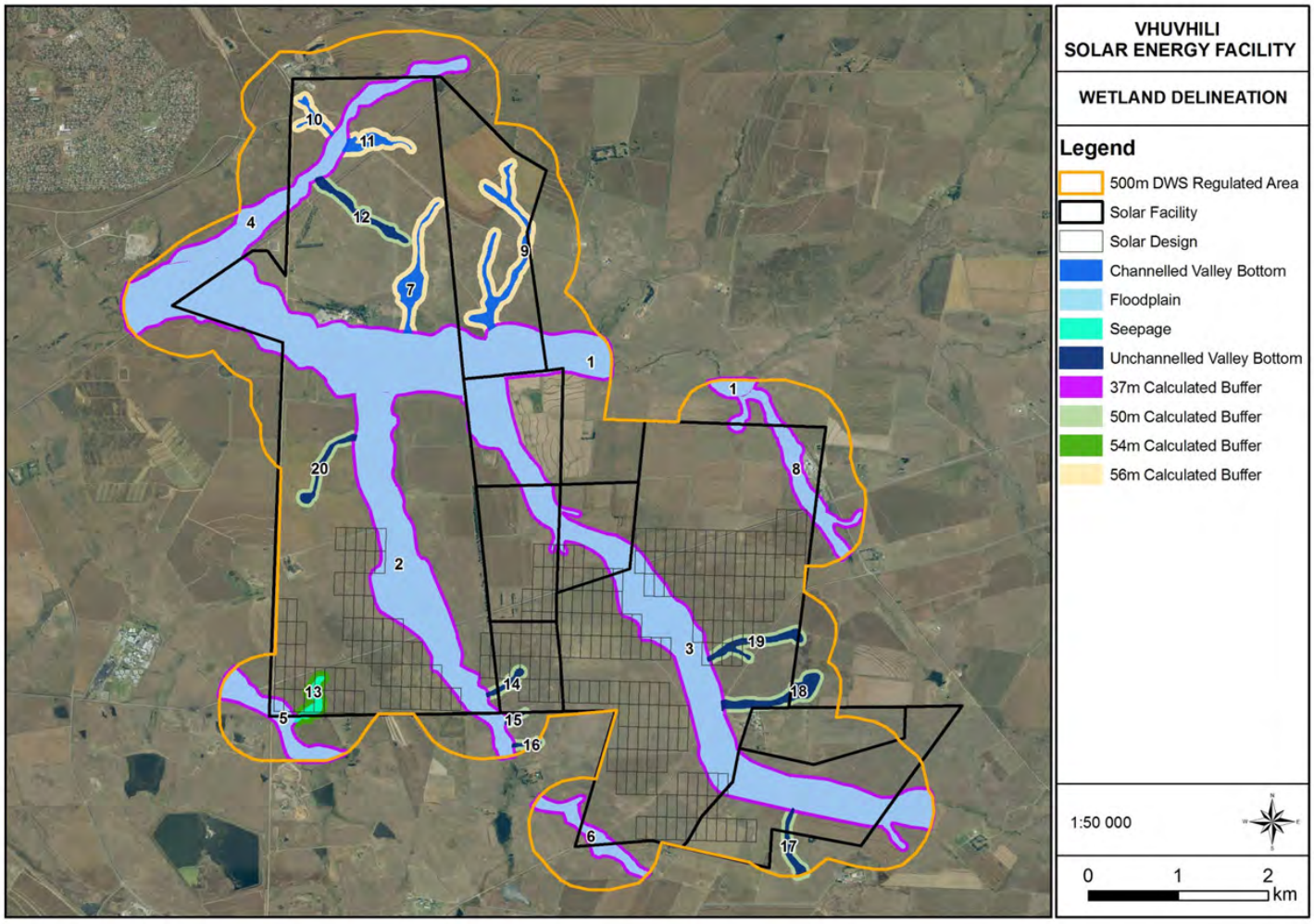


Figure 3-34: Delineated watercourses together with their calculated buffer zones and the 500 m DWS regulated area (Source: den Boogert et al, 2022)

As indicated in Figure 3-34 some of the planned SEF footprint encroaches on the wetlands and buffer zones. It is therefore recommended that the development footprint should be altered to exclude wetlands and their buffer zones.

3.2.8 Avifauna

A detailed description of the avifauna species encountered within the study area during the pre-construction monitoring, and the potential impact of the proposed Solar PV development on bird species will be provided in the Avifauna Impact Assessment that will be included in the EIA Report.

3.2.8.1 Avifaunal Assessment

The information described below is based on the findings of a Regime 2 pre-construction avifaunal monitoring programme, which was implemented by the Avifauna Specialist at the study area for the proposed Vhuvhili SEF project. Site visits were conducted from 22 – 26 July, on 04 December 202 and from 5 – 8 January 2022. The monitoring programme was implemented after the promulgation of the prescribed protocol on terrestrial animal species (GN 1150 published on 30 October 2020), therefore this protocol applies. The resultant Scoping Level Avifauna Report is included in Appendix G.4 of this Scoping Report.

In terms of the baseline of the environment with respect to avifauna, the proposed development area is not located in an Important Bird Area (IBA). The closest IBAs are the Amersfoort-Bethal-Carolina IBA SA018 – approximately 20.5km east of the Vhuvhili SEF – and the Devon Grasslands IBA SA130 – approximately 34 km west of the Vhuvhili SEF (Marnewick et al., 2015). It is not envisaged that the proposed SEF will impact on avifauna in the IBAs due to the distance from the development area.

3.2.8.2 Habitat classes and avifauna features on site

The following bird habitat features were identified in the development area:

3.2.8.2.1 Grassland

This habitat feature is described in the section on Terrestrial Biodiversity above (see Figure 3-35).

Figure 3-35: Natural grassland tracts within the proposed Vhuvhili SEF.

3.2.8.2.2 Drainage lines and wetlands

Streams, wetlands, vleis and floodplains are associated mostly with the Klipspruit River and its tributaries (Figure 3-36). Surface rocks are present in some places along the streams. The alluvial soils are mostly deep dark brown to black clayey soils.

Figure 3-36: A drainage line within the proposed Vhuvhili SEF.

3.2.8.2.3 Dams and pans

There are several small dams, as well as a few small pans, mostly associated with the Klipspruit River and its tributaries (Figure 3-37). There is one moderately large dam near the western central portion of the Vhuvhili SEF (Thompson, 2019).

Figure 3-37: The main dam within the proposed Vhuvhili SEF.

3.2.8.2.4 Agriculture

Agricultural activity present within the Vhuvhili SEF comprises cultivated commercial annuals non-pivot cropland (Thompson, 2019), predominately dedicated towards maize production (Figure 3-38).

Figure 3-38: Maize cropland (post-harvest) within the proposed Vhuvhili SEF

3.2.8.2.5 Alien trees

Alien trees are present on the Vhuvhili SEF site as windbreaks either between agricultural fields or between homesteads (Thompson, 2019) (Figure 3-39).

Figure 3-39: Alien tree line within the proposed Vhuvhili SEF site.

3.2.8.3 Avifauna species

A total of 186 species could potentially occur within the broader area where the project is located (see Appendix E of the Avifauna Scoping Report included in Appendix D.4 of this Scoping Report). Of these, 92 are classified as priority species for solar developments. Of the 92 priority species, 47 have a medium to very high probability of occurring in the development site. Of the 47 priority species with a medium to high probability of occurrence, 34 were recorded during site surveys.

Eleven Red Data List species are associated with the broader area. Nine Red Data List species have a low probability of occurrence – African Marsh Harrier, Blue Crane, Caspian Tern, European Roller, Greater Painted Snipe, Lanner Falcon, Maccoa Duck, Pallid Harrier, and Red-footed Falcon – while three Red Data List Species have a medium to high probability of occurrence – Blue Korhaan, Greater Flamingo, and Secretarybird. Three Red Data species were recorded during the site surveys – Blue Korhaan, Greater Flamingo, and Lanner Falcon.

See Appendix E of the Avifauna Scoping Report (included in Appendix D.4 of this Scoping Report) for a list of species potentially occurring in the broader area. The possibility of priority species occurring in the development area and potential long-term impacts are listed in Table 3-10 below.

Table 3-10: Priority species with a medium to high potential for regular occurrence in the development area

Global and SA status: CR = Critically Endangered; EN = Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern

Likelihood of regular occurrence: L = Low; M = Medium; H = High

Group	Species name	Scientific name	Full protocol	Global status	SA status	Likelihood of regular occurrence	Recorded during monitoring	Grassland	Drainage lines and wetlands	Agriculture	Alien trees	Dams and pans	Solar - Collisions with solar panels	Solar - Displacement: Disturbance	Solar - Displacement: Habitat transformation	Solar - Entanglement in fences	Electrocution - on site substation
	Hamerkop	*Scopus umbretta*	9.76	-	-	M	x		x		x	x	x				
	Ruff	*Calidris pugnax*	10.98	-	-	M			x			x	x				
	Secretarybird	*Sagittarius serpentarius*	8.54	EN	VU	M		x			x	x		x	x	x	
Avocet	Pied Avocet	*Recurvirostra avosetta*	6.10	-	-	M			x			x	x				
Buzzard	Common Buzzard	*Buteo buteo*	8.54	-	-	M		x		x	x				x		x
Buzzard	Jackal Buzzard	*Buteo rufofuscus*	4.88	-	-	M		x			x				x		x
Coot	Red-knobbed Coot	*Fulica cristata*	74.39	-	-	H	x					x	x				
Cormorant	Reed Cormorant	*Microcarbo africanus*	75.61	-	-	H	x		x			x	x				
Cormorant	White-breasted Cormorant	*Phalacrocorax lucidus*	25.61	-	-	H	x		x		x	x	x				

Group	Species name	Scientific name	Full protocol	Global status	SA status	Likelihood of regular occurrence	Recorded during monitoring	Grassland	Drainage lines and wetlands	Agriculture	Alien trees	Dams and pans	Solar - Collisions with solar panels	Solar - Displacement: Disturbance	Solar - Displacement: Habitat transformation	Solar - Entanglement in fences	Electrocution - on site substation
Darter	African Darter	*Anhinga rufa*	26.83	-	-	H	x		x			x	x				
Duck	African Black Duck	*Anas sparsa*	8.54	-	-	H	x		x				x				
Duck	White-faced Whistling Duck	*Dendrocygna viduata*	14.63	-	-	M			x			x	x				
Duck	Yellow-billed Duck	*Anas undulata*	70.73	-	-	H	x		x			x	x				
Eagle-Owl	Spotted Eagle-Owl	*Bubo africanus*	6.10	-	-	M		x			x		x	x		x	x
Egret	Great Egret	*Ardea alba*	6.10	-	-	M	x		x			x	x				
Egret	Intermediate Egret	*Ardea intermedia*	23.17	-	-	H	x		x			x	x				
Egret	Little Egret	*Egretta garzetta*	23.17	-	-	H	x		x			x	x				
Egret	Western Cattle Egret	*Bubulcus ibis*	70.73	-	-	H	x	x	x		x	x	x				
Falcon	Amur Falcon	*Falco amurensis*	34.15	-	-	H		x		x	x		x		x		
Flamingo	Greater Flamingo	*Phoenicopterus roseus*	4.88	-	NT	M	x					x	x				
Goose	Egyptian Goose	*Alopochen aegyptiaca*	73.17	-	-	H	x		x	x	x	x	x				x
Goose	Spur-winged Goose	*Plectropterus gambensis*	40.24	-	-	H	x	x	x	x		x	x				x

Group	Species name	Scientific name	Full protocol	Global status	SA status	Likelihood of regular occurrence	Recorded during monitoring	Grassland	Drainage lines and wetlands	Agriculture	Alien trees	Dams and pans	Solar - Collisions with solar panels	Solar - Displacement: Disturbance	Solar - Displacement: Habitat transformation	Solar - Entanglement in fences	Electrocution - on site substation
Grebe	Little Grebe	*Tachybaptus ruficollis*	64.63	-	-	H	x		x			x	x				
Greenshank	Common Greenshank	*Tringa nebularia*	18.29	-	-	H	x		x			x	x				
Gull	Grey-headed Gull	*Chroicocephalus cirrocephalus*	37.80	-	-	H	x		x			x	x				x
Heron	Black-headed Heron	*Ardea melanocephala*	81.71	-	-	H	x	x	x		x		x			x	x
Heron	Grey Heron	*Ardea cinerea*	34.15	-	-	H			x		x	x	x				x
Heron	Purple Heron	*Ardea purpurea*	10.98	-	-	M			x			x	x				
Ibis	African Sacred Ibis	*Threskiornis aethiopicus*	63.41	-	-	H	x	x	x		x		x				
Ibis	Glossy Ibis	*Plegadis falcinellus*	36.59	-	-	H	x		x				x				
Kestrel	Greater Kestrel	*Falco rupicoloides*	6.10	-	-	M	x	x	x		x				x		x
Kite	Black-winged Kite	*Elanus caeruleus*	70.73	-	-	H	x	x			x		x		x		x
Korhaan	Blue Korhaan	*Eupodotis caerulescens*	17.07	NT	LC	H	x	x					x	x	x	x	
Lapwing	Blacksmith Lapwing	*Vanellus armatus*	95.12	-	-	H	x	x	x				x				
Moorhen	Common Moorhen	*Gallinula chloropus*	36.59	-	-	H			x			x	x				

Group	Species name	Scientific name	Full protocol	Global status	SA status	Likelihood of regular occurrence	Recorded during monitoring	Grassland	Drainage lines and wetlands	Agriculture	Alien trees	Dams and pans	Solar - Collisions with solar panels	Solar - Displacement: Disturbance	Solar - Displacement: Habitat transformation	Solar - Entanglement in fences	Electrocution - on site substation
Owl	Marsh Owl	*Asio capensis*	24.39	-	-	H	x	x	x				x	x	x	x	x
Plover	Kittlitz's Plover	*Charadrius pecuarius*	17.07	-	-	H	x		x			x	x				
Plover	Three-banded Plover	*Charadrius tricollaris*	50.00	-	-	H	x		x			x	x				
Pochard	Southern Pochard	*Netta erythrophthalma*	12.20	-	-	M	x		x			x	x				
Shelduck	South African Shelduck	*Tadorna cana*	8.54	-	-	M	x		x			x	x				
Shoveler	Cape Shoveler	*Spatula smithii*	29.27	-	-	H	x		x			x	x				
Snipe	African Snipe	*Gallinago nigripennis*	9.76	-	-	M	x		x				x		x		
Spoonbill	African Spoonbill	*Platalea alba*	21.95	-	-	H	x		x			x	x				
Stilt	Black-winged Stilt	*Himantopus himantopus*	19.51	-	-	M			x			x	x				
Stint	Little Stint	*Calidris minuta*	13.41	-	-	M	x		x		x	x	x				
Teal	Red-billed Teal	*Anas erythrorhyncha*	35.37	-	-	H	x		x			x	x				
Tern	Whiskered Tern	*Chlidonias hybrida*	20.73	-	-	M			x			x	x				

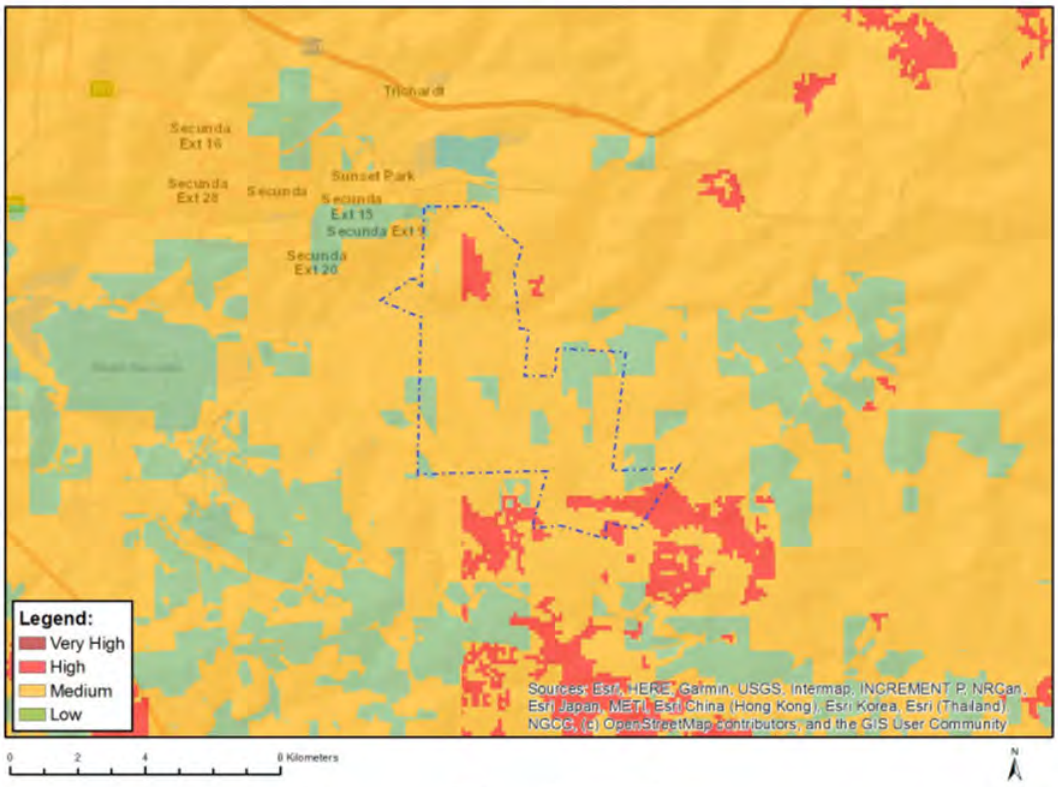
3.2.8.4 Screening Tool Descriptions and Site Verification

Site verification was undertaken from 22 – 26 July, 04 December 2021 and 05 – 08 January 2022 by the specialist. The purpose of this preliminary on-site inspection was to confirm the current use of the land and environmental sensitivities as identified by the screening tool. In terms of the DFFE Screening Tool, the development area and immediate environment is classified largely as **High sensitivity** for terrestrial animals according to the Terrestrial Animal Species Theme (Figure 3-40). The High classification is linked to the potential occurrence of African Marsh Harrier (Globally Least Concern, Regionally Endangered), Secretarybird (Globally Endangered, Regionally Vulnerable) and Blue Crane (Globally Vulnerable, Regionally Near-Threatened). The development area contains confirmed habitat for these 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), namely listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable. The occurrence of SCC was also confirmed during the surveys i.e. Lanner Falcon (Globally Least Concern, Regionally Vulnerable) was recorded in the development area.

3.2.8.5 Sensitivity analysis summary statement

Based on the field surveys to date, the classification of High sensitivity for avifauna in the screening tool is confirmed for proposed developable area, given the reliable detection of suitable habitat for African Marsh Harrier, Secretarybird, and other SCCs, namely Blue Korhaan and Blue Crane.

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Aves-Circus ranivorus
High	Aves-Sagittarius serpentarius
Low	Low sensitivity
Medium	Aves-Circus ranivorus
Medium	Aves-Sagittarius serpentarius
Medium	Insecta-Lepidochrysops procera
Medium	Mammalia-Crocidura maquassiensis
Medium	Mammalia-Hydrictis maculicollis

Figure 3-40: The National Web-Based Environmental Screening Tool map of the project site, indicating sensitivities for the Terrestrial Animal Species theme. The High and medium sensitivity classification is linked to African Marsh Harrier (*Circus ranivorus*) and Secretarybird (*Sagittarius serpentarius*).

Specialist Sensitivity Analysis and Verification

- **Very High sensitivity: No Go**

All surface water (drainage lines, wetlands, dams, and pans) must be buffered by **200 m** to ensure unhindered access of priority species to the water. Surface water and wetland habitats are crucially important for priority avifauna, including the African Marsh Harrier (Regionally Endangered) and many non-priority species. No PV panels should be constructed in this zone.

- **High sensitivity zones**

Areas of natural and natural rocky grassland should be demarcated as high sensitivity areas wherein development should be limited where feasible. These natural grassland tracts provide suitable foraging/nesting habitat for Secretarybird (Globally Endangered, Regionally Vulnerable), Blue Korhaan (Globally Near Threatened, Regionally Least Concern) and Blue Crane (Regionally Near-threatened, Globally Vulnerable) within the development area. However, these species do not require specific avoidance measures because there is also habitat available outside the development areas.

Figure 3-41 below is a sensitivity map, indicating very high and high sensitivity areas identified for PV development at the proposed Vhuvhili SEF site.

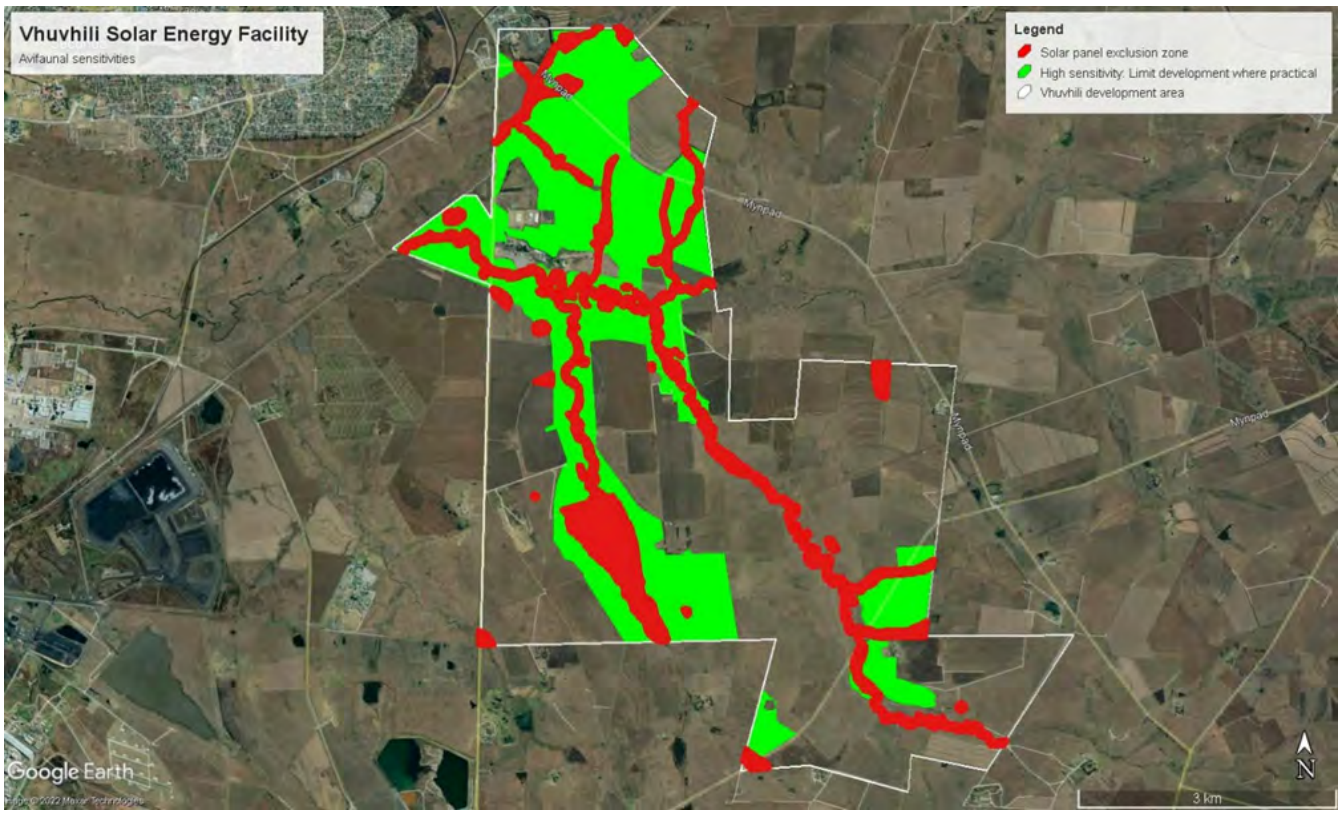


Figure 3-41: Areas of avifaunal sensitivity for the proposed Vhuvhili SEF site (Source: Van Rooyen, 2021).

3.2.9 Visual Aspects and Sensitive Receptors

A detailed description of the landscape and sensitive receptors of the proposed Vhuvhili projects site will be provided in the Visual Impact Assessment that will be included in the EIA Report. The information described below is based on scoping inputs provided by the Visual Specialist, and which are included in Appendix G.6 of this Scoping Report.

The visual assessment provides information on landscape, terrain and vegetation, as well as other aspects such as land use and sensitive receptors.

3.2.9.1 Visual character

According to the South African National Land Cover dataset (Geoterraimage 2020), much of the visual assessment area is classified as "Cultivated Land" interspersed with significant areas of "Grassland". Small tracts of forested land and numerous water bodies are scattered throughout the study area (Figure 3-42). Commercial agriculture is the dominant activity in the study area, with the main focus being maize cultivation (Figure 3-42) with some limited livestock and game farming. There are multiple farm portions in the study area, resulting in a relatively moderate density of rural settlement with many scattered farmsteads in evidence. Built form in much of the study area comprises farmsteads, ancillary farm buildings and workers' dwellings, gravel access roads, power and telephone lines and fences.

Figure 3-42: Maize cultivation south-west of the Vhuvhili SEF project area (Source: Schwartz, 2022).

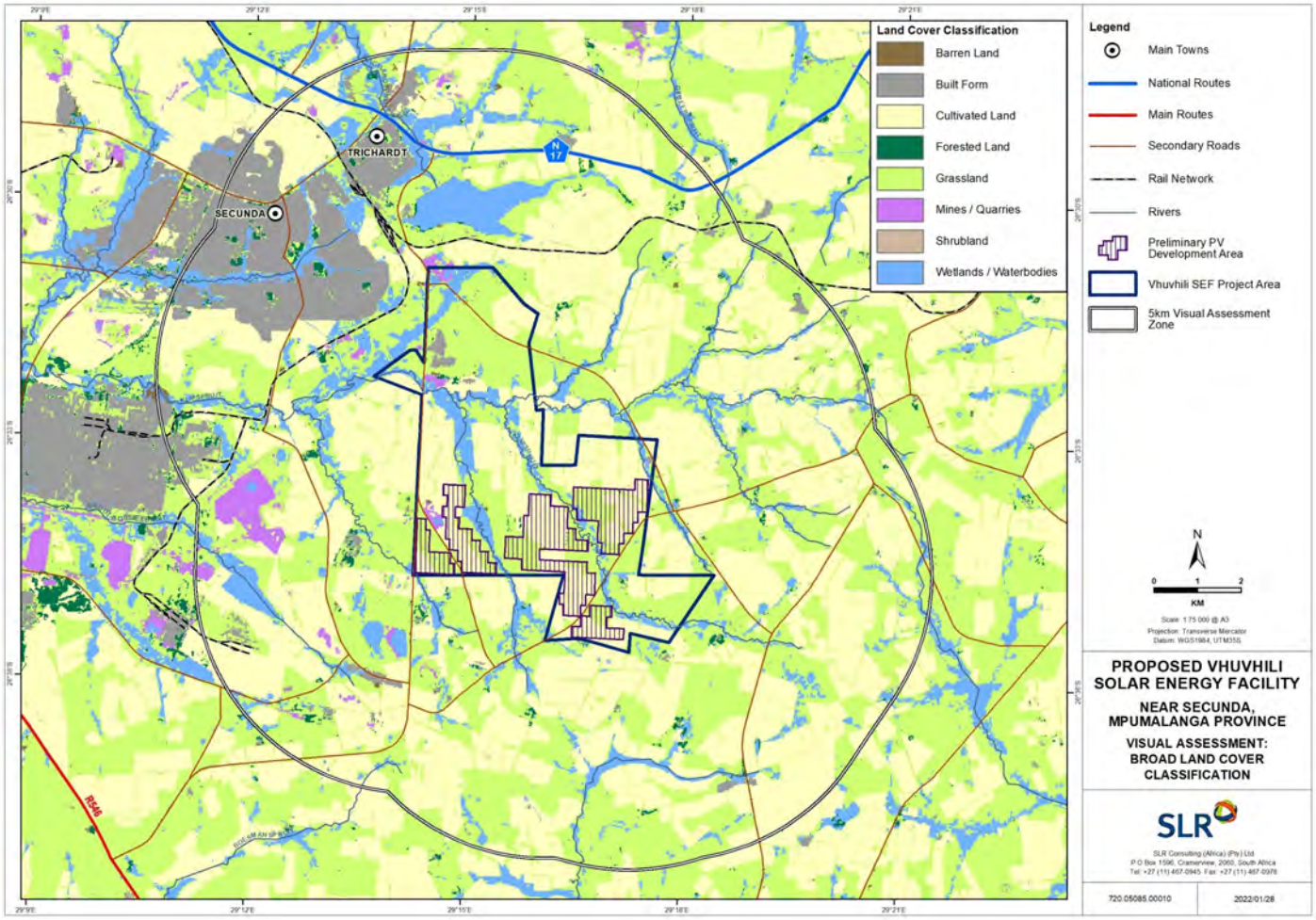


Figure 3-43: Maize cultivation south-west of the Vhuvhili SEF project area (Source: Schwartz, 2022).

High levels of human influence are however visible in the northern and north-western sector of the study area. Much of the town of Secunda (Figure 3-43) and the adjacent small town of Trichardt encroach into the study area and the peri-urban areas are dominated by industrial / mining activity (Figure 3-45). In addition, the Sasol Secunda synthetic fuel plant (Figure 3-46) is located on the western boundary of the study area, and this facility together with the associated infrastructure related to the supply and storage of coal as well as electrical infrastructure (Figure 3-47 has resulted in significant transformation in the landscape. Associated with the Sasol plant is the nearby Riaan Rademan Training Academy (Figure 3-48) and adjacent electrical substation (Figure 3-49), contributing further to the overall transformation of the landscape in this area.

Other evidence of significant human influence in the area includes mining activity in the south-western sector of the study area (Bosjesspruit Mine) with some associated service industry as well as road, rail, telecommunications and electricity infrastructure.

The physical and land use-related characteristics of the study area as described above contribute to its overall visual character. Visual character largely depends on the level of change or transformation from a natural baseline in which there is little evidence of human transformation of the landscape. Varying degrees of human transformation of a landscape would engender differing visual characteristics to that landscape, with a highly modified urban or industrial landscape being at the opposite end of the scale to a largely natural, undisturbed landscape. Visual character is also influenced by the presence of built infrastructure including buildings, roads and other objects such as telephone or electrical infrastructure. The visual character of an area largely determines the sense of place relevant to the area. This is the unique quality or character of a place, whether natural, rural or urban which results in a uniqueness, distinctiveness or strong identity.

The predominant land use in the area (maize cultivation) has significantly transformed the natural landscape across much of the study area. In addition, the landscape becomes progressively more transformed towards the northern and north-western boundary of the study area where the towns of Secunda and Trichardt, the Sasol Secunda fuel plant and mining activities have resulted in a high degree of visual degradation. The more industrial character of the landscape is an important factor in this context, as the introduction of the proposed SEF would result in less visual contrast where other anthropogenic elements are already present, especially where the scale of those elements is similar to that of the proposed Vhuvhili SEF development.

The scenic quality of the landscape is also an important factor that contributes to the visual character or inherent sense of place. Visual appeal is often associated with unique natural features or distinct variations in form. As such, the pastoral landscape and rolling hills in parts of the study area are important features that could increase the visual appeal and visual interest in the area.

Cultural landscapes are becoming increasingly important concepts in terms of the preservation and management of rural and urban settings across the world. The concept of ‘cultural landscape’ is a way of looking at a place that focuses on the relationship between human activity and the biophysical environment (Breedlove, 2002). In this instance, the rural / pastoral landscape represents how the environment has shaped the predominant land use and economic activity practiced in the area, as well as the patterns of human habitation and interaction.

In light of this, it is important to assess whether the introduction of a solar PV facility into the study area would be a degrading factor in the context of the prevailing character of the cultural landscape. Broadly speaking, visual impacts on the cultural landscape in the area around the proposed development would be reduced by the fact that the visual character in much of the area has been significantly transformed and degraded by urban/industrial, mining and infrastructural development.

Figure 3-44: View southwards from Secunda towards the Sasol Fuel Plant

Figure 3-45: Mining /Quarrying Activity on the periphery of Secunda

Figure 3-46: Sasol synthetic fuel plant located on the western boundary of the Vhuvhili SEF study area.

Figure 3-47: Infrastructure associated with the Sasol Plant

Figure 3-48: Riaan Rademan Training Academy located close to the Sasol Fuel Plant

Figure 3-49: Substation and coal conveyor adjacent to the Riaan Rademan Training Academy (Source: Google Earth 2022)

3.2.9.2 Visual Implications

The predominance of cultivated land in conjunction with the remaining natural grassland cover across much of the study area would give the viewer the general impression of a largely rural / pastoral setting. Thus, the proposed Vhuvhili SEF development would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the development site and across much of the study area.

High levels of human transformation and visual degradation are however evident in the north and north-west where urban/industrial, peri-urban development and mining activity dominate the landscape. In addition, roads, railways, coal conveyors and power lines have further degraded the visual character of the study area to some degree. This transformation has already altered the visual character across much of the north and north-western sector of the study area, thus reducing the level of contrast of the proposed Vhuvhili SEF development.

3.2.9.3 Visual Absorption Capacity

Visual absorption capacity is the ability of the landscape to absorb a new development without any significant change in the visual character and quality of the landscape. The level of absorption capacity is largely based on the physical characteristics of the landscape (topography and vegetation cover) and the level of transformation present in the landscape.

Although the undulating topography in the study area and the areas of cultivation and grassland would reduce the visual absorption capacity, this would be offset considerably by the presence of urban/industrial, mining and infrastructural development in the vicinity of the proposed Vhuvhili SEF.

Visual absorption capacity in the study area is therefore rated as **MODERATE.**

3.2.9.4 Sensitive Visual Receptor Locations

A sensitive visual receptor location is defined as a location from where receptors would potentially be impacted by a proposed development. Adverse impacts often arise where a new development is seen as an intrusion that alters the visual character of the area and affects the 'sense of place'. The degree of visual impact experienced will however vary from one receptor to another, depending on the viewer's perception.

A distinction must be made between a receptor location and a sensitive receptor location. A receptor location is a site from where the proposed development may be visible, but the receptor may not necessarily be adversely affected by any visual intrusion associated with the development. Less sensitive receptor locations include locations of commercial activities and certain movement corridors, such as roads that are not tourism routes. More sensitive receptor locations typically include sites that are likely to be adversely affected by the visual intrusion of the proposed development. They include tourism facilities, scenic sites and residential dwellings in natural settings.

The identification of sensitive receptors is typically based on a number of factors which include:

- the visual character of the area, especially taking into account visually scenic areas and areas of visual sensitivity;
- the presence of leisure-based (especially nature-based) tourism in an area;
- the presence of sites / routes that are valued for their scenic quality and sense of place;
- the presence of homesteads / farmsteads in a largely natural setting where the development may influence the typical character of their views; and
- feedback from I&APs, as raised during the public participation process conducted as part of the Scoping and EIA process.

As the visibility of the development would diminish exponentially over distance, receptors that are closer to the SEF would experience greater adverse visual impacts than those located further away. Zones of visual impact were therefore delineated based on distance bands measured from the proposed boundaries of the Vhuvhili PV development area. Based on the height and scale of the project, the distance intervals chosen for these zones of visual impact are as follow:

- 0 – 500 m (high impact zone);
- 500 m – 2 km (moderate impact zone); and
- 2 km – 5 km (low impact zone).

The degree of visual impact experienced will vary from one receptor location to another, as it is largely based on the viewer's perception. Factors influencing the degree of visual impact experienced by the viewer include the following:

- Value placed by the viewer on the natural scenic characteristics of the area;

- The viewer's sentiments toward the proposed development. These may be positive (a symbol of progression toward a less polluted future) or negative (foreign objects degrading the natural landscape); and
- Degree to which the viewer will accept a change in the typical character of the surrounding area.

A preliminary desktop assessment undertaken by the Visual Specialist did not identify any formal protected areas or leisure-based tourism activities in the study area for the proposed Vhuvhili SEF. The desktop assessment did however identify multiple farmsteads and residences within the study area. While these homesteads and residences could be considered to be receptors, not all of them would be sensitive to the proposed development and given the number of farmsteads, it was not possible to confirm the presence of receptors at all the identified locations. Notwithstanding these limitations, all the identified receptor locations were assessed as part of the VIA as they are still regarded as being potentially sensitive to the visual impacts associated with the proposed development. None of these receptor locations was found to be sensitive.

Although most of the receptor locations are believed to be farmsteads, they are regarded as potentially sensitive visual receptors as the proposed development could potentially alter natural or semi-natural vistas experienced from these locations. At this stage however, local sentiments towards the proposed development are not known.

It was noted that residential areas within the towns of Secunda and Trichardt are located within the Vhuvhili SEF study area. While these could be considered as receptors, they are not considered to be sensitive due to their location within built-up, heavily transformed areas.

In many cases, roads along which people travel, are regarded as sensitive receptors. The primary thoroughfare in the study area is the N17 National Route, which provides a major link between Johannesburg in the West with Ermelo, and the Eswatini Border in the east. The section of this road traversing the study area is not however considered part of a designated scenic route, although the route is an important link and is likely to be utilised, to some extent, by tourists en route to other parts of Mpumalanga Province. As a result, it is considered to be a potentially sensitive receptor road – i.e, a road being used by motorists who may object to the potential visual intrusion of the proposed SEF.

The other thoroughfares in the study area are primarily used as local access roads and do not form part of any scenic tourist routes. These roads are not specifically valued or utilised for their scenic or tourism potential and are therefore not regarded as visually sensitive.

The potentially sensitive visual receptor locations identified within the study area for the proposed Vhuvhili SEF are indicated in Figure 3-50.

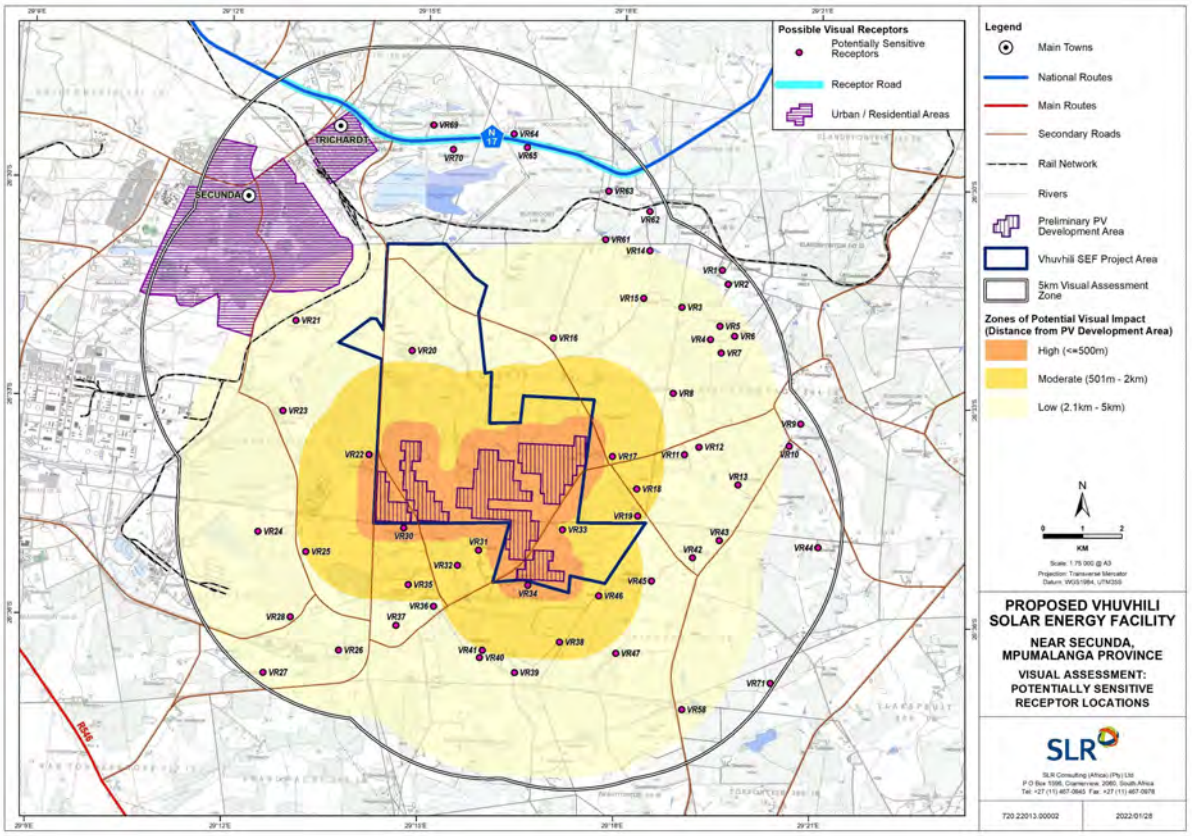


Figure 3-50: Potentially sensitive receptor locations of the proposed Vhuvhili SEF (Source: Schwartz, 2022)

3.2.9.5 Receptor Impact Rating

The methodology to determine the receptor impact rating is included in Section 4 of the Visual Scoping Report which is included in Appendix G.6. The full receptor impact rating for the proposed Vhuvhili SEF is provided in Appendix E of the said report. However, Table 3-11 below presents a summary of the overall visual impact of the proposed SEF on each of the potentially sensitive visual receptor locations identified within 5 kms of the proposed PV development area.

Table 3-11: Summary receptor impact rating for the proposed Vhuvhili SEF

OVERALL IMPACT RATING	NUMBER OF SENSITIVE RECEPTORS	TOTAL NUMBER OF POTENTIALLY SENSITIVE RECEPTORS	POTENTIALLY SENSITIVE RECEPTORS INSIDE VIEWSHED
HIGH	0	2	2
MODERATE	0	26	23
LOW	0	14	10
TOTAL	*0*	*42*	*35*

Table 3-11 above shows that a total of 42 receptors were identified within 5 kms of the proposed Vhuvhili PV development area, i.e. within 5 kms of the nearest PV array, seven (7) of which are outside the viewshed for the PV arrays. None of the remaining receptors are considered sensitive. As previously mentioned, most of the locations identified are assumed to be farmsteads and although these residences could be considered to be receptors, given the degree of transformation in the landscape, not all of them would be sensitive to the proposed development

Of the remaining thirty-five (35) potentially sensitive receptor locations, two (2) are located within the Vhuvhili SEF project area and it has been assumed that the relevant landowners are involved in the project. As such these landowners are not expected to perceive the proposed development in a negative light.

Only two (2) potentially sensitive receptors (VR19 and VR22) are expected to experience high levels of visual impact. Twenty-three (23) of the remaining receptor locations are expected to experience moderate levels of impact as a result of the Vhuvhili SEF development, while the remaining ten (10) would only experience low levels of visual impact.

As stated above, the N17 national route could be considered a potentially sensitive receptor road. This road is outside the viewshed of the proposed SEF and as such motorists utilising this route will not experience any visual impacts as a result of the SEF development.

3.2.9.6 National Environmental Screening Tool

In assessing the visual sensitivity of the proposed Vhuvhili SEF project area, consideration was given to the Landscape Theme of the National Environmental Screening Tool. The Landscape Theme of the National Environmental Screening Tool identifies areas of very high sensitivity in respect of solar PV development in the Vhuvhili SEF project area (Figure 3-51). According to the Screening Tool, the project area is associated with “mountain tops and high ridges” and this factor has resulted in areas of “Very High” landscape sensitivity in the northern and southern sectors of the site.

The Screening Tool is however a very high level, desktop study and as such the results of the study must be viewed against the findings of the field investigation as well as factors affecting visual impacts such as:

- the presence of visual receptors;
- the distance of those receptors from the proposed development;
- the likely visibility of the development from the receptor locations; and
- the degree of landscape transformation and / or degradation already present.

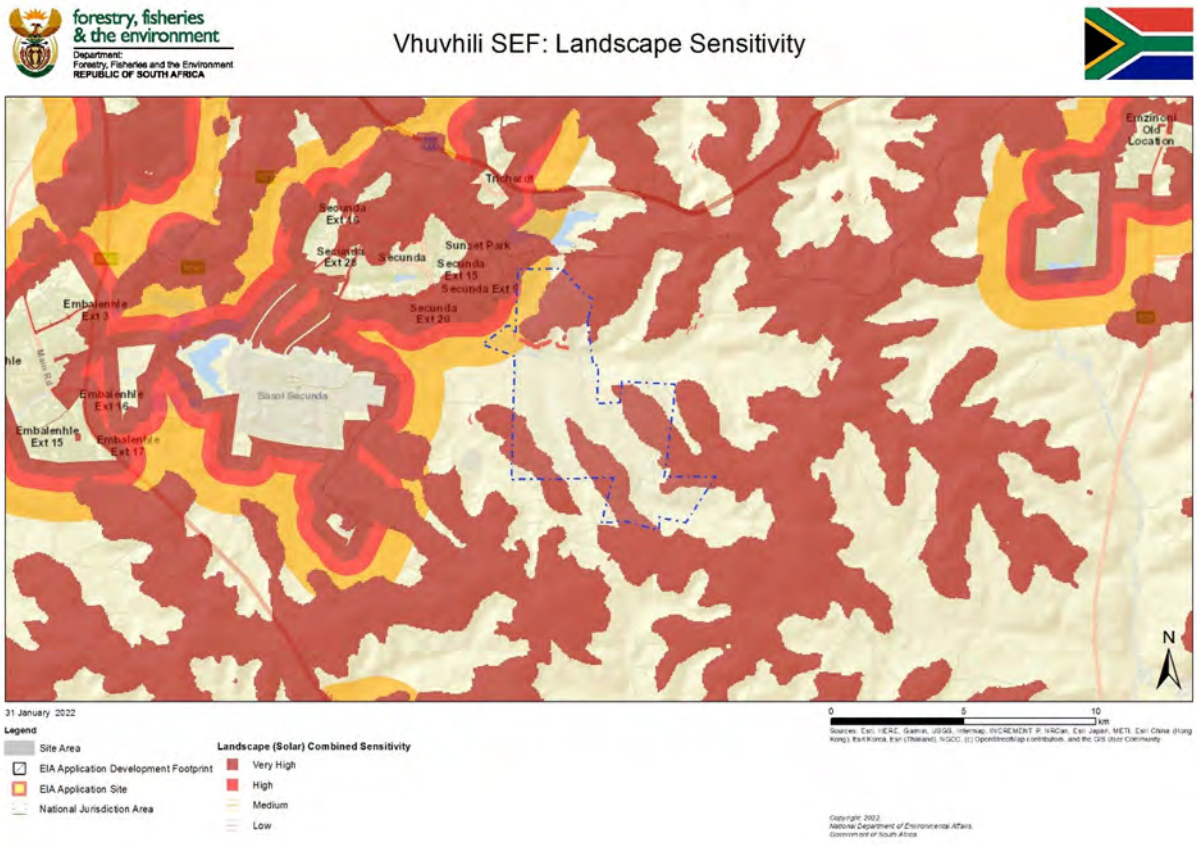


Figure 3-51: Vhuvhili SEF Relative Landscape Sensitivity (January 2022) (Source: Schwartz, 2022)

3.2.9.6.1 Screening Tool Descriptions and Site Verification

A site sensitivity verification has been conducted in support of the VIA for the Vhuvhili SEF. The verification exercise is based on a desktop-level assessment supported by field-based observation and involved an assessment of factors as outlined below. The site visit or site verification was undertaken from 25 – 26 January 2022 by the specialist. The purpose of this preliminary on-site inspection was to verify the landscape characteristics identified via the desktop study and environmental sensitivities as identified by the Screening Tool.

3.2.9.6.2 Outcome of Site Sensitivity Verification

The assessment has shown that, overall, the study area has a somewhat mixed visual character, transitioning from the heavily transformed urban / peri-urban landscape associated with the Secunda and Trichardt urban areas, the Sasol Secunda fuel plant and associated infrastructure in the north / north-west to a more rural / pastoral character across the remainder of the study area. Hence, although a solar PV development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed SEF in relatively close proximity to Secunda and Trichardt and the Sasol refinery will significantly reduce the level of contrast.

A broad-scale assessment of landscape sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have **a low**

visual sensitivity. No formal protected areas, leisure-based tourism activities or sensitive receptor locations were identified in the study area, thus confirming the low level of visual sensitivity.

A site sensitivity assessment was undertaken to inform the site layout for the SEF with the aim of indicating any areas within the proposed SEF project area which should be precluded from the development footprint. From a visual perspective, sensitive areas would be areas where the establishment of PV arrays would result in the greatest probability of visual impacts on potentially sensitive visual receptors.

Using GIS-based visibility analysis, it was possible to determine which sectors of the application site would be visible to the highest numbers of receptors in the study area. This analysis confirmed that areas of higher elevation are visible to greater numbers of potentially sensitive receptors. Hence the visual prominence of a tall structure such as a PV panel would be exacerbated if located on any ridges or a relatively higher-lying plateaus on the site. It is therefore recommended that PV panels should preferably not be located on the highest ridges within the Vhuvhili SEF project area. However, while these ridges could be seen as areas of potentially high visual sensitivity, the study area as a whole is rated as having a low visual sensitivity, and as such, the sensitivity rating would be reduced to "Medium". Hence the ridges are not considered to be "no go areas", but rather should be viewed as zones where turbine placement would be least preferred.

In determining visual sensitivity, consideration must be given to the direct visual impact of the PV arrays on any farmsteads or receptors located in, or within 500m of, the project area. Accordingly, a visual sensitivity zone of 500 m has been delineated around the existing receptor located within 500 m of the site boundary. In addition, it is recommended that a 300 m visual sensitivity zone is applied on either side of the D619 and D823 district roads which traverse the SEF project area.

The exclusion of PV arrays from these areas will reduce visual impacts and prevent significantly adverse impacts of glint and glare on the local residents and on passing motorists, although the full extent of these impacts can only be determined by way of a Glint and Glare Impact Assessment. At this stage however, the visual sensitivity zones are not considered "no go" areas, but rather should be viewed as zones where development should be limited. It should be stressed that these zones apply to PV array development only. The visual impacts resulting from the associated on-site infrastructure are considered to have far less significance when viewed in the context of the SEF as a whole and as such the associated on-site infrastructure (e.g. the substation and BESS) has been excluded from the sensitivity analysis.

The areas identified as visually sensitive to SEF development are shown in Figure 3-52.

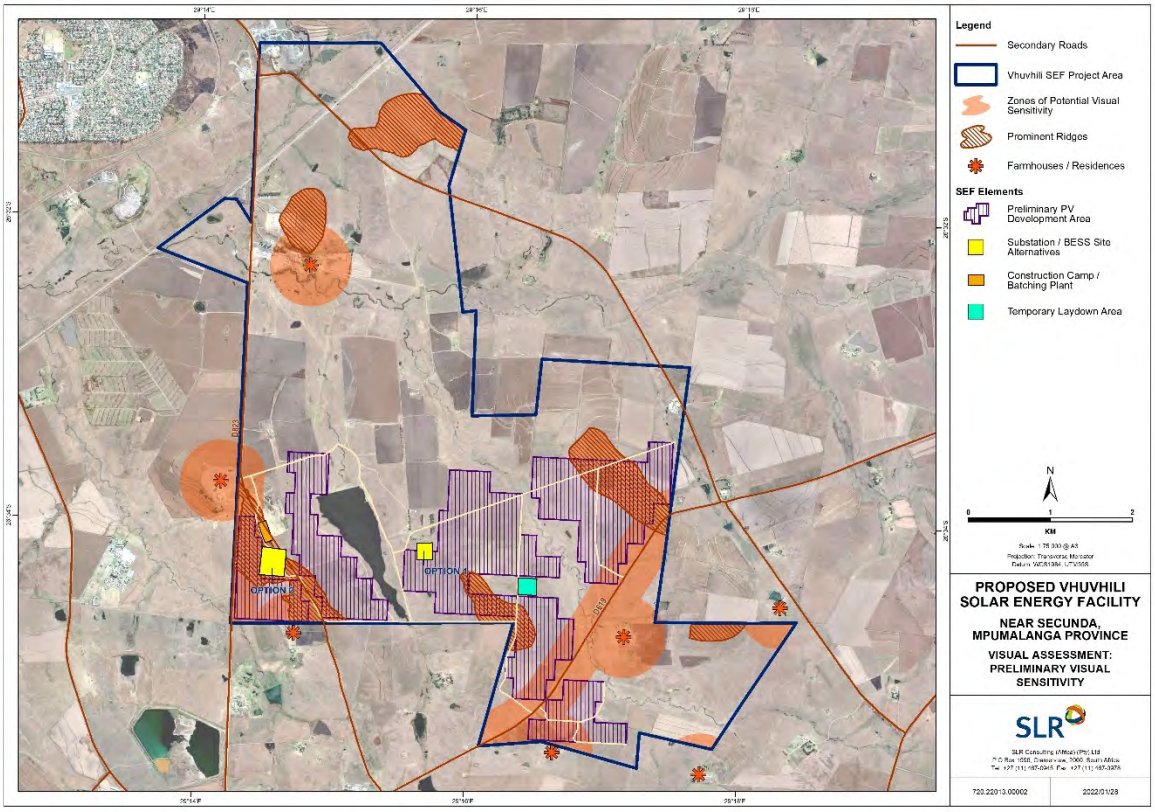


Figure 3-52: Areas of Potential Visual Sensitivity in the Vhuvhili SEF Project Area (Source: Schwartz, 2022)

Although the Screening Tool identifies significant areas of very high landscape sensitivity, the site sensitivity verification exercise conducted in respect of this VIA (Appendix E of the Visual Scoping Report) did not indicate the presence of mountain tops, high ridges or any significantly steep slopes. Therefore, the rating of very high landscape sensitivity assigned by the Screening Tool is not supported by the findings of this assessment. This assessment, confirmed by the field investigation, showed the presence of low ridges and plateaus in a largely undulating landscape. The sensitivity analysis above has recognised these ridges and identified the higher ridges as zones where development would be least preferred.

3.2.10 Heritage: Archaeology and Cultural Landscape

A detailed description of the archaeological features and cultural landscape within the proposed Vhuvhili projects site will be provided in the Heritage Impact Assessment (Archaeology and Cultural Landscape), that will be included in the EIA Report. The information described below is based on scoping inputs provided by the Heritage Specialist, and which are included in Appendix G.7 of this Scoping Report.

The project area is characterised by grazing lands and ploughed fields. The various farms are subdivided into large grazing camps with multiple gravel roads running through the area. Existing infrastructure occurring across the project area includes farmsteads, powerlines, pipelines, and farm dams.

The site is mostly characterised by thick grass cover. There is a general lack of trees, but clusters do occur at farmhouses. Some fields were planted with crops at the time of inspection. Figures 3-53 to 3-61 show the nature of the study area and its vegetation covering.

Figure 3-53: Grass cover.

Figure 3-54: Grass cover and loose rocks.

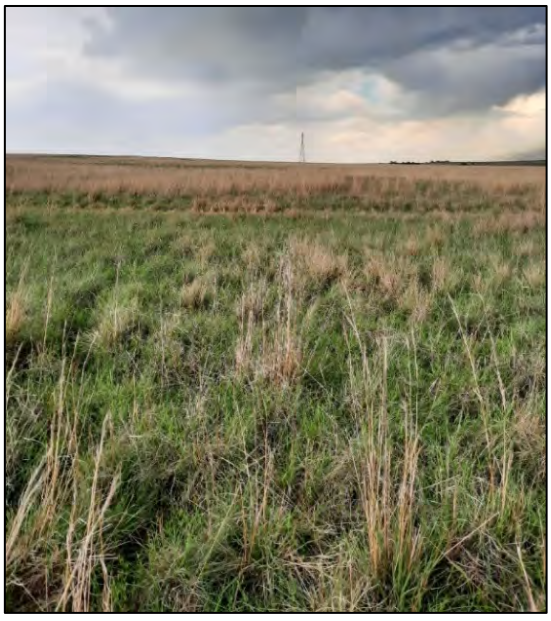


Figure 3-55: Grass cover.

Figure 3-56: Grass cover and powerlines.

Figure 3-57: Grass cover and a pipeline manhole.

Figure 3-58: Gravel road with a dam in the background.

Figure 3-59: Arable land planted with crops.

Figure 3-60: Dense grass with a dam in the background.

Figure 3-61: Dense grass with a dry stream bed in the background.

3.2.10.1 Findings of the Heritage Study

3.2.10.1.1 Archaeology

This section describes the heritage resources recorded in the study area during the course of the field survey which took place on 10, 11, 12 and 17 November 2021. Their locations are listed in Table 3-12, mapped in Figure 3-62, and then described in full further below.

Table 3-12: List of heritage finds recorded during the field survey.

Waypoint	Location	Nature	Grade
168	26° 35' 00.91" S 29° 16' 51.59" E	Archaeological – stone feature	GPC
169	26° 34' 56.49" S 29° 16' 53.38" E	Archaeological – stone feature	GPB
170	26° 35' 10.78" S 29° 16' 49.80" E	Archaeological – stone feature	GPC
171	26° 35' 09.09" S 29° 16' 52.27" E	Possible graves	IIIA
172	26° 35' 08.13" S 29° 16' 51.89" E	Archaeological – stone feature	GPB
173	26° 34' 53.38" S 29° 17' 01.27" E	Archaeological – stone feature	GPC
174	26° 35' 26.69" S 29° 17' 10.42" E	Archaeological – stone feature	GPC
175	26° 35' 13.73" S 29° 16' 57.80" E	Possible grave	IIIA
176	26° 35' 05.02" S 29° 17' 28.87" E	Not heritage	---
177	26° 35' 04.95" S 29° 17' 40.35" E	Grave	IIIA
178	26° 35' 09.11" S 29° 17' 49.44" E	Graves	IIIA
179	26° 34' 12.57" S 29° 15' 34.82" E	Graves	IIIA
180	26° 34' 09.92" S 29° 16' 27.47" E	Archaeological – stone feature	GPB
181	26° 33' 53.42" S 29° 16' 38.41" E	Graves	IIIA
182	26° 34' 30.94" S 29° 15' 22.54" E	Graves	IIIA
183	26° 34' 28.24" S 29° 15' 15.88" E	Archaeological – stone feature	GPB

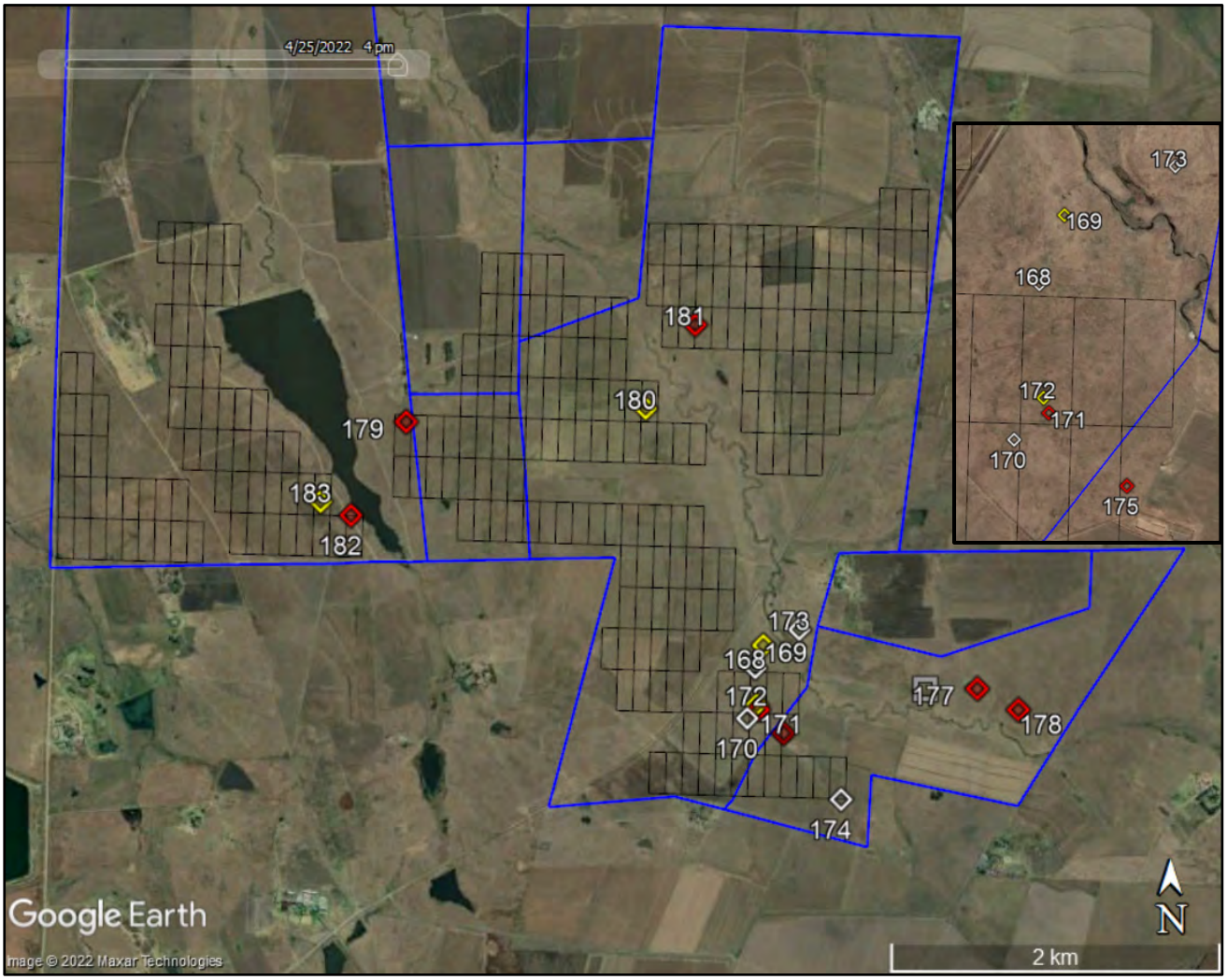


Figure 3-62: Aerial view of the study area showing the locations of the recorded heritage resources.

3.2.10.1.2 Site visit

Despite the grass cover, the field survey revealed a number of archaeological remnants of old stone-built features. The age and functions of these features is not easily determined and, for precautionary reasons and in the absence of evidence to the contrary, they are generally treated as having been greater than 100 years of age and hence included within the legal definition of archaeological heritage. It seems likely that the above ground stones have largely been removed from these features for reuse elsewhere on the farms, leaving only the ground-level archaeological remnants. The various sites are discussed and illustrated in turn below.

Site Number:	Description:	Period:	Condition:
168	Remains of an ephemeral stone and mud foundation of a rectangular feature with two walls visible at right angles to one another, one about 10 m long and the other about 20 m long. The feature is degraded to the extent that its original purpose cannot be determined. Although unlikely, could contain unmarked graves of stillborn babies.	Historic, Recent	Poor

Figure 3-63 and Figure 3-64: Ephemeral stone and mud foundations. Scale bar = 1 m.

Significance and Grade:
Very Low - GPC

Site Number:	Description:	Period:	Condition:
169	This site is some 100 m by 40 m in dimension and has many packed stone features visible along with what may be the remnants of a kraal of some 40 m by 50 m and a smaller feature of some 10 m by 10 m. The features are square, and partially buried under grass. Possibly the remnants of a large kraal and accompanying structure. The site is situated in an open field with fairly overgrown grass. Based on the 1955 aerial photography, the site is likely more than 67 years old.	Historic, recent	Poor

Figure 3-65 and Figure 3-66: Remains of stone walling. Scale bar = 1 m.

Figure 3-67: Remnants of a wall corner. Scale bar = 1 m.

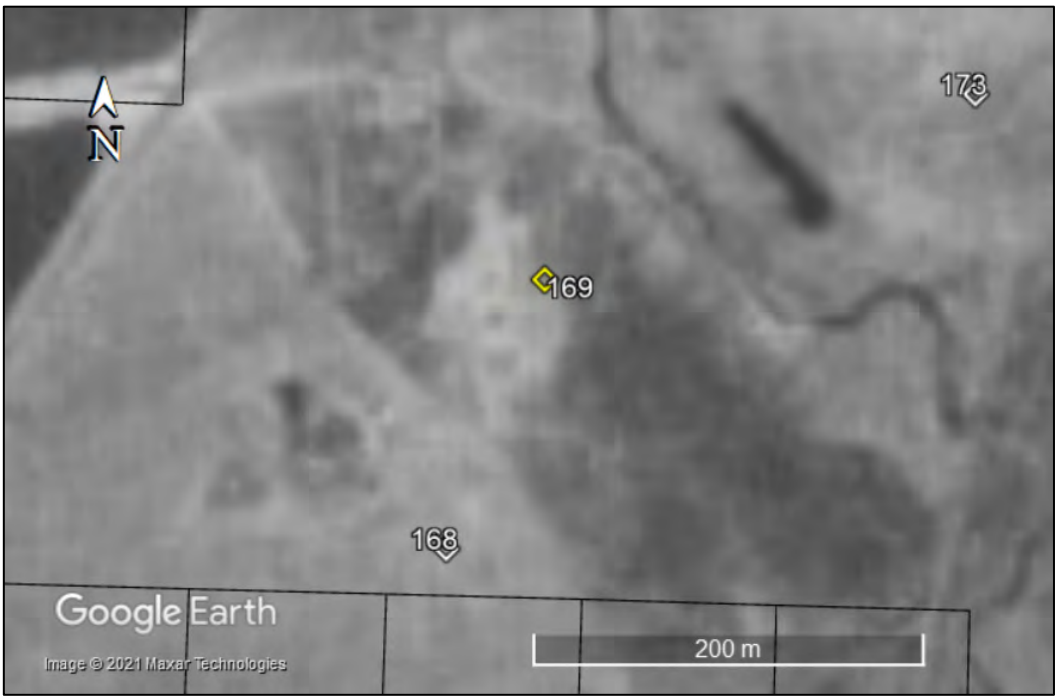


Figure 3-68: 1955 aerial photograph (201_007_04189) showing a pale area at waypoint 169. This either indicates a relatively recent demolition at that time (not yet overgrown) or else that the site was still actively in use.

Significance and Grade:
Low - GPB

Site Number:	**Description:**	**Period**:	**Condition**:
170	Several linear stone packed features, possibly agricultural in nature, and stretching in a straight line for approximately 100 m. The features are located close to a previously ploughed field and could be related to that field.	Historic, recent	Poor.

Figure 3-69: Linear packed stone walling. Scale bar = 1 m.

Significance and Grade:
Very Low - GPC

Site Number:	Description:	**Period:**	**Condition:**
172	Multiple stone packed features were seen in an area of about 50 m by 50 m. These include a small circular feature of about 5 m diameter and a larger area of packed stones that may represent the remains of a kraal of some 40 m diameter. The site is heavily overgrown with grass.	Historic, recent	Poor, fairly degraded.

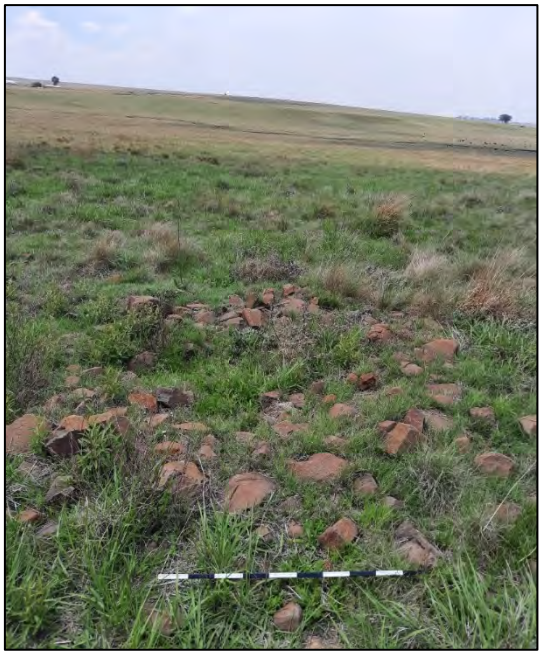


Figure 3-70 and Figure 3-71: Circular packed stone feature as well as the remnants of a larger packed stone feature. Scale bar = 1 m.

Significance and Grade:
Low - GPB

Site Number:	Description:	Period:	Condition:
173	Ephemeral, small stone packed foundation and a 2 m long section of packed stone wall footing. The features are overgrown with grass.	Historic, recent	Poor

Figure 3-72 and Figure 3-73: Small section of packed stone walling/foundation barely visible in the grass. Scale bar = 1 m.

Significance and Grade:
Very Low - GPC

Site Number:	Description:	Period:	Condition:
174	Ephemeral remains of a stone foundation running in a straight line for about 5 m.	Historic, recent	Poor, Degraded.

Figure 3-74 and Figure 3-75: Ephemeral remnants of a packed stone foundation/feature. Scale bar = 1 m.

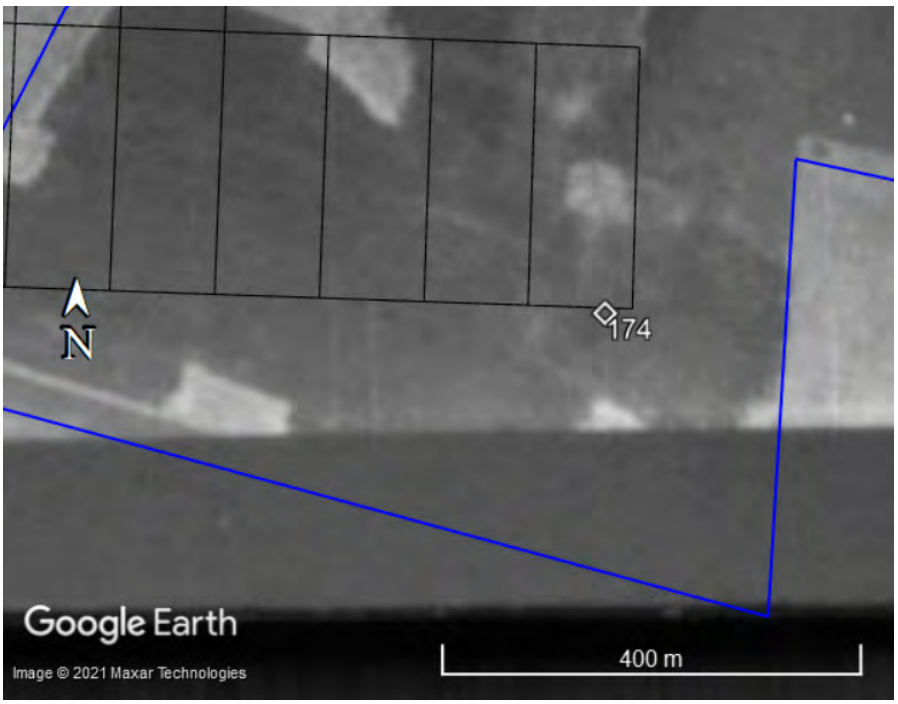


Figure 3-76: 1955 aerial photograph (201_007_04189) showing that the site was in a planted field at that time.

Significance and Grade:

Very Low - GPC

Site Number:	Description:	Period:	Condition:
176	The remains of two demolished structures measuring about 10 m by 10 m and 10 m by 5 m. Only the foundation and some scattered building materials are present. This site is considered to be too recent to be heritage but is documented for the record.	Recent	Demolished

Figure 3-77: Remnants of modern structures that have been demolished. Scale bar = 1 m.

Significance and Grade:
Very Low – n/a

Site Number:	Description:	Period:	Condition:
180	Large rectangular packed stone feature measuring about 10 m by 20 m. It is possibly a kraal and is situated near a small stream in a large open field. The feature is half buried and very degraded.	Historic, Recent	Poor, Degraded

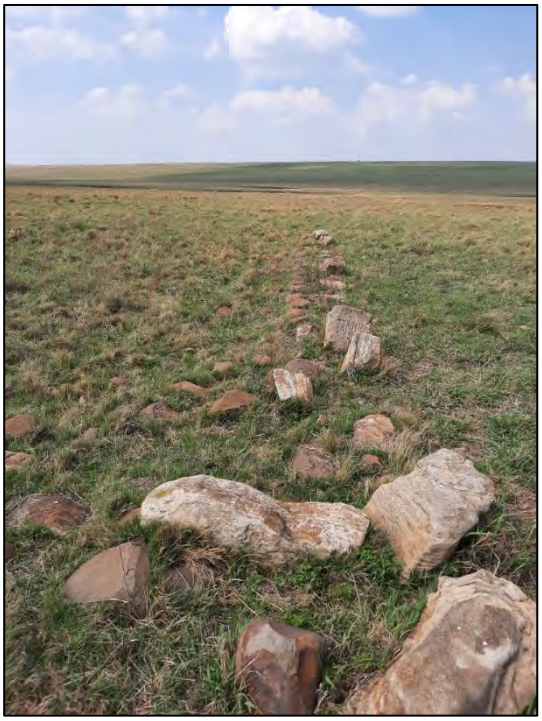


Figure 3-78 and Figure 3-79: Large packed stone feature/kraal with some stone wall foundations still intact.

Significance and Grade:
Low - GPB

Site Number:	Description:	Period:	Condition:
183	A large square stone packed feature of some 30 m by 30 m and situated in an open field near a large farm dam. The feature is half buried under grass making it difficult to determine the layout. Remnants of intact wall foundations are still visible. The feature is possibly part of a demolished kraal.	Historic, recent.	Poor, degraded.

Figure 3-80 and Figure 3-81: Large square packed stone feature.

Significance and Grade:
Low – GPB

No Stone Age or Iron Age archaeological materials such as stone artefacts or pottery were seen in the study area, perhaps largely due to the thick grass cover.

3.2.10.2 Graves

Graves, including a number of features identified as possible graves, were seen in several places in the study area and it is always possible that further unmarked or poorly marked graves will be present in unsurveyed areas or beneath the grass cover. Notable are two sets of graves that represent reburials. Both are noted on the grave markers to have been buried in 2020 but no dates of birth and death are known. The landowners noted that the graves were moved from the footprint of the enlarged farm dam, but aerial photography reveals that this dam was completed in 2017. This suggests that the remains were stored and only reburied later, perhaps after the full supply level of the dam had been reached.

Site Number:	Description:
171	Three stone packed features over an area of about 30 m by 30 m and situated on top of a small, low rise. Some of these features are very degraded and difficult to identify/define. It is not clear what the purpose of the features are but they could be graves. Although quite spread out, for precautionary reasons, they are assumed to be graves.

Figure 3-82 and Figure 3-83: Possible graves or packed stone features. Scale bar = 1 m.

Significance and Grade:
Unknown – GPC or IIIA if graves (given precautionary grade of IIIA)

Site Number:	Description:
175	A single stone feature situated in a large open field. The feature is a circular/oval packed stone feature with a small section of straight walling. The stones occur over a 3 m by 3 m area. Although seemingly unlikely, this could be the remains of a degraded grave site.

Figure 3-84 and Figure 3-85: Packed stone feature situated on an open field. Scale bar = 1 m.

Significance and Grade:
Unknown – GPC or IIIA if grave (given precautionary grade of IIIA)

Site Number:	Description:
177	A single, isolated formal grave of a child situated on the side of a small hill. The grave surround is built from sandstone blocks. The headstone has been broken off but still lies on the grave. There is no visible inscription on the grave but its small size shows that it was a child's grave. The remains of a wire fence are also evident.

Figure 3-86 and Figure 3-87: Small sandstone child grave situated on an open field. Scale bar = 1 m.

Significance and Grade:
High – IIIA

Site Number:	Description:
178	Several stone-packed grave mounds that are ill defined such that it is difficult to determine the total number of graves. It is estimated that there are four to six graves present and they are placed in a single row.

Figure 3-88 and Figure 3-89: Series of packed stone graves. Scale bar = 1 m.

Significance and Grade:
High – IIIA

Site Number:	**Description**:
179	A set of four graves placed in a single row with metal grave markers. The graves are indicated to have been moved from the enlarged farm dam and reburied in 2020. Although names are provided, dates of birth and death are indicated as unknown. Without knowing their temporal origins (which could very easily be older than 60 years), they are treated as heritage for precautionary reasons.

Figure 3-90 and Figure 3-91: Relocated graves situated in an open field. Scale bar = 1 m.

Significance and Grade:
High - IIIA

Site Number:	**Description:**
181	Small cemetery of about 30 m by 30 m located in an open field near the bottom of a low hill. There are at least twenty graves present. The graves mostly have stone-packed mounds but one is a formal grave with a granite headstone. Some graves are fairly degraded and there is a possibility that further unidentifiable graves occur. The single headstone inscription dates the grave to 1979 but it is possible that some graves are older than sixty years so the site is treated as heritage for precautionary reasons.



Figure 3-92 and Figure 3-93: Small cemetery located on a slope within an open field. The single formal grave is shown, along with a typical example of all the others. Scale bar = 1 m.

Statement of Significance and Grade:
High – IIIA

Site Number:	Description:
182	A set of six graves placed in a single row with metal grave markers. The graves are indicated to have been moved from the enlarged farm dam footprint and reburied in 2020. Although names are provided, dates of birth and death are indicated as unknown. Without knowing their temporal origins (which could very easily be older than 60 years), they are treated as heritage for precautionary reasons.

Figure 3-94 and Figure 3-95: Series of relocated graves situated on the edge of a large farm dam.

Statement of Significance and Grade:
High - IIIA

3.2.10.3 Historical aspects and the Built Environment

Aside from the archaeological remains described above, no historical sites were present anywhere within the study area. A few farmsteads occur nearby but historical aerial photography indicates that most of the structures and many entire farmsteads are modern. None of them occur within the area proposed for the Vhuvhili Solar PV development. Most are more than 0.5 km from the proposed development area, but two do occur close to the southern margin of the proposed footprint. Both are on separate properties not forming part of the development proposal and thus could not be accessed.

3.2.10.4 Cultural Landscapes and Scenic Routes

The landscape is an agricultural one characterised by grazing lands (grass) and arable lands (planted with crops). The landscape is extensive and is punctuated by towns and coal mines. It is not a particularly sensitive cultural landscape with most of its development having taken place during the 20th century. It is

compromised by the very large Sasol oil refinery located 6 km west of the study area, and several coal mines in the surrounding landscape.

There are no scenic routes in the area, although the N17 runs west to east about 3 km north of the broader study area and some 8 km north of the proposed footprint area. Due to distance and topography, the proposed Vhuvhili SEF should only be minimally visible from the N17, and then only in certain places.

3.2.10.5 Screening Tool Descriptions and Site Verification

A Site verification was undertaken on 10 & 13 November 2021 by the specialist. The purpose of this preliminary on-site inspection was to confirm the current use of the land and environmental sensitivities as identified by the Screening Tool.

The Screening Tool identifies the entire study area as being of low sensitivity for archaeological and cultural heritage (Figure 3-96).

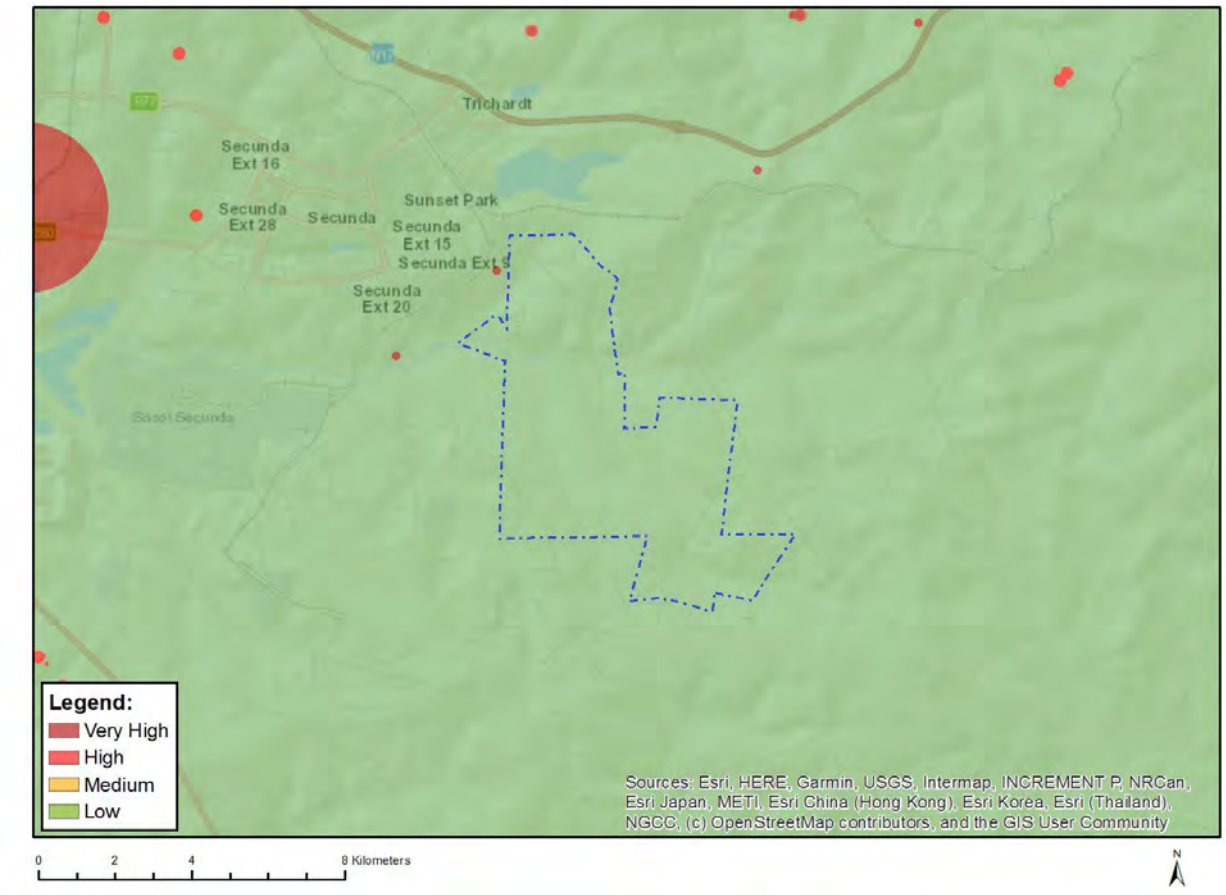


Figure 3-96: Screening tool map showing the site to be of low archaeological and cultural heritage sensitivity (green shading). (Source: Orton, 2022)

Verification by the heritage specialist

The fieldwork revealed that most of the site is indeed of very low sensitivity. The only areas considered to be of low sensitivity were some stone features. However, a number of graves and some possible graves were found at the project site. These areas are mapped in Figure 3-97. The low sensitivity identified by the screening tool is therefore largely true, but a few areas where graves occur have been assigned a very high sensitivity by the specialist.

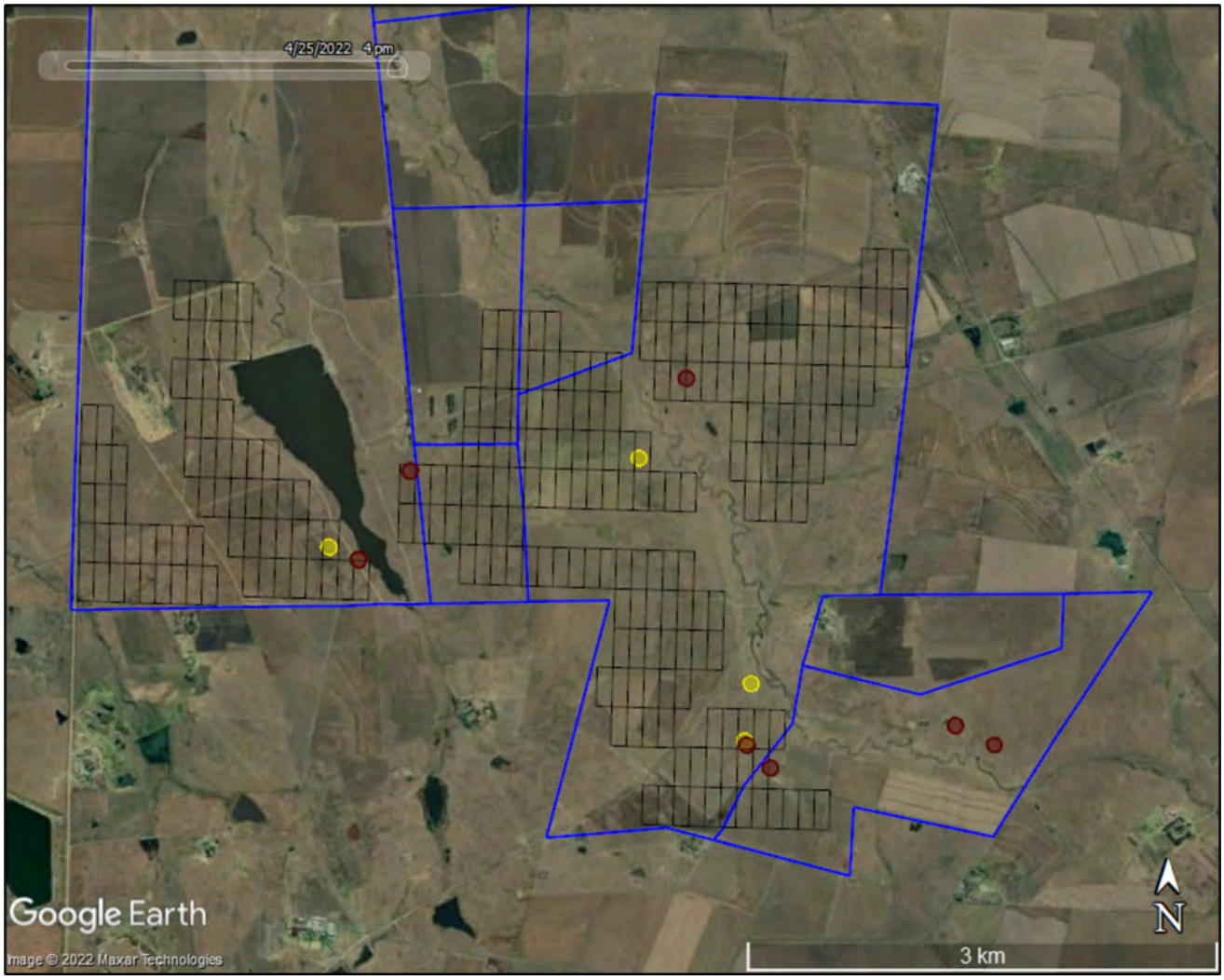


Figure 3-97: Sensitivity map showing the archaeological and cultural heritage sensitivity as determined by the field study (red = high, yellow = low). The finds are mapped with 50 m buffers (Source: Orton, 2022).

3.2.11 Palaeontology

A detailed description of the palaeontological features of the proposed Vhuvhili project site will be provided in the HIA, that will be included in the EIA Report. The information described below is based on scoping inputs provided by the Palaeontologist, and which are included in Appendix G.8 of this Scoping Report.

No fossils were seen in the study area and the substrate is sandy which precludes any being visible at the surface.

3.2.11.1 Screening Tool Descriptions and Site Verification

The screening tool report map for palaeontology indicates a combination of medium and very high sensitivity both within the project area and in the wider surroundings (Figure 3-98). The project palaeontologist (Prof. Marion Bamford) indicates that the red areas are indeed very highly sensitive because the rocks are Vryheid Formation and could have fossils of the *Glossopteris* flora. The orange areas, however, are not sensitive since they are largely dolerite (zero sensitivity) but with some overlying fluvial sediments dolerite along the river and its tributaries in the centre of the site and which would be moderately sensitive). The palaeontological specialist thus disputes the screening tool map in that the stated sensitivity is too high over some parts and correct in others.

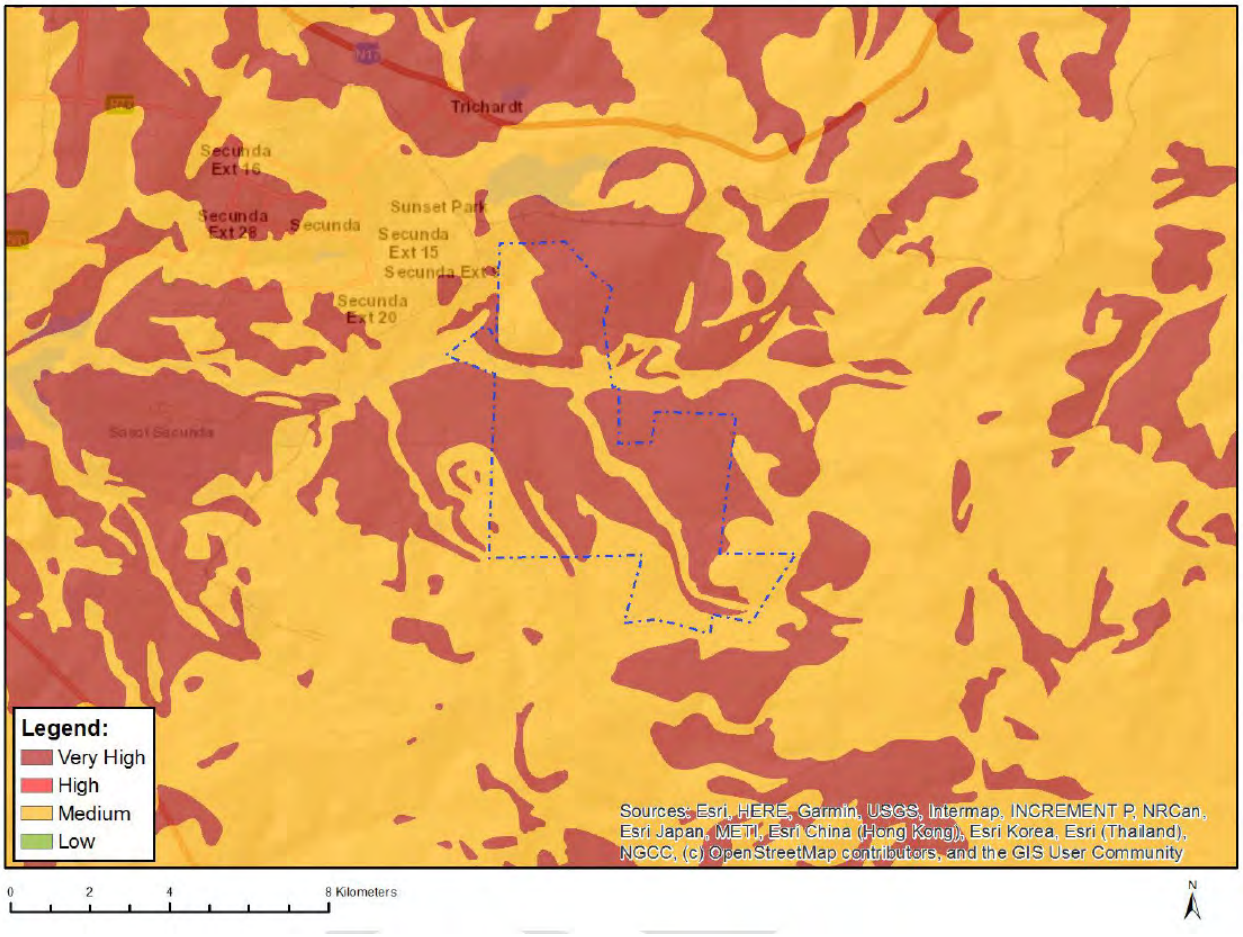


Figure 3-98: Screening tool map showing the site to be of medium to very high palaeontological sensitivity (orange and red shading respectively).

3.3 Environmental Sensitivity Map

Based on the environmental sensitivities identified and verified by the Specialists on site during the Scoping Phase (included as Appendix G to this Scoping Report), a combined environmental sensitivity map has been compiled for the study area of the Vhuvhili SEF which shows the no-go areas (Figure 3-99 below).

Figure 3-99 shows the identified and assessed environmental sensitivities as described in the sub-sections above. These identified sensitivities will be further assessed and refined through detailed specialist impact assessments during the EIA Phase. The detailed specialist impact assessments will be included in the EIA Report. It should also be noted that the project footprint may be refined as part of the detailed specialist studies to be undertaken in the EIA phase. Hence, an updated, refined footprint may be presented in the EIA Report.

The Palaeontology and Traffic Impact Assessments did not identify any sensitive areas for avoidance. The BESS Risk Assessment did note the Lithium Ion BESS (should this be the preferred BESS type) should be located over 500 m from residential areas, in this case isolated farmhouses. This will be adopted in the final placement of the BESS. The Visual specialist confirmed that the sensitivities identified in the are not no-go areas. For Terrestrial Biodiversity, only the areas shown as very high sensitivity are regarded as no-go areas, with the mapping from the Aquatic specialist for watercourses taking precedence. For Aquatic Biodiversity, Avifauna and Archaeology, only the areas shown as Very High sensitivity (including the specified buffer areas) are regarded as no-go areas.

The sensitivities identified and verified by the specialists during the scoping phase will be used to develop the Revised Buildable Area which will be included and assessed by the specialists in the EIA phase. Refer to Figure 3-99 for combined Sensitivity Map overlain with the Scoping Buildable Area which shows the no-go areas.

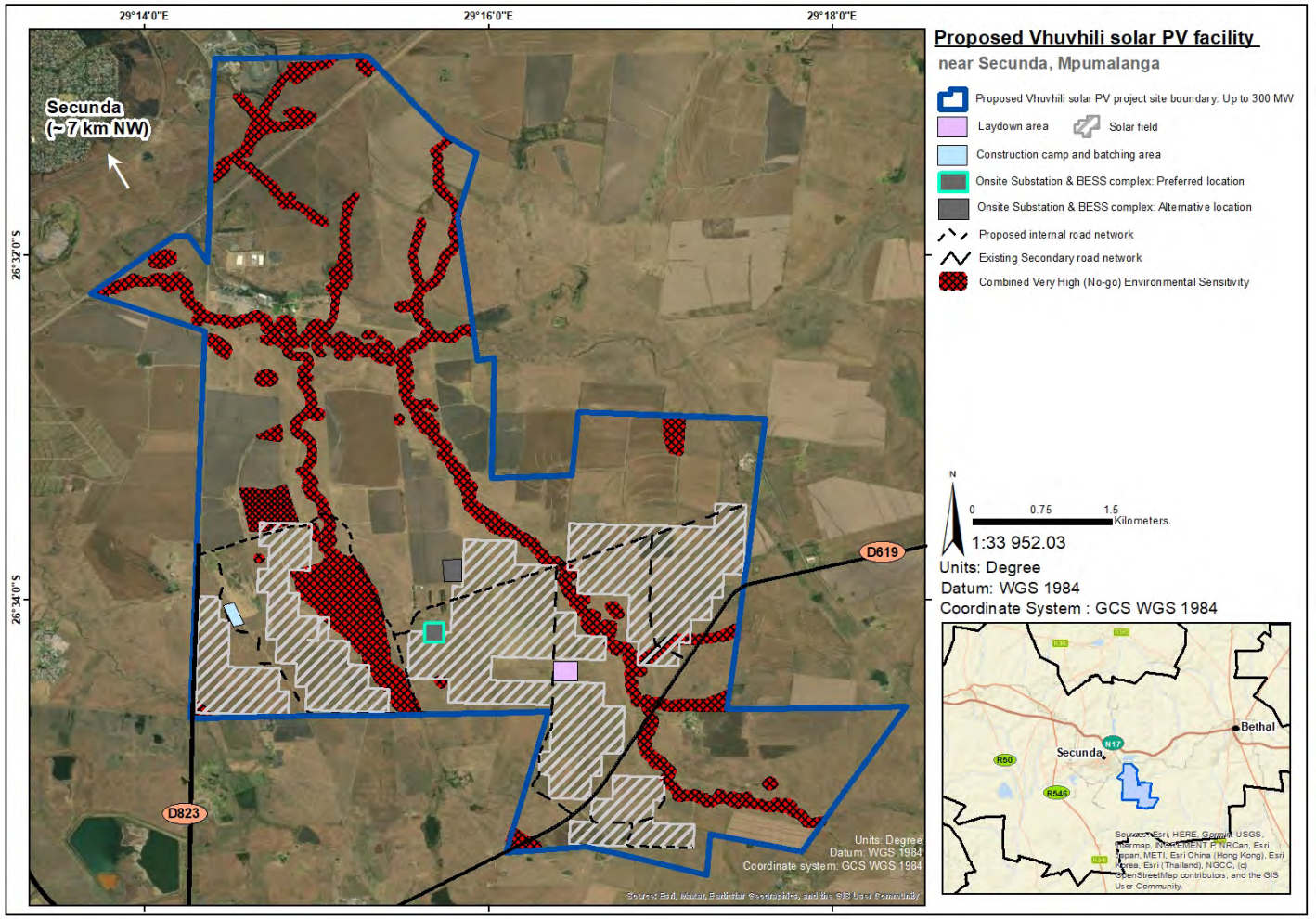


Figure 3-99: Preliminary combined environmental sensitivity map for the proposed Vhuvhili SEF (to be refined following detailed specialist studies to be undertaken in the EIA Phase)

3.4 Socio-Economic Environment

A Socio-Economic Scoping Report has been compiled and is included in Appendix D.9 of this Scoping Report. Some of the information provided in this section has been extracted from this Socio-Economic Scoping Report.

3.4.1 Regional Context – Gert Sibande District Municipality (GSDM)

The Govan Mbeki Municipality (GMM) is located in the south-eastern part of Mpumalanga Province and is one of seven local municipalities that make up the Gert Sibande District Municipality (GSDM) (Figure 3-100.) The GMM is made up of eight towns and 32 electoral wards. The project site is located within Ward 5 to the east and southeast of Secunda.

Figure 3-100: Location of Govan Mbeki Municipality within the Gert Sibande District Municipality.

3.4.2 Local Context –Govan Mbeki Local Municipality

The information described below is based on scoping inputs provided by the Socio-Economic Specialist, which are included in Appendix G.9 of this Scoping Report.

The study area is located approximately 5-8 km east and south-east of the town of Secunda in the GMM. The town of Secunda has its origins in the 1973/74 international oil crisis when the then South African Government took the decision to establish a second coal liquefaction plant following the establishment of

the first at Sasolburg in the 1950s. After the site for the Sasol complex had been identified, it had to be decided whether or not to combine the existing towns of Evander and Trichardt. The huge burden that extensions of this nature would have had on the financial and administrative resources of the established communities as well as the tempo at which such development should proceed was decisive and resulted in the decision to develop Trichardt and Secunda to be one town, named Secunda. Evander, located ~ 8km to the west of the current day Secunda, remained a separate town. Trichardt borders onto the northern part of Secunda.

The first town area was proclaimed in June 1976. The name Secunda is derived from the Latin, secundi meaning second/following, and was given to the town as it was the second extraction refinery producing oil from coal, after Sasolburg, which is located approximately 140km west of Secunda. The town was located adjacent to the large coalfields in the area, including the Evander and Winkelhaak coal mines located to the northwest of the town. The Secunda facility consists of Sasol Two (1980) and Sasol Three (1982) is the largest coal liquefaction plant in the world, and produces synthetic fuel, diesel, and related fuels and petrochemicals from coal gasification. The Secunda facility is located to the south of the town, approximately 5.6 km from the western boundary of the PV site (Figure 3-101).

Figure 3-101: The Secunda Sasol Facility located approximately 5.6 km from the western boundary of the Vhuvhili SEF site

The town of Secunda is located approximately 90 km west of Benoni in Gauteng, and 23 km west of Bethal. The N17 which runs to the north of the town and the site connects the towns of Benoni and Bethal (Figure 3-102).

The other land uses in the study area include coal mining and commercial agriculture. Commercial agriculture in the study area located to the south of the N17 and east of Secunda includes livestock and grain farming. Based on the Google Earth information there appear to be a limited number of farmsteads in the study area. The number of occupied farmsteads will be confirmed during the site visit undertaken during the EIA phase. The social environment can therefore be described is a working agricultural / industrial environment. There do not appear to be any tourist related activities located in the study area. Therefore, from a social perspective there appear to be a limited number of sensitive social receptors. This will be confirmed during the site visit undertaken during the EIA phase of the SIA.

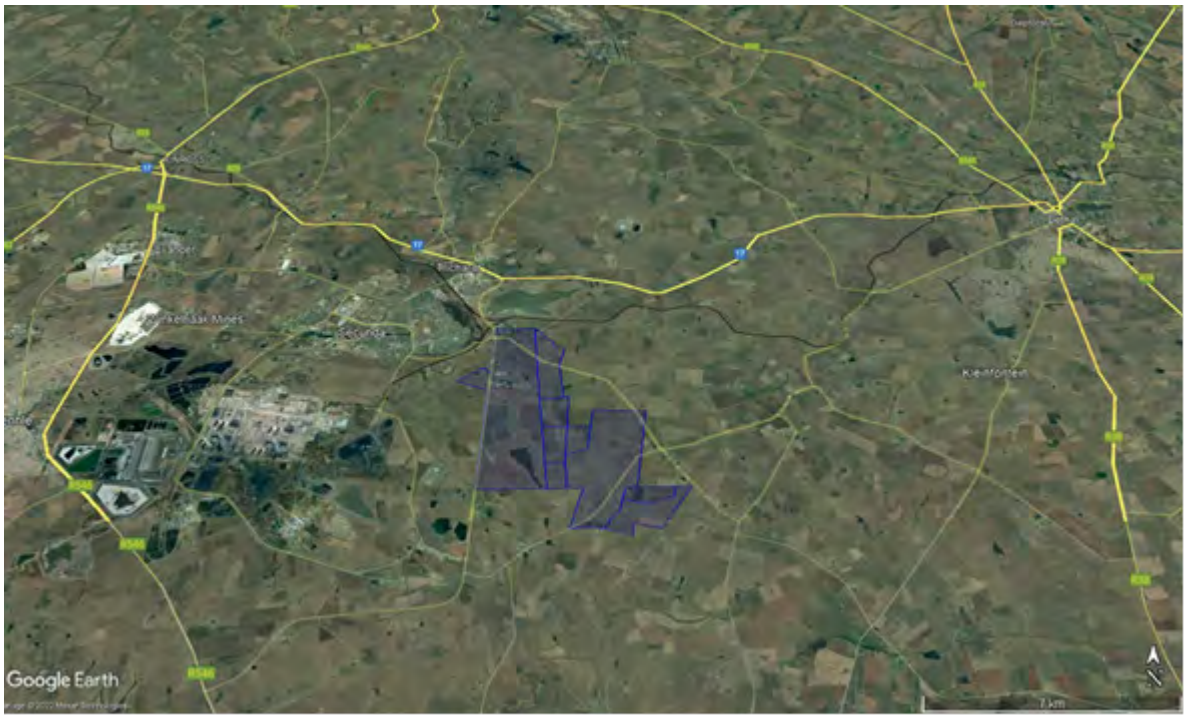


Figure 3-102: The N17 which runs to the north of the town of Secunda and the site connects the towns of Benoni and Bethal

3.4.2.1 Vision of the Govan Mbeki Local Municipality

The vision of the GMM as set out in the 2020/2021 Integrated Development Plan (IDP) review is "To be a Model City and Centre of Excellence" The associated Mission Statement is to serve our community by:

- Providing sustainable, quality services;
- Enabling diversified local economic development and job creation;
- Ensuring the financial sustainability of the Municipality;
- Working together with our stakeholders;
- Empowering our workforce; and
- Ensuring sound corporate governance.

The Vision, Mission and Values are informed by six (6) Key Strategic objectives of which Strategic Objective 3, To facilitate and create an enabling environment for diversified local economic development, social cohesion, and job creation and Strategic Objective 5, To develop spatially integrated, safe communities and a protected environment, are relevant to the proposed development.

A SWOT analysis undertaken as part of the IDP process identified key strengths, weaknesses, opportunities, and threats. The key findings relevant to the project include:

Strengths

- Petro-Chemical and synthetic fuels plant;
- Good tourism potential;
- Good infrastructure;
- Rail Network;
- Mining Area; and
- University /satellite campus.

Opportunities

- Economic development opportunities;
- SMME Development; and
- Industrial Park West of Secunda.

Weaknesses

- Ageing electricity infrastructure;
- Pressure on energy sources;
- Eskom Price increases;
- Unemployment and poverty;
- Climate change;
- Air pollution;
- Water shortages;
- Limited lifespan of mines;
- Increasing population (informal settlements, pressure on housing, unemployment, infrastructure, and municipal services); and
- Closure of mining and petrochemical industry.

The IDP provides a summary of the key socio-economic challenges facing the GMM, of which the following are relevant to the project.

- High and rising in unemployment.
- Youth unemployment.
- Creating of local economic development opportunities.
- Closure of mines.
- Increasing dependency rates.
- Low education levels and declining matric pass rate.
- Social development concerns such as clinics, police stations and schools.

The IDP notes that the key economic sectors that contribute to the local economy within in Govan Mbeki community are:

- Trade (including tourism);

- Mining;
- Manufacturing;
- Finance; and
- Agriculture.

The IDP lists the Local Economic Development (LED) Strategic Objectives as per the LED Strategy. Of relevance these include:

- Industrialisation of the Govan Mbeki economy using current and future comparative and competitive advantages; and newly targeted industries.
- Diversification of the local economy to reduce overreliance on the two complimentary sectors of coal mining and fuel from coal SASOL production.
- Improvement of living standards of the local citizenry through business and employment opportunities across economic sectors and industries

3.4.2.2 Demographics and Economic Profile

3.4.2.2.1 Population

The population of the GMM in 2016 was 340 091 (Community Household Survey 2016). Of this total, 32.5% were under the age of 18, 63.3% were between 18 and 64, and the remaining 4.2% were 65 and older. The GMM therefore had a high percentage of the population that fall within the economically active group of 18-65. The population of Ward 5 in 2011 was 9 219 (Census 2011). Of this total, 21.5% were under the age of 18, 72.1% were between 18 and 64, and the remaining 6.4% were 65 and older. Ward 5 like the GMM also had a high percentage of the population that fall within the economically active group of 18-65. The figures are higher than the figures for the GSDM and Mpumalanga (57.7% and 56.6% respectively). This is due to the employment opportunities associated with the industrial, mining and manufacturing activities in the MM.

The dependency ratio is the ratio of non-economically active dependents (usually people younger than 15 or older than 64) to the working age population group (15-64). The higher the dependency ratio the larger the percentage of the population dependent on the economically active age group. This in turn translates to reduced revenue for local authorities to meet the growing demand for services. The traditional approach is based people younger than 15 or older than 64. The information provided provides information for the age group under 18. The total number of people falling within this age group will therefore be higher than the 0-15 age group. However, most people between the age of 15 and 17 are not economically active (i.e., they are likely to be at school).

Using information on people under the age of 18 is therefore likely to represent a more accurate reflection of the dependency ratio. Based on these figures, the dependency ratios for the GMM, the GSDM and Mpumalanga in 2016 were 58%, 73.5% and 77% respectively. The dependency ratio for Ward 5 in 2011 was 38.6%. The lower dependency ratios in the GMM and Ward 5 reflect the employment and economic opportunities in and around Secunda linked to the towns petrochemical and industrial sector.

In terms of race groups, Black Africans made up 85.8% of the population on the GMM, followed by Whites, 12.1% and Coloureds (1.2%). The figures for Ward 5 in 2011 were Whites (72.6%), Black Africans (22.2%), Indian or Asian (2.7%) and Coloureds (2.3%). The main first language spoken in the GMM was isizulu, 60.5%, followed by Siswati, 7.3% and Afrikaans, 6.2%. In Ward 5 Afrikaans (64.6%) followed by English (11.1%) were the main languages spoken.

3.4.2.2.2 Households and house types

The total number of households in the GMM in 2016 was 108 892, which constituted approximately 33% of the total number of households in the GSDM. Of these 63% were formal houses, 20.4% were shacks, and 10.6% were flats in backyards. The figures for the GSDM were 67.2%, 13.4%, 6.7% and 8.3% respectively. While most of dwellings in the GMM are formal structures there are a high percentage of informal structures which reflects the migration of jobseekers to the area and the pressure this in turn places on housing. In Ward 5 82.5% of the dwellings were formal houses. There were no reported shacks.

In terms of ownership, 46% of the dwellings in the GMM were owned and fully paid off, while 10.6% were in the process of being paid off. 17.9% of the dwellings were rented from private individuals. In Ward 5, 15.2% were owned and fully paid off, 34.2% were in the process of being paid off, and 35% were rented. A relatively large percentage of the properties in the GMM (56.6%) were owned and or in the process of being paid off. This reflects a relatively stable and established community.

In terms of household heads, approximately 30.8% of the households in the GMM and 39.1% of the households in the GSDM were headed by women. These figures similar to the provincial figure of 39.71%. The figure for Ward 5 in 2011 was substantially lower at 15.5%. The high percentage of households headed by women in the GMM reflects the likelihood that the men have left the area in search of employment opportunities in Gauteng. This is despite the well-developed industrial sector in and around Secunda. Women headed households tend to be more vulnerable.

3.4.2.2.3 Education

In terms of education levels, the percentage of the population over 20 years of age in the GMM and GSDM with no schooling was 6.5% in 2016, compared to 10.8% and 11.3% for the GSDM and Mpumalanga Province respectively. The figure for Ward 5 in 201 was 1.8%. The percentage of the population over the age of 20 with matric in the GMM (2016) and Ward 5 (2011) was 39.4% and 39.2% respectively, compared to 34.3% and 36.1% for the GSDM and Mpumalanga. The education levels in the GMM and Ward 5 are therefore marginally higher than the DM and Provincial figures.

3.4.2.2.4 Employment

The official unemployment rate in the GMM in 2016 was 17.2%, while 48.5% were employed, and 31% were regarded as not economically active. The figures for Ward 5 in 2011 were 3.6%, 63.6% and 32.4% respectively. However, the COVID-19 pandemic is likely to have resulted in an increase in unemployment rates in both the GMM and Ward 5. Recent figures released by Stats South Africa also indicate that South Africa's unemployment rate is in the region of 36%, the highest formal unemployment rate in the world.

3.4.2.2.5 Household income

Based on the data from the 2011 Census, 16.6% of the population of the GMM had no formal income, 3.6% earned less than R 4 800, 5.5% earned between R 5 000 and R 10 000 per annum, 12.6% between R 10 000 and R 20 000 per annum and 16.4% between R 20 000 and 40 000 per annum (2016). The poverty gap indicator produced by the World Bank Development Research Group measures poverty using information from household per capita income/consumption. This indicator illustrates the average shortfall of the total population from the poverty line. This measurement is used to reflect the intensity of poverty, which is based on living on less than R3 200 per month for an average sized household (~ 40 000 per annum). Based on this measure, in the region of 54.7% of the households in the GMM and 65.2% in the GSDM live close to or below the poverty line. The figure for Ward 5 in 2011 was 16.9%.

The low-income levels in the GMM and GSDM reflect the limited formal employment opportunities outside in the urban areas. This is also reflected in the high unemployment rates. The low-income levels are a major concern given that an increasing number of individuals and households are likely to be dependent on social grants. The low-income levels also result in reduced spending in the local economy and less tax and rates revenue for the GMM. This in turn impacts on the ability of the GMM to maintain and provide services.

Household income levels are likely to have been impacted by the COVID-19 pandemic. The number of households in the GMM and GSDM that live close to or below the poverty line is likely to have increased over the last 18 months. This, coupled with the high dependency ratio, is a major cause of concern for the area.

3.4.2.3 Municipal services

3.4.2.3.1 Electricity

Based on 2016 survey, 95.1% of households in the GMM had access to electricity, compared to 90% for the GSDM and 93% for Mpumalanga.

3.4.2.3.2 Access to water

Based on the 2016 survey information, 96.9% of households in the GMM were supplied by a service provider. This compares to 86.7% and 80.5% for the GSDM and Mpumalanga respectively. The figure for Ward 5 in 2011 was 91.4%.

3.4.2.3.3 Sanitation

94.9% of the households in the GMM had access to flush toilets (2016), while 3.4% relied on pit toilets. This compares to 65.3% and 42.1% for the GSDM and Mpumalanga respectively. The figure for Ward 5 in 2011 was 94.5%. Only 0.5% of the households in the GMM reported that they had no access to formal sanitation, compared to 2.6% and 2.8% for the GSDM and Mpumalanga respectively.

3.4.2.3.4 Refuse collection

72.5% of the households in the GMM had access to regular refuse removal service, while for 13.9% the service was provided, but not on a regular basis. This compares to 52.2% for the GSDM (regular) and 5.2% (irregular). 89% of households in Ward 5 had their waste collected on a regular basis by a service provided.

3.5 Civil Aviation

As required by GN 320, a Civil Aviation Site Sensitivity Verification must be complied as part of this EIA process. The Screening Tool has indicated that some of the south-eastern and north-western parts of the proposed Vhuvhili SEF project site is of potential 'medium' sensitivity with the classification of "within 8 km of another civil aviation aerodrome" whereas the rest of the site is of 'low' sensitivity (Figure 3-103).

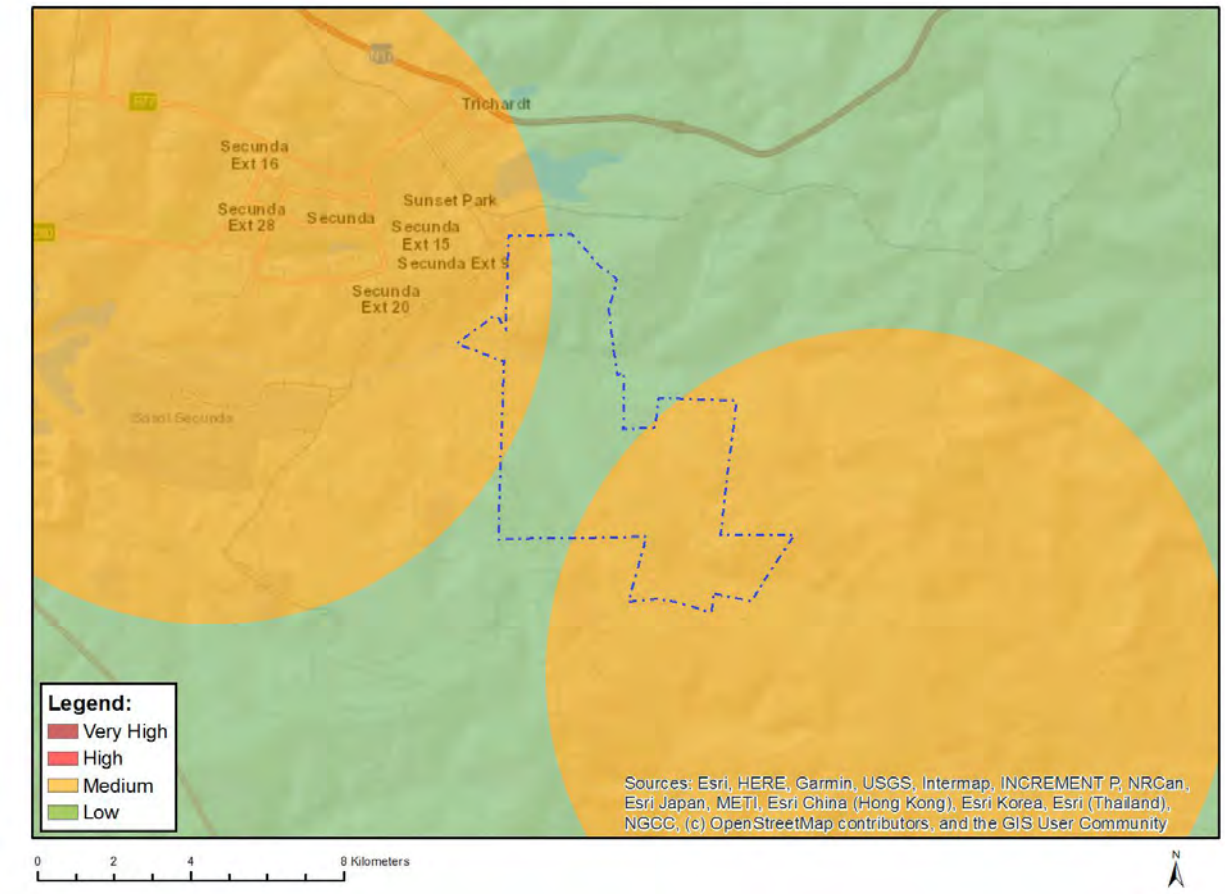


Figure 3-103: Map showing the proposed Vhuvhili SEF project site relating to Civil Aviation sensitivity (Source: DFFE Screening Tool, 2022)

The Secunda aerodrome has been identified within 8 km of the proposed Vhuvhili SEF site (Figure 3-104). The sensitivities will be verified by the Environmental Assessment Practitioner (EAP) during a site visit to be undertaken. Liaison with the South African Civil Aviation Authority (SACAA) will also aid in confirming sensitivities.

Therefore, in line with the requirements of GN R320, a Civil Aviation Site Sensitivity Verification will be conducted by the EAP to determine if a Civil Aviation Compliance Statement should be undertaken. If the verified sensitivity appears to be medium, high or very high sensitivity, then a Compliance Statement will be required. If the verified sensitivity appears to be low, then no further requirements are necessary,

except for the site sensitivity verification confirming the low sensitivity. This will be included in the EIA Phase.

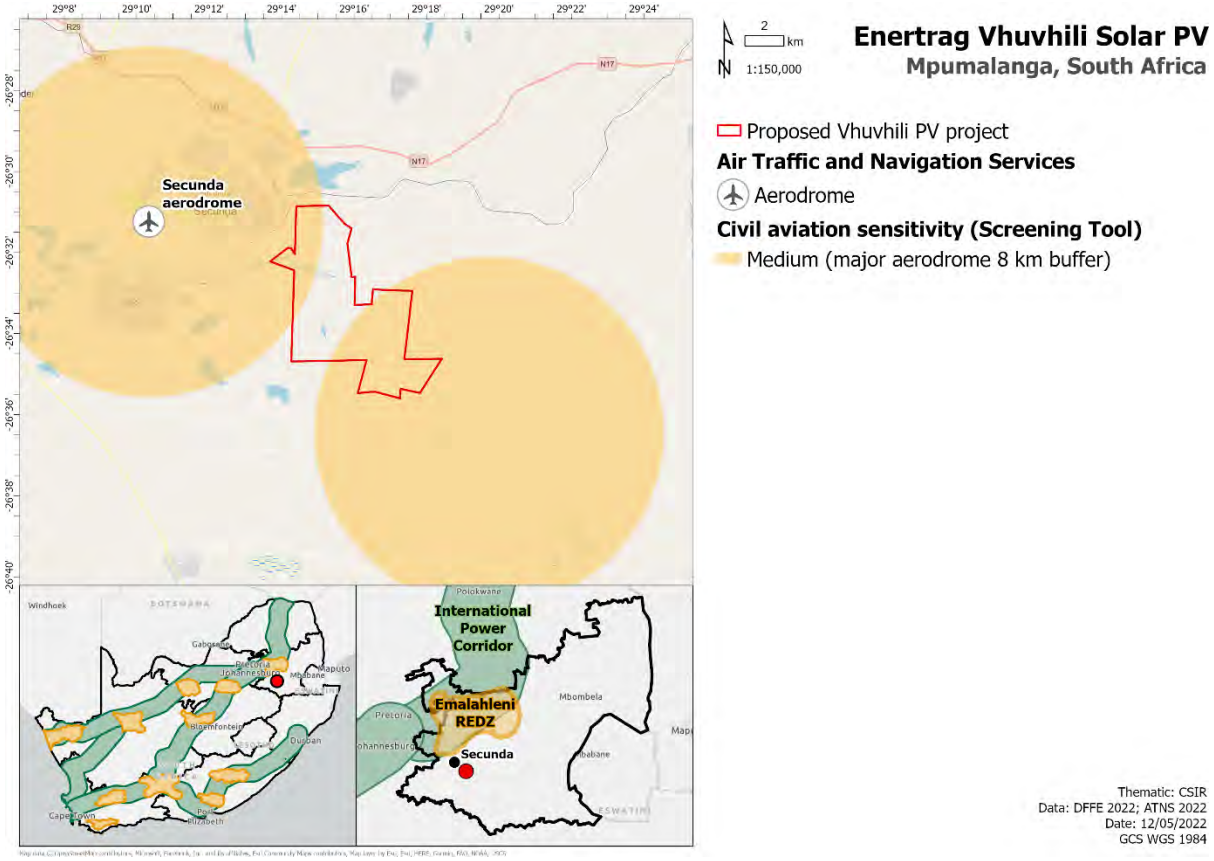


Figure 3-104: Map showing the Secunda aerodrome has been identified within 8 km of the proposed Vhuvhili SEF site

3.6 Defence

As required by GN 320, a Defence Site Sensitivity Verification must be compiled as part of this EIA process.

The Screening Tool has indicated the proposed Vhuvhili SEF project site to be of low sensitivity relating to Defence (Figure 3-105). This low sensitivity will be verified and confirmed by the EAP in the EIA phase. If low sensitivity is confirmed, in line with GN R320, no further requirements will be applicable i.e. a Defence Compliance Statement may not be required.

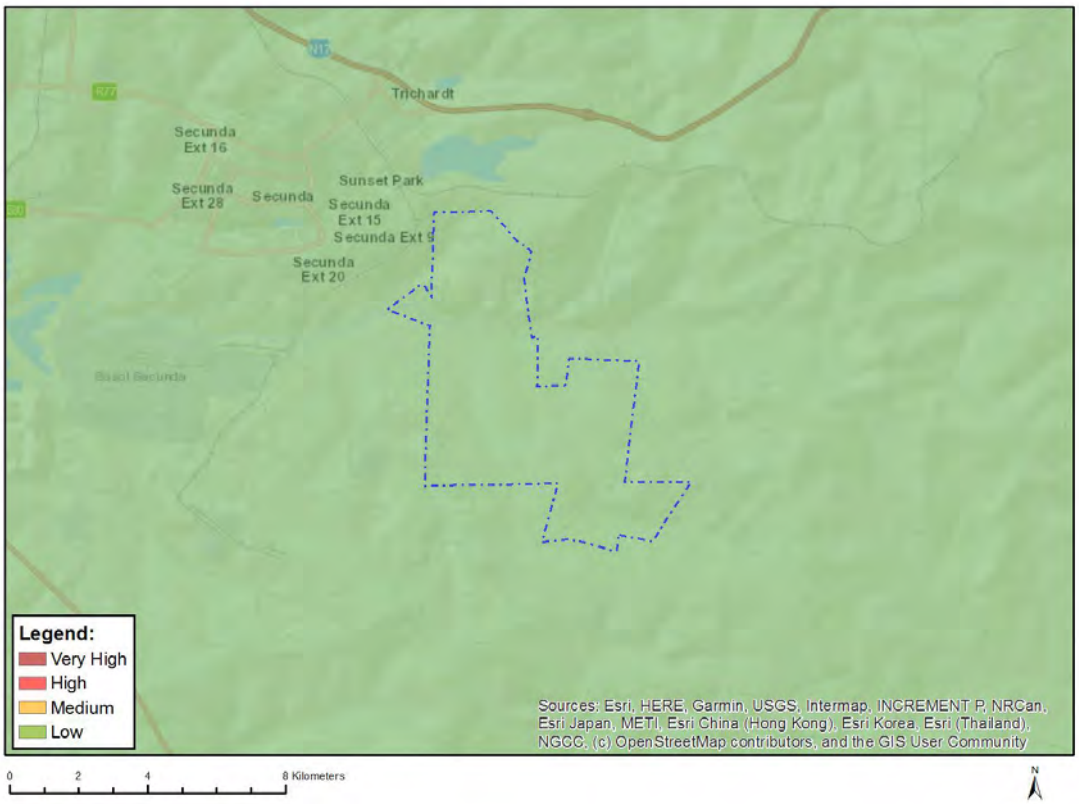


Figure 3-105: Map showing the proposed Vhuvhili SEF project site relating to Defence sensitivity (Source: DFFE Screening Tool, 2022)

3.7 Radio Frequency Interference (RFI)

The DFFE Screening Tool results for Radio Frequency Interference (RFI) for the proposed Vhuvhili SEF indicated "medium" sensitivity. This result arose because some of the south-western part of the proposed Vhuvhili project site "lies within 1 km of a telecommunication facility", as per Figure 3-106 below.

Therefore, it is important to note that the "medium" sensitivity assigned to the south-western portion of the site, is therefore not related to the Square Kilometre Array (SKA) or the Karoo Central Astronomy Advantage Area (KCAAA).

The location of the proposed project does not pose a Electro Magnetic Interference (EMI) or RFI risk to the SKA, as the proposed project is located outside of the Northern Cape and outside of the SKA and KCAAA. The proposed Vhuvhili SEF site is located approximately 743 km from the KCAAA. The distance from site to the SKA spiral arm (spiral arm 2) and to the SKA core are 780 km and 864 km respectively. Please refer to Figure 3-107 which confirms this.

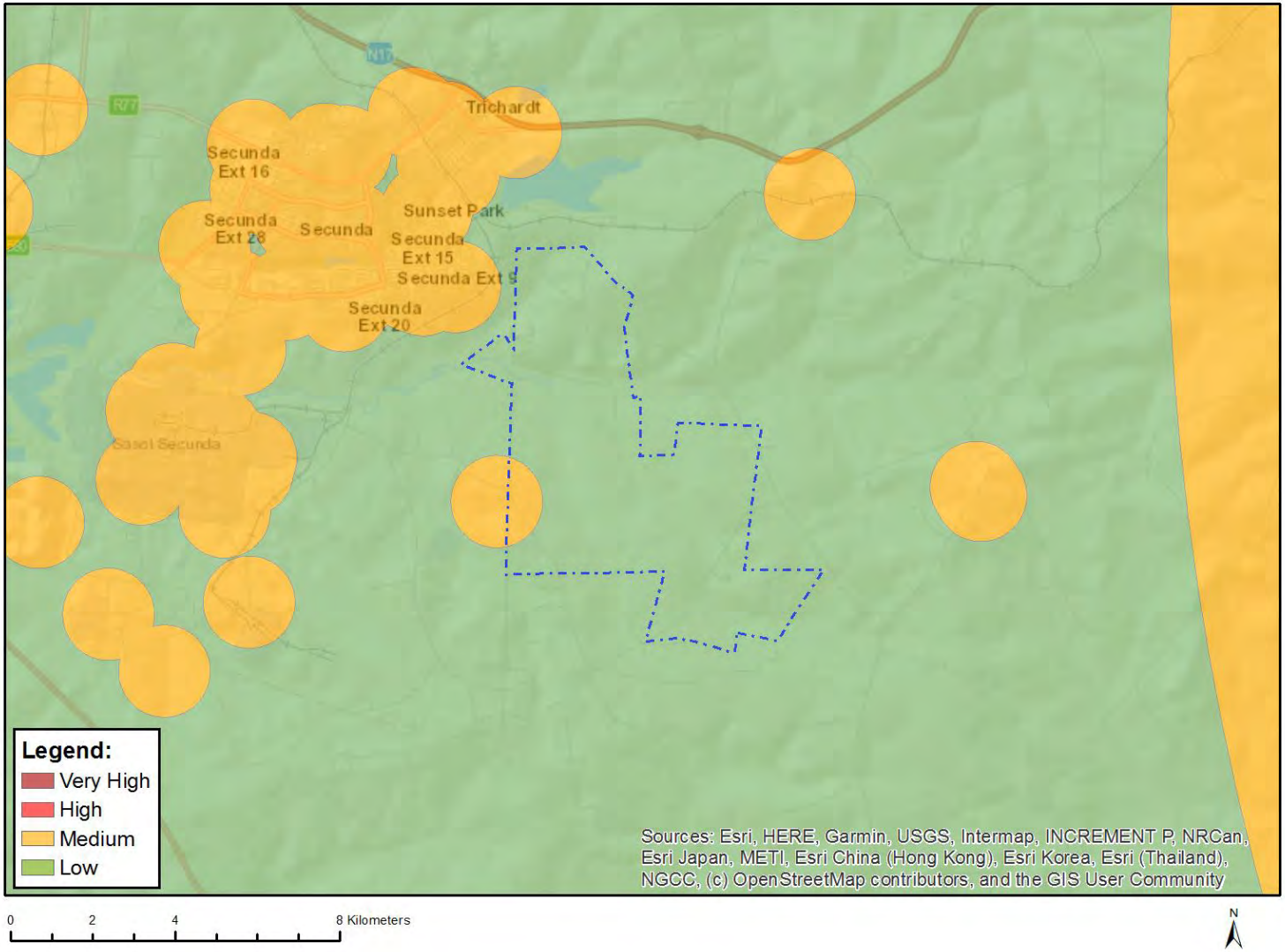


Figure 3-106: Map showing the proposed Vhuvhili project site relating to RFI sensitivity (Source: DFFE Screening Tool, 2022

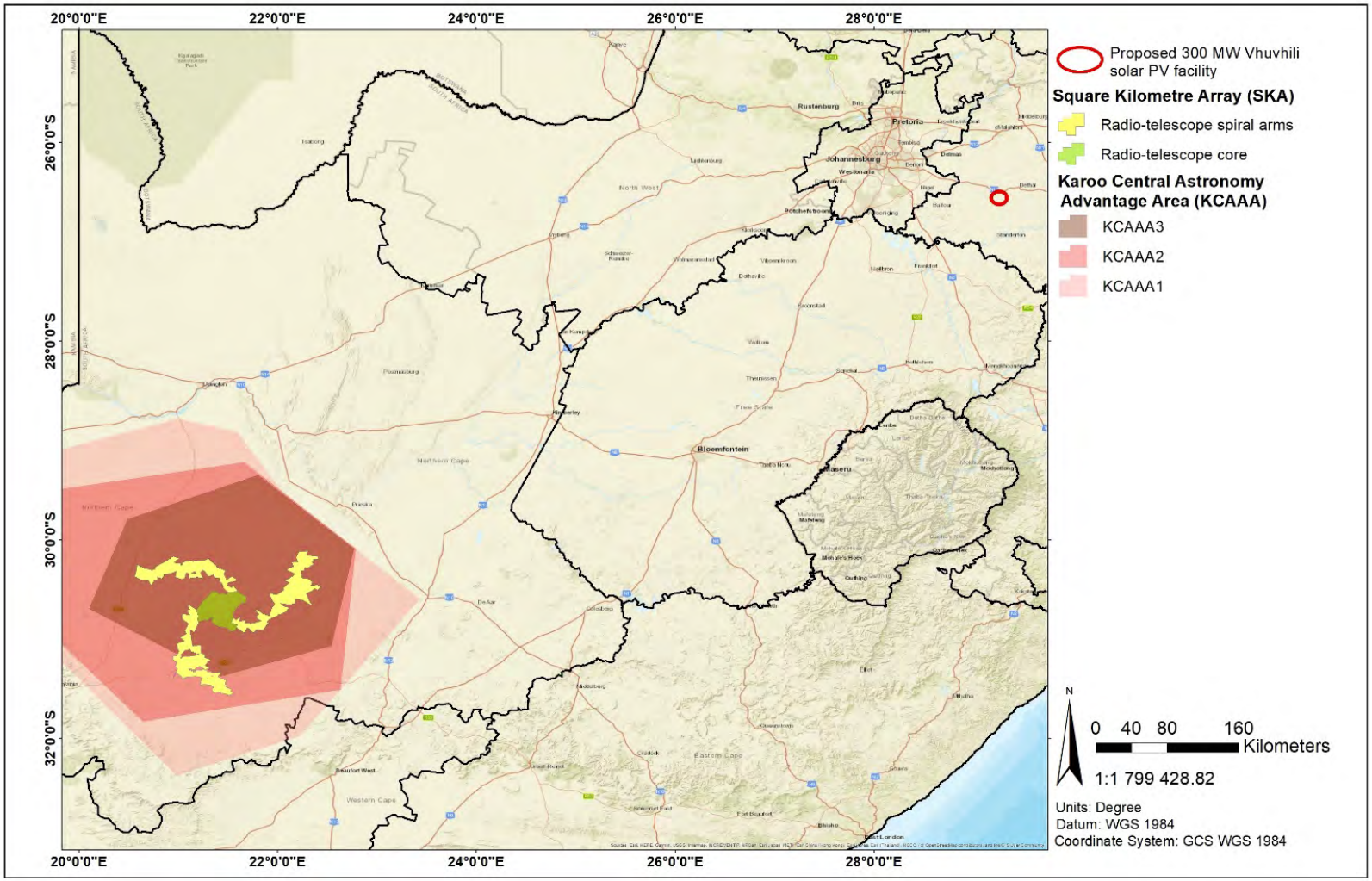


Figure 3-107: Map showing the proposed Vhuvhili project site relating to RFI sensitivity in relation to SKA and KCAAA

DRAFT SCOPING REPORT

Draft Scoping Report for the proposed development of the Vhuvhili Solar Photovoltaic (PV) Facility near Secunda in the Mpumalanga Province.

CHAPTER 4:

Approach to EIA Process and Public Participation

ENERTRAG

CSIR
Touching lives through innovation

CONTENTS

TABLES

FIGURES

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), and the steps in the Public Participation Process of the Scoping Phase of the EIA (in accordance with Regulations 41, 42, 43 and 44 of GN R326 of the 2014 NEMA EIA Regulations, as amended) and the schedule for the Scoping and EIA Process.

4.1 Legislation, Policies and Guidelines Pertinent to this EIA

The scope and content of this Draft Scoping 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 Scoping Level Specialist Assessments included in Appendix G of this Draft Scoping Report.

4.1.1 National Legislation

4.1.1.1 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 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.

4.1.1.2 NEMA and EIA Regulations published on 8 December 2014

Chapter 1, Section 2 of the National Environmental Management Act (Act 107 of 1998, as amended) (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 several 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 Government Notice (GN) R982, R983, R984 and R985 in Government Gazette 38282, dated 4 December 2014, which came into effect on 8 December 2014. These were amended in April 2017, specifically promulgated in GN R326, R327, R325 and R324 in Government Gazette 40772, dated 7 April 2017. GN R326 contains the regulations for the Environmental Assessment Process. GN R327 and GN R324 include 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 in Government Gazette 41766, GN 706 on 13 July 20218; and in Government Gazette 44701, GN R517 on 11 June 2021. Based on the transitional arrangements, these 11 June 2021 amendments apply to the proposed project as the Applications for Environmental Authorisation (EA) were not submitted at the time GN R517 took effect. 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 Vhuvhili SEF and associated infrastructure. Refer to Section 4.2 of this chapter for additional information on the 2014 NEMA EIA Regulations (as amended).

4.1.1.3 Government Notice (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 Vhuvhili SEF has been run through the Screening Tool, and the associated report generated and attached to the combined Application for EA, which is being submitted to the Mpumalanga DARDLEA with the Draft Scoping Report.

4.1.1.4 Government Notice (GN) 320 (20 March 2020)

GN 320 prescribes the general requirements for undertaking site sensitivity verification 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 Specialist Assessments undertaken as part of this Scoping and EIA Process will comply with GN 320, where applicable, specifically Agriculture, Terrestrial Biodiversity and Species, 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 and Traffic Assessments. 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 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, as well as the Compliance Statements, should they be required, will also comply with GN 320. Additional detail on Civil Aviation and Defence will be provided in the EIA Phase. The protocols were enforced within a period of 50 days of publication of the notice i.e. on 9 May 2020.

4.1.1.5 Government Notice (GN) 1150 (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 Government Gazette, in which case Appendix 6 of the 2014 NEMA EIA Regulations (as amended) will apply to such applications.

As confirmed with the Mpumalanga DARDLEA, one combined report was provided to address the Terrestrial Biodiversity and Species and the Terrestrial Plant Species Protocols (please refer to Appendix G.2). This report also addressed faunal species and includes a Site Sensitivity Verification report for the Terrestrial Animal Species Themes.

However, the Avifauna specialist on the specialist team conducted a Terrestrial Animal Species Assessment based on the Terrestrial Animal Species Protocols (please refer to Appendix G.4).

4.1.1.6 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.

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.

4.1.1.6.1 Threatened Ecosystems

Government Gazette 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. The recent 2018 National Biodiversity Assessment (NBA) (SANBI, 2018) includes the updated extent and status of threatened ecosystems, although not yet formally adopted under the NEMBA.

The list of threatened ecosystems includes 225 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 m^2 or more of indigenous vegetation in Mpumalanga, 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.

As explained in the Terrestrial Biodiversity and Species Scoping Level Assessment (Appendix G.2 of this Draft Scoping Report), the vegetation within the study area is located within the Soweto Highveld Grassland (Gm8) vegetation type (SANBI 2006-2018). This vegetation type covers 14 513 km^2 of Mpumalanga and Gauteng (and to a very small extent also in the neighbouring Free State and North-West provinces) (Mucina & Rutherford 2006). The ecosystem / vegetation type is classified as having a **Vulnerable conservation status because almost half of it has been transformed mostly by cultivation, plantations, mining and urbanisation.** Therefore, GN 1002 applies.

4.1.1.6.2 Threatened and Protected Species (ToPS)

The 2007 Threatened or Protected Species (ToPs) 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 Government Gazette 29657, GN R151 on 23 February 2007 in terms of Section 56 (1) of the NEMBA. The list was further amended in Government Gazette 30568, GN R1187 on 14 December 2007, as well as in Government Gazette 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.

Based on the preliminary sensitivity screening and site sensitivity verification undertaken for the proposed development during the Scoping Phase (van Rooyen, 2022), no threatened or protected plant species (ToPS; NEMA 2007c)) were recorded during the Vhuvhili site survey. None of the ToPs listed plant species are expected to be negatively affected by the development.

The following protected **threatened or protected faunal species** (ToPS) are listed for the general region:

Mammals:

Aonyx capensis	African Clawless otter	Protected
Atelerix frontalis	Southern African hedgehog	Protected
Connochaetes gnou	Black wildebeest	Protected
Felis nigripes	Black-footed cat	Vulnerable
Leptailurus serval	Serval	Protected
Ourebia ourebi	Oribi	Endangered
Panthera pardus	Leopard	Vulnerable
Vulpes chama	Cape fox	Protected

The Southern African hedgehog and serval do occur on site according to the landowners.

Reptiles:
The giant girdled lizard (*Smaug giganteus*) is listed for the region on the ADU database, but was not highlighted by the Screening Tool. No individuals were recorded on site. However, as a precautionary measure it is recommended that a survey be done for this reptile once the proposed final layout has been established (van Rooyen, 2022).

Amphibians:
None of the listed amphibians for the region are ToPS protected species.

4.1.1.6.3 Alien and Invasive Species

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 Government Gazette 40166, GN 864 on 29 July 2016.

As noted in the Terrestrial Biodiversity and Species Scoping Level Assessment (Appendix G.2 of this Draft Scoping Report), *the following Category 1b Listed Invasive Species were recorded in the wider area:*

Arundo donax	*Opuntia ficus-indica*
Cereus jamacaru	*Solanum elaeagnifolium*
Cirsium vulgare	*Verbena bonariensis*
Cuscuta campestris	*Verbena brasiliensis*
Datura ferox	*Xanthium spinosum*

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

The National Heritage Resources Act (Act 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;
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 m^2 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 m^2 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.

In terms of Archaeology, a Site Sensitivity Verification Report (in terms of Part A of GN 320) was compiled during the Scoping Phase, as included in Appendix G.7 of this Draft Scoping Report. Initial work was carried out using satellite aerial photography in combination with the specialist's accumulated knowledge of the local landscape. This was used to identify potentially sensitive areas. Subsequent fieldwork served to ground-truth the site, including areas identified as potentially sensitive. Desktop research was also conducted to inform on the heritage context of the area. Historical aerial photography was also used in an attempt to see historical sites as well as to characterise the changes in the cultural landscape. The fieldwork revealed that most of the site is of very low sensitivity. The only areas considered to be of low sensitivity were some stone features, while a number of graves and some possible graves were allocated very high sensitivity. Therefore, the main concern identified for this project is graves which occur both inside and outside of the project footprint. Archaeological remains (ephemeral traces and foundations of past walling and stone features) do not appear to be of great age and do not have any associated materials. Although a very small chance exists of still born infant remains having been buried under any residential structures that once occurred on site, such remains would be difficult to locate. No unequivocal residential sites were identified and this aspect is thus of limited further concern. The specialist recommends that a pre-construction survey be undertaken to examine the final approved footprint. This will serve to identify any further archaeological sites that might potentially be sensitive and, more importantly, it will serve to check for further graves. In conjunction with the survey, social consultation could be carried out to ascertain if any residents know of further graves in the study area. The specialist also strongly recommends that the project proponent plans for a larger area than is required so that any graves within the final footprint can be excised from the PV area without compromising the area required for the facility.

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 will be included in the Draft EIA Report that will be released to Interested and Affected Parties (I&APs) for review during the EIA Phase.

In terms of Palaeontology, a Site Sensitivity Verification Report (in terms of Part A of GN 320) was compiled during the Scoping Phase, as included in Appendix G.8 of this Draft Scoping Report. During a recent palaeontological site visit undertaken by the Palaeontologist in October 2021, the adjacent farm Goedenoeg 290 was surveyed for the proposed Becrux SEF project. The palaeontologist notes that no fossils of any kind were seen during this site visit. The recently ploughed agricultural land has deep, dark soils, more or less flat topography, and no rocky outcrops.

Since the site visit by the archaeologist for the proposed Vhuvhili SEF project confirmed that the land has been ploughed and planted in the last few decades, the palaeontologist confirmed it is unlikely that any fossils will be seen before excavations commences. Therefore, a desktop study with a Fossil Chance Find Protocol that should be added to the EMPr, is strongly recommended for this Vhuvhili SEF project.

Mpumalanga Provincial Heritage Resource Authority (MPHRA; for built environment and cultural landscapes) and the South African Heritage Resources Agency (SAHRA; for archaeology and palaeontology) are required to provide comment on the proposed project. The Draft Scoping Report will be uploaded onto SAHRIS during the 30-day review period. Any issues by SAHRA and/or MPHRA will then be addressed as part of the Final Scoping Report or during the EIA Phase, where required.

Once a final comment has been issued by the heritage authority, the recommendations should be included in the conditions of the EA (should such authorisation be granted). This will essentially give 'permission' from the heritage authorities to proceed.

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 MPHRA 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).

4.1.1.8 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 Scoping Level Assessment (Appendix G.2 of this Draft Scoping Report) notes that no protected trees, according to the protected tree list (NFA 2021), were observed on site and it is unlikely that any such species occur within the Vhuvhili SEF development footprint.

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.

4.1.1.9 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 landowner to control invasive alien plants occurring on the land under their control.

Invasive alien species (and their category) likely to occur on site are listed in Chapter 6 and Appendix B of the Terrestrial Biodiversity and Species Scoping Level Assessment (Appendix G.2 of this Draft Scoping Report). These alien plant species will be managed in line with the EMPr.

As noted in the Agriculture Assessment (Appendix G.1 of this Draft Scoping 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 Anneliza Collett (Acting Scientific Manager: Natural Resources Inventories and Assessments in the Directorate: Land and Soil Management of the Department of Agriculture, Land Reform and Rural Development (DALRRD)). The construction and operation of the facility will therefore not require consent from the DALRRD in terms of this provision of CARA.

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

The Subdivision of Agricultural Land Act (Act 70 of 1970) (SALA) requires that any long-term lease associated with the proposed Vhuvhili SEF be approved by the DALRRD. The SALA consent is separate from the Application for EA and needs to be applied for and obtained separately. An application for the change of land use (re-zoning) for the development on agricultural land will be lodged by the Project Applicant for approval in terms of the SALA as required.

4.1.1.11 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, 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 Vhuvhili SEF 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.

Based on the preliminary risk matrix assessment undertaken for the proposed project, and assuming that the recommended buffers and mitigation measures will be implemented, the associated risk to the aquatic features would be low. Additional detail will be provided during the EIA Phase.

4.1.1.12 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: Govan Mbeki Local Municipality; third-party water supplier; or existing 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 Vhuvhili SEF. 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.

4.1.1.13 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 will be included as an Appendix to the Draft and Final EIA Reports.

4.1.1.14 National Environmental Management: Waste Act (Act 59 of 2008) (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. 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 Vhuvhili SEF 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 EMPr, which will be included as an Appendix to the Draft and Final EIA Reports.

4.1.1.15 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; and
- 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, Government Gazette 33064 dated 31 March 2010 and thereafter amended in GN 893, Government Gazette 37054 dated 22 November 2013. The list of activities was further amended in GN 551, Government Gazette 38863 dated 12 June 2015; GN 1207, Government Gazette 42013 dated 31 October 2018; GN 687, Government Gazette 42472 dated 22 May 2019; and GN 421, Government Gazette 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 Vhuvhili SEF 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 EMPr, which will be included as an Appendix to the Draft and Final EIA Reports.

4.1.1.16 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).

The DFFE Screening Tool results for RFI for the proposed Vhuvhili SEF indicated "medium" sensitivity. This result arose because some of the south-western part of the proposed Vhuvhili project site "lies within 1 km of a telecommunication facility." This sensitivity is therefore not related to the Square Kilometre Array (SKA).

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 and outside of the SKA and Karoo Central Astronomy Advantage Area (KCAAA). The proposed Vhuvhili SEF site is located approximately 743 km from the KCAAA. The distance from site to the SKA spiral arm (spiral arm 2) and to the SKA core are 780 km and 864 km respectively. Please refer to Chapter 3 of this Draft Scoping Report for additional information on the RFI.

The SKA has been pre-identified as a key stakeholder and therefore included on the project database of I&APs (as shown in Appendix D of this Draft Scoping Report). The SKA Project Office will be requested to comment on the Draft Scoping Report during the 30-day review period.

4.1.1.17 Development Facilitation Act (Act 67 of 1995)

The Development Facilitation Act (Act 67 of 1995) (DFA) sets out several 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.

4.1.1.18 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)[1];
- Road Safety Act (Act 93 of 1996);
- Fencing Act (Act 31 of 1963);
- National Environmental Management: Protected Areas Act (NEM:PA) (Act 57 of 2003); and
- National Road Traffic Act (Act 93 of 1996).

4.1.2 Provincial Legislation

4.1.2.1 Mpumalanga Nature Conservation Act (Act 10 of 1998) (MNCA)

4.1.2.1.1 Flora (see Appendix B of the Terrestrial Biodiversity and Species Assessment)

Schedule 11: Protected Plants (Section 69(1)(a) of the MNCA 1998)
A total of thirty (30) plant species are listed as Schedule 11 Protected plant species in the region according to the MNCA (1998) (Appendix B of the Terrestrial Biodiversity and Species Assessment). Most of these species are members of the Amaryllidaceae and Orchidaceae. Twelve of the 30 protected plant species (Schedule 11) were recorded during the site survey undertaken by the Terrestrial Biodiversity specialist in December 2021. Another five species are on the Mpumalanga Red list (Lötter 2015) although not included in the MNCA (1998) list for Mpumalanga:

Drimia angustifolia	LC
Hypoxis hemerocallidea	LC
Khadia beswickii	VU
Nerine gracilis	VU
Trachyandra erythrorrhiza	NT

[1] 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).

Some provisions are given in terms of Schedule 11 Protected plants and Schedule 12 Specially Protected plants (Chapter 6, MNCA 1998):

- No person shall pick a protected plant without a permit.
- No person shall pick an indigenous plant in a nature reserve without a permit.
- No person shall pick an indigenous plant on a public road, land next to a public road within a distance of 100 meters from the centre of the road without a permit.
- No person shall pick an indigenous plant which is not a protected plant or specially protected plant on land which he or she is not the owner or occupier.
- No person shall donate, sell or export or remove from the province a protected plant without a permit.
- No person shall possess, pick, sell, purchase, donate or receive as a donation, import or export or remove from the Province a specially protected plant without a permit.

It will be recommended as part of the EMPr, that a detailed plant search and rescue operation be conducted before the final design process, during the appropriate flowering period where needed, and prior to the commencement of the construction phase. If any of the listed species are found, the relevant permits should be obtained by the Project Applicant prior to their relocation or destruction.

Schedule 12: Specially Protected Plants (Section 69(1)(b) of the MNCA 1998)
No Schedule 12 plant species are listed or were recorded on site during the site survey.

Schedule 13: Invader weeds and plants (MNCA 1998)
Ten Schedule 13 species were recorded on site (Appendix B of the Terrestrial Biodiversity and Species Assessment). No person shall possess, sell, purchase, donate or receive as a donation, convey, import or cultivate a Schedule 13 declared invader weed or plant without a permit.

4.1.2.1.2 Fauna (see Appendix C of the Terrestrial Biodiversity and Species Assessment)

Schedule 1: Specially Protected Game (Section 4 (1)(a) of MNCA 1998)
No Schedule 1 species are listed or were recorded on site during the site survey.

Schedule 2: Protected Game (Section 4 (1)(a) of MNCA 1998)
Under the provincial Act (MNCA 1998), most mammals, reptiles and amphibians are listed as Schedule 2: Protected Game (see Appendix C of the Terrestrial Biodiversity and Species Assessment). Three species were recorded on site or confirmed by the landowners (Appendix C):

- Steenbok
- Hedgehog
- Serval

Schedule 3: Ordinary Game (Section 4(1)(c) of MNCA 1998)
Three species were recorded on site or confirmed by the landowners (Appendix C):

- Springbok
- Blesbok
- Scrub hare

Schedule 4: Protected Wild Animals (Section 4(1)(d) of MNCA 1998)
No species were recorded on site (Appendix C).

Schedule 5: Wild Animals to which Section 33 apply (MNCA 1998)
Provisions of Section 33 apply (MNCA 1998): No person shall import into the province, keep, possess, sell, purchase, donate or receive as a donation or convey a Schedule 5 live wild animal without a permit. Five species were recorded on site or confirmed by the landowners (Appendix C):

- Serval
- Egyptian mongoose
- Meerkat
- Springhare
- Civet

Schedule 6: Exotic Animals to which the provisions of Section 34 apply (MNCA 1998)
Provisions of Section 34 apply (MNCA 1998): No person shall keep, possess, sell, donate or receive as a donation or convey a Schedule 6 live exotic animal without a permit. No species were recorded on site (Appendix C).

Schedule 7: Invertebrates (Section 35 (1) of the MNCA 1998)
Provisions of Section 35(1) apply (MNCA 1998): No person shall collect, catch, kill, keep, purchase, sell, donate or receive as a donation, convey, import or export a Schedule 7 invertebrate without a permit.

Schedule 8: Problem Animals (Section 44(1) of the MNCA 1998)
One species was recorded on site (Appendix C):

- Black-backed jackal

No permits are required for animal species since none should be harmed by the development.

Based on the Terrestrial Biodiversity and Species Scoping Level Assessment (Appendix G.2 of this Draft Scoping Report), the Screening Tool listed *Lepidochrysops procera* (Lepidoptera) as a Species of Conservation Concern (SCC) for the site. However, it was not listed in the ADU database, the MNCA (1998) provincial species lists or the NEMBA (2007c) ToPS lists. *Lepidochrysops procera* was not recorded on site and is unlikely to occur there because its host plant (*Ocimum obovatum*) was not present on site.

The said assessment notes that the screening tool, however, did not highlight the possible presence of the giant girdled lizard, a species with a Vulnerable IUCN status. However, the species was not recorded on site. Overall, the sensitivity of the animal species theme (avifaunal component excluded) is rated as medium. If the suggested mitigation measures are followed the animal SCC should not be negatively affected by the development.

The Mpumalanga Tourism and Parks Agency (MTPA) is the regulatory authority in Mpumalanga for the issuing of permits for fauna, flora, hunting and CITES and has been pre-identified as a key stakeholder and is included on the project database (as shown in Appendix D of this Draft Scoping Report).

4.1.2.2 Mpumalanga Vision 2030

As noted in the Socio-Economic Scoping Level Assessment (Appendix G.9 of this Draft Scoping Report), the Mpumalanga Vision 2030 Strategic Implementation Framework (2013-2030) provides a provincial expression of the key priorities, objectives and targets outlined in the National Development Plan 2030. In line with the objectives of the NDP the Mpumalanga Vision focusses on the following key socio-economic outcomes:

- Employment and Economic Growth;
- Education and Training;
- Health Care for all; and
- Social Protection.

The Mpumalanga Vision 2030 also identifies nine key drivers that have a bearing on the spatial development of the province. Key Drivers 1 to 6 are focused towards promoting economic development and job creation, Key Drivers 7 and 8 are focused on human settlement in and around the key priority nodes/areas identified and linked to Key Drivers 1-6, and Key Driver 9 is focused on the conservation and sustainable management of the natural environment. The relevant Key Drivers are summarised below.

Key Driver 1: Nodal Development. Key Driver 1 identifies corridors linked to key roads where investment should be focussed. Of relevance to the project is the fact that the N17 has been identified as a key corridor. The N17 is located to the north of the study area. It provides a major link between Johannesburg in the West with Ermelo, and the Eswatini Border in the east. Five primary nodes for development are also identified, including Secunda (and Ermelo).

Key Driver 2: Business, Commercial and Industrial Development. Key driver 2 focuses on development of business and commercial sectors on the primary, secondary and rural nodes in Mpumalanga and the potential for these activities to generate employment. Of relevance to the study is that the vision notes that the bulk of industrial investment in Mpumalanga Province should be clustered around the existing industrial strongholds, including Secunda (Petrochemical Industry).

Key Driver 9: Environmental Management and Conservation. The vision notes that in terms of mining it is important to establish proper environmental management systems during the operational phase of the mines to prevent large-scale water and air pollution. While the section does not specifically refer to renewable energy, much of the mining in Mpumalanga is linked to coal mining and power generation, both of which are large consumers of water. The water demands associated with renewable energy projects are significantly lower than those associated with traditional coal power stations.

4.1.2.3 Mpumalanga Growth and Development Path

The Mpumalanga Economic Growth and Development Path (MEGDP)(2011) is informed by the National Economic Growth Path. The MEGDP notes that Mpumalanga is committed to increasing local economic development and job creation in the agricultural, industrial, manufacturing, ***green economy***, tourism, and mining sectors.

The MEGDP is informed by six key pillars, namely:

1. Job creation;
2. Inclusive and shared growth of a diversified economy;
3. Spatial distribution;
4. Integration of regional economies;
5. Sustainable human development; and
6. Environmental sustainability.

The pillars of job creation, the development of a diversified economy, and sustainable environmental development are all relevant to the proposed Vhuvhili SEF development.

The MEGDP also identifies several key employment drivers aimed at realising the MEGDP objectives and securing strong and sustainable growth for the next decade. Of relevance these include the creation of employment of economic sectors including energy and the development of new economies including green industries. The MEGDP notes that the development of clean forms of energy like wind and hydro power generation opportunities, including gas production from landfill and organic waste should be supported. Although solar PV development is not listed specifically as a potential clean energy form, it shows that the municipality is supporting green energy initiatives in the energy sector of the province.

4.1.2.4 Mpumalanga Spatial Development Framework (2019)

The spatial vision for Mpumalanga Province is "A sustainable, vibrant and inclusive economy, Mpumalanga". The Spatial Development Framework (SDF) identifies several opportunities and challenges facing the province. The opportunities are linked to the province's natural resources, well developed economy, and established economies.

Natural Environment: The natural environment is diversified and is associated with the Highveld and the Lowveld areas in the province. Five major river systems flow through Mpumalanga and it is an important catchment area.

Connectivity and Infrastructure: The province is well connected in terms of infrastructure and is connected to Maputo and Richards Bay ports by both rail and road.

Economy: The province's rich biodiversity and scenic beauty support the tourism industry, while at the same time mining, specifically coal mining, plays a key role in the province's economy. The availability of high potential soil and diverse climatic conditions also support a range of crops.

Urban settlements: The key urban centres are well established economic centres and offer the opportunity for further economic development by leveraging on the towns' economic bases.

In terms of challenges, climate change is identified as a key challenge. In this regard the activities in the province, specifically the generation of coal powered energy, account for 90% of South Africa's scheduled emissions. The province is also home to 50% of the most polluted towns in the country. The predicted impacts associated with climate change include decreased rainfall in the province and increased temperatures. This will increase the risk of natural disasters, including droughts, flooding, and fires.

The SDF identifies five spatial objectives, namely:

Connectivity and corridor functionality: The aim is to ensure connectivity between nodes, secondary towns, marginalised areas, the surrounding area, and to green open space systems.

Sustainable concentration and agglomeration: The aim is to promote the creation of an agglomeration economy that will encourage people and economic activities to locate near one another in urban centres and industrial clusters.

Conservation and resource utilisation: The aim is to promote the maximisation, protection and maintenance of ecosystems, scarce natural resources, high-potential agricultural land, and integrated open space systems.

Liveability and sense of place: The aim is to create settlements that contribute to people's sense of personal and collective wellbeing and to their sense of satisfaction in being residents of a settlement.

Rural diversity and transformation: The aim is to create Urban-Rural anchors and choices for residents within the rural economy linked to access to markets, food security and security of land tenure.

Connectivity and corridor functionality, Sustainable concentration and agglomeration, and Conservation and resource utilisation are of specific relevance to the proposed Vhuvhili SEF development.

Connectivity and corridor functionality

The Strategic Objectives that are relevant the study area and the proposed development include:

- Strategic Objective 2: Development of the existing corridors and building new linkages to increase capacity and economic opportunities and ensure connectivity to the surrounding areas.
- Strategic Objective 5: Decongestion of the coal haul roads and Improvement of Freight Network.

In terms of Strategic Objective 2, the spatial linkages identified for development and upgrading include the upgrade of the N17, **N17**/N2 and the N12 and N11 corridor.

Sustainable concentration and agglomeration

Of specific relevance, Strategic Objective 4, Diversify Economy, focusses on the need to diversify the economy. The SDF notes that the mining sector contributes 25% to Mpumalanga's Gross Value Added (GVA). In addition, there are several other sectors directly or indirectly dependent on mining such as manufacturing (specifically metal processing) and utilities (specifically power generation). The combined GVA of these three sectors makes up more than 40% of the provincial GVA.

However, the SDF recognises that mining is not a sustainable industry and resources are finite. There is therefore a need for a gradual shift from mining-oriented sectors to the sustainable economic sectors to maintain sustained growth of the provincial economy. Mpumalanga's Coal Mining and Coal Fired Power Plant region (located mainly in the Highveld area) will become under increasing pressure due to environmental considerations. As a result, the region is likely to experience a decline in demand for coal and with it a decline in the associated employment it creates. There is therefore a need to diversify the regional economy and facilitate the gradual transition of economic activities in the region. The proposed

Vhuvhili Solar development supports the objective of diversifying the province's economy by establishing a green energy project which will create local employment opportunities.

Conservation and resource utilisation

The strategic objectives that are relevant the study area and the proposed development include:

- Strategic Objective 2: Ensure conservation of all water resources and catchment Areas.
- Strategic Objective 4: Promote a low carbon and climate resilient economy.
- Strategic Objective 6: To optimally utilise the mining potential without compromising the long-term sustainability of the natural environment.

Strategic Objective 2: Ensure Conservation of all Water Resources and Catchment Areas

Achieving Strategic Objective 2, "Ensure Conservation of all Water Resources and Catchment Areas", is closely linked to diversifying the economy. The SDF notes that the province's water resources are under pressure from high demand activities, including Eskom's power stations, mining, and industrial uses. The proposed Vhuvhili SEF development represents a low consumer of water.

Strategic Objective 4: Promote a Low Carbon and Climate Resilient Economy

Mpumalanga is home to 12 of Eskom's 15 coal-fired power stations; petrochemical plants including Sasol's refinery in Secunda; metal smelters; coal and other mines; brick and stone works; fertiliser and chemical producers; explosives producers; and other smaller industrial operations, making the Highveld one of South Africa's industrial heartlands (CER, 2017). As a result, the air quality within the Mpumalanga Province, especially within the Highveld area, is the poorest in South Africa. The Highveld region accounts for approximately 90 % of South Africa's scheduled emissions of industrial dust, sulphur dioxide and nitrogen oxides (Wells et al. 1996, as cited in Josipovic et al. 2009). Achieving Strategic Objective 4, "Promote a low carbon and climate resilient economy", is closely linked to diversifying the economy. The proposed Vhuvhili SEF development supports the development of a low carbon, climate resistant economy.

Strategic Objective 6: To optimally utilise the mining potential without compromising the long-term sustainability of the natural environment

Mining contributes R 49.6 billion (approximately 25%) to the Mpumalanga economy. The key mining sector is coal, which represents 83% of South Africa's coal production. The mining sector, specifically coal mining, creates employment opportunities and supports the manufacturing and power generation sector. However, mining is also associated with many issues including water and soil contamination, air pollution and environmental degradation.

Achieving Strategic Objective 6, "To optimally utilise the mining potential without compromising the long-term sustainability of the natural environment", is closely linked to diversifying and developing a low carbon climate resistant economy. The proposed Vhuvhili SEF development supports the objective of diversifying and developing a low carbon, climate resistant economy. In terms of the high-level composite spatial development framework, Ermelo is identified as a Regional Service Centre (red dot) and the development area located to the south-east of the town falls within a mining area (brown hatched) (Figure 4.1). The economic sectors in the area include mining and power generation. The dominant land use in the area is commercial agriculture (yellow, Figure 4.2).

The proposed Vhuvhili SEF aligns with the focus areas of the Mpumalanga SDF. It will uplift the local communities through employment creation and increased investment in infrastructure. In addition, the proposed development will provide a sustainable source of energy for the national grid or for the Sasol grid. Employment creation would mainly be temporary in nature during the construction phase with limited opportunities created during the operational phase. Refer to Chapter 2 of this Draft Scoping Report for additional information on the proposed employment opportunities.

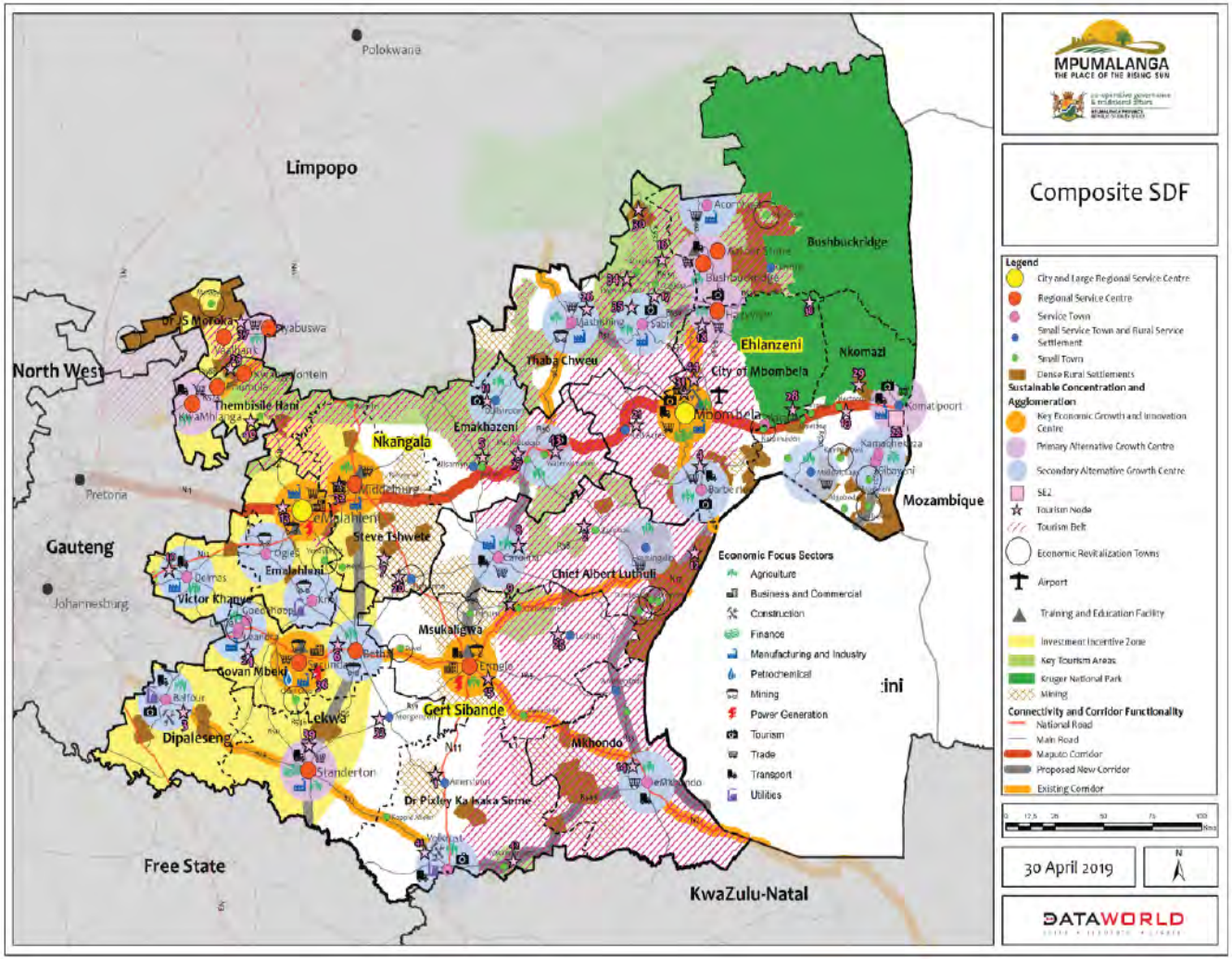


Figure 4.1: Mpumalanga Composite SDF-Economic Activities *(Source: Mpumalanga SDF)*

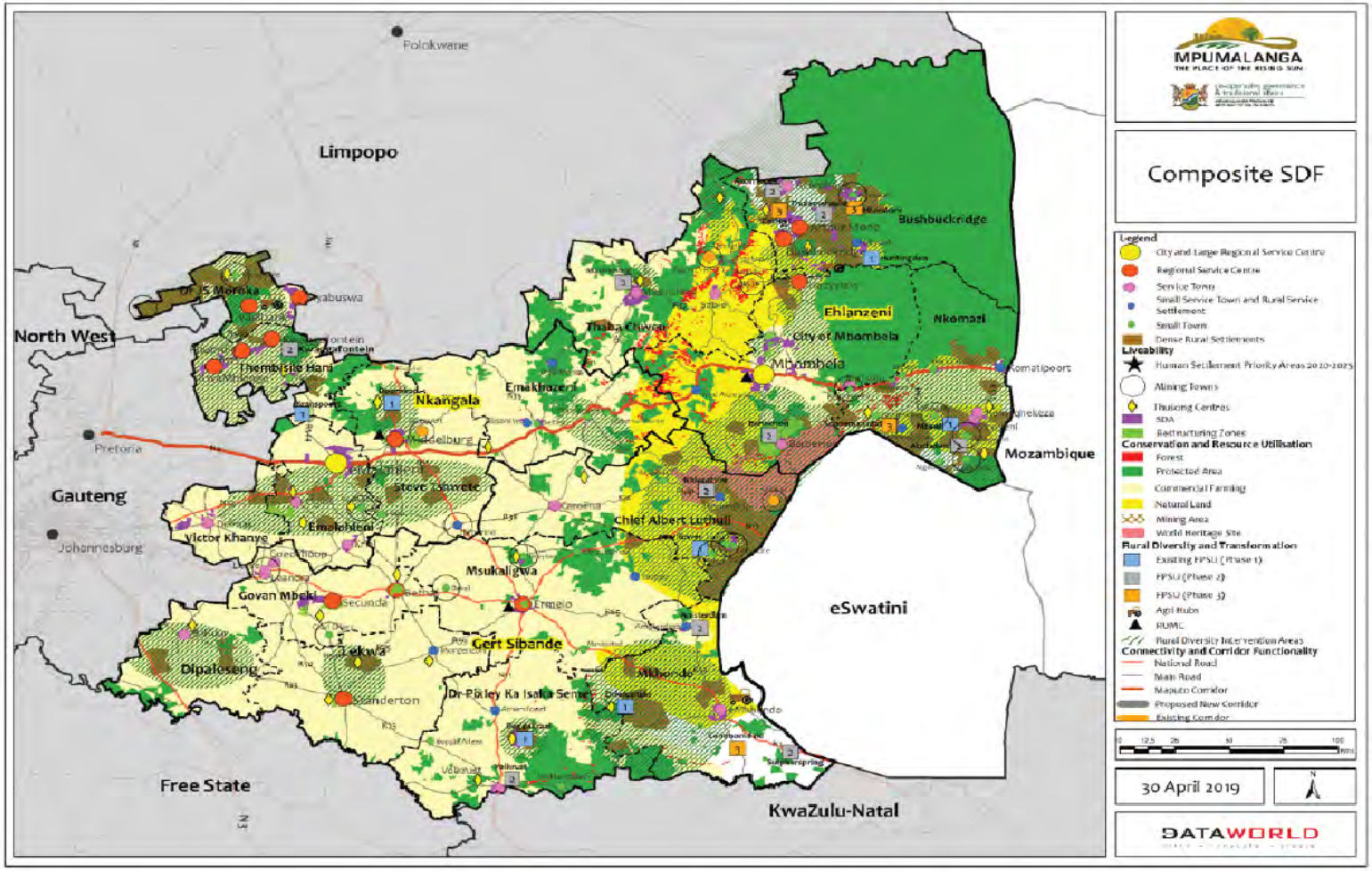


Figure 4.2: Mpumalanga Composite SDF-Land Uses *(Source: Mpumalanga SDF)*

4.1.3 District and Local Planning Legislation

4.1.3.1 Environmental Management Framework

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

4.1.3.2 Gert Sibande District Municipality Integrated Development Plan (IDP) 2021/2022

The Strategic Objectives of the Gert Sibande District Municipality Integrated Development Plan (IDP) 2021/2022, are to:

Strategic Objective 1: To develop and retain skilled and capacitated workforce.
Strategic Objective 2: To facilitate and coordinate provision of sustainable community and social services.
Strategic Objective 3: To facilitate economic growth and development.
Strategic Objective 4: To ensure financial viability and provide support to local municipalities.
Strategic Objective 5: To ensure effective governance in the administration of the institution.
Strategic Objective 6: To support and coordinate spatial transformation.

The IDP states that the Gert Sibande district must achieve sufficient, secure and reliable energy supply and should rapidly expand generation capacity through a diverse energy mix. The proposed Vhuvhili SEF project is in line with the district IDP because it will enable the Gert Sibande District Municipality to expand their generation capacity by developing a 300 MW solar PV project which will contribute to the diverse energy mix. Furthermore, it will contribute to local economic growth and development as it will create employment and support livelihoods.

4.1.3.3 Govan Mbeki Local Municipality IDP 2021/2022

The vision of the Govan Mbeki Municipality (GMM) as set out in the 2020/2021 IDP review is “To be a Model City and Centre of Excellence.”

The Vision, Mission and Values are informed by six (6) Key Strategic objectives:

Strategic Objective 1: To enhance revenue & secure financial sustainability.
Strategic Objective 2: To provide sustainable services, optimise operations and improve customer care.
Strategic Objective 3: To facilitate and create an enabling environment for diversified local economic development, social cohesion and job creation.
Strategic Objective 4: To enhance the capacity of human capital and deliver institutional transformation.
Strategic Objective 5: To develop spatially integrated, safe communities and a protected environment.
Strategic Objective 6: To promote good corporate governance and effective stakeholder engagement.

Strategic Objectives 2,3 and 5 are relevant to the proposed Vhuvhili SEF project.

The IDP highlights the renewable energy sector as a technical service that can be provided to support the

workforce in delivering on the strategic objectives. Green (renewable) energy & energy efficiency is listed as one of the strategic initiatives and proposed interventions to achieve Strategic Objective 2, "To provide sustainable services, optimise operations and improve customer care". The proposed Vhuvhili SEF development is therefore directly aligned with this objective as it is a green (renewable) energy initiative.

Strategic Objective 3, "To facilitate and create an enabling environment for diversified local economic development, social cohesion, and job creation", is of relevance to this project. The IDP notes that this objective can be achieved through the phasing in of renewable energy options, which include concentrated solar power, wind and natural gas thereby reducing its dependence on coal resources. Although solar PV is not specifically listed as a renewable energy option, it shows that the municipality is supporting green energy initiatives to diversify local economic development. The proposed Vhuvhili SEF is therefore aligned with this objective.

Strategic Objective 5, "To develop spatially integrated, safe communities and a protected environment", is also relevant to the proposed Vhuvhili SEF development.

The proposed project is also aligned with Strategic Objective 6, "Infrastructure Investment", of the SDF for the Govan Mbeki Municipality. The IDP notes that the municipality should invest in green infrastructure e.g. water tanks and **renewable energy (e.g. solar).**

The proposed project is aligned with two of the objectives of the IDP in that it will encourage sustainable development and economic growth through increased investment and employment opportunities. The proposed project will create employment opportunities and economic spin offs during the construction and operational phases (if EA is granted by the Mpumalanga DARDLEA). This will also address unemployment and poverty as well as Climate Change which have been identified as "Threats" in the SWOT analysis which was undertaken as part of the IDP process for the Govan Mbeki Local Municipality.

4.1.3.4 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
- Kyoto Protocol (which South Africa acceded to in 2002).

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

Accordingly, projects such as the proposed Vhuvhili 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.

4.2 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 Vhuvhili SEF 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, nor is it located within any of the strategic power corridors gazetted in GN 113 on 16 February 2018 and GN 383 on 29 April 2021; therefore, a full Scoping and EIA Process is being undertaken for the proposed project, subjected to a 107-day decision-making timeframe. Additional information on the REDZs and power corridors are provided in Chapter 5 of this Draft Scoping Report.

The proposed Vhuvhili SEF project site is nevertheless located approximately 29 km away (at its closest point) from the Emalahleni REDZ (i.e., REDZ 9). In addition, it is located approximately 34 km away (at its closest points) from the International Strategic Transmission Corridor. While the proposed SEF is not located within the Emalahleni REDZ or International Strategic Transmission Corridor, the proposed project 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 as well as the development of the Green Hydrogen economy in South Africa.

All the listed activities forming part of this proposed development and therefore requiring EA are included in the Application Form for EA that has been prepared and submitted to the Mpumalanga DARDLEA with this Draft Scoping Report. The listed activities triggered by the proposed Vhuvhili SEF are indicated in Table 4.1. **Note that the listed activities noted below only address the current Scoping and EIA Project (Vhuvhili SEF) and not the EGI project which will be subjected to a separate BA Process.**

It should be noted that a precautionary approach was followed when identifying listed activities (for inclusion in the Application for EA and to be assessed as part of the Scoping and EIA Process), i.e. if the activity potentially forms part of the project, it is listed. However, the final project description will be shaped by the findings of the EIA Process and certain activities may be added or removed from the project proposal, followed by the submission of an Amended Application Form for EA to the Mpumalanga DARDLEA, as required.

Table 4.1: Listed Activities in GN R327, GN R325, and GN R324 that will be potentially triggered by the proposed Vhuvhili SEF

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
Listing Notice 1, GN R327		
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 proposed project will entail the construction of an on-site substation complex, as indicated below: The footprint of the on-site substation complex will extend approximately 4 ha, respectively. The internal distribution electrical infrastructure required to connect the respective electrical components related to the project, and the onsite substation, including cabling (buried or overhead) will be between 33kV and 132kV. The onsite substation will be rated 33/132kV whereas internal cabling will be up to 33kV. This constitutes facilities for the distribution and transmission of electricity. The proposed Vhuvhili SEF project will take place outside of an urban area. It will be constructed on various affected farm portions, south-east of the town of Secunda in the Govan Mbeki Local Municipality and Gert Sibande District Municipality, in the Mpumalanga Province. *This activity would therefore be triggered.*
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—	The proposed Vhuvhili SEF project will take place outside of an urban area. It will be constructed on various affected farm portions, south-east of the town of Secunda in the Govan Mbeki Local Municipality and Gert Sibande District Municipality, in the Mpumalanga Province.

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
	(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 the commencement of development and where indigenous vegetation will not be cleared.	The proposed Vhuvhili SEF will entail the construction of various building infrastructure and structures (such as the solar fields, offices, warehouses/workshops, ablution facilities, guard houses, Operational and Maintenance (O&M) control centres, inverter/transformer stations, an on-site substation complex, laydown areas and an on-site Battery Energy Storage System (BESS) etc.). The infrastructure and structures will exceed a footprint of 100 m^2 and some will occur within minor watercourses and drainage features and within 32 m of these aquatic features. The aquatic features within the study area for the Vhuvhili SEF comprise of several un/channelled valley bottom wetlands, seepage wetlands and floodplain wetlands, most of which are captured in the Critical Biodiversity Area (CBA). Several of the above-mentioned wetlands and rivers are located on the study site and all drain into the Klipspruit River (which is classified as a floodplain wetland) in the middle of the study site. The Klipspruit River drains into Trichardspruit and then into the Kleinspruit approximately 10 km west of the study site. The study site is situated within an upstream FEPA. Upstream FEPA's are areas in which human activities need to be managed to prevent damage to downstream FEPA's. The Klipspruit River and associated wetlands that drain into the Klipspruit River are all classified as NFEPA Wetlands. The sensitivity model that was applied in the Aquatic Scoping Assessment classified the drainage lines in the FEPA as being of high sensitivity with most of the area classified as low sensitivity and a few areas of medium sensitivity.

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
		Refer to Appendix G.3 of this Draft Scoping Report (Aquatic Biodiversity Scoping Level Specialist Assessment) for additional feedback on the aquatic features within the study area. In addition, the proposed project site contains areas of CBA in terms of the MBSP CBA Map within which the proposed infrastructure will be constructed. The road upgrading may also occur within these areas. Based on an access investigation conducted for the site by the Traffic Specialist (Wink, 2021)), two site access points are recommended for the site. The access points are proposed off the gravel sections of the D823 and D619 road. The access points are located off existing gravel access roads thus access spacing restrictions are not envisaged. Sight lines along the access points are within the recommended limits. The final site access points will be based on the access investigation findings, geometric considerations and site layout restrictions. This existing gravel road will be widened and upgraded for the proposed project, with an upgraded width ranging up to approximately 10 m. Exact specifications of the widening and upgrading of the farm gravel road will be confirmed during the detailed design phase. The road widening and upgrading will exceed a footprint of 100 m^2. *This activity would therefore be triggered.*

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
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 Facility will require storage and handling of dangerous goods, including fuel, cement and chemical storage onsite, that will be greater than 80m^3 but not exceeding 500m^3. *This activity would therefore be triggered.*
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- 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 proposed Vhuvhili SEF project may entail the excavation, removal and moving of more than 10 m^3 of soil, sand, pebbles or rock from nearby watercourses on site. The proposed project may also entail the infilling of more than 10 m^3 of material into the nearby watercourses. The aquatic features within the study area for the Vhuvhili SEF comprise of un/channelled valley bottom wetlands, seepage wetlands and floodplain wetlands. Several of the above-mentioned wetlands and rivers are located on the study site and all drain into the Klipspruit River in the middle of the study site. This access road will be widened and upgraded for the proposed project, with a width of up to 10 m. Exact specifications of the widening and upgrading of the farm gravel road will be confirmed during the detailed design phase. Refer to Appendix G.3 of this Draft Scoping Report (Aquatic Biodiversity Scoping Level Specialist Assessment) for additional feedback on the aquatic features within the study area. *This activity would therefore be triggered.*

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
Activity 24 (ii)	The development of a road – (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road– a) which is identified and included in activity 27 in Listing Notice 2 of 2014; or b) where the entire road falls within an urban area; or c) which is 1 km or shorter.	Internal access roads required by the Facility will be between 5 m and 6 m wide and longer than 1 km. Where required for turning circle/bypass areas, however, access or internal roads may be up to 10 m to allow for larger component transport. The exact values will be confirmed once final designs have been provided. *This activity would therefore be triggered.*
Activity 28 (ii)	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	The proposed Vhuvhili SEF will be developed outside of an urban area. It will be constructed on various affected farm portions, south-east of the town of Secunda in the Govan Mbeki Local Municipality and Gert Sibande District Municipality, in the Mpumalanga Province. Hence the proposed project will take place outside of an urban area. The land earmarked for the development of the proposed Vhuvhili SEF is currently used for agricultural purposes (mainly maize cultivation and limited livestock farming). The proposed Vhuvhili SEF which is considered as a commercial/industrial development, will have an estimated footprint of approximately 650 ha. The proposed project will entail the construction of various building infrastructure and structures (such as the solar fields, offices, warehouses/workshops, ablution facilities, guard houses, O&M control centres, inverter/transformer stations, on-site substation complex, laydown areas and BESS etc.). This will constitute infrastructure with a physical footprint of more than 1 ha. *This activity would therefore be triggered.*

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
Activity 48(i)(a)(c)	The expansion of— (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or (ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more; where such expansion occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	Transport of large infrastructure components related to the facility will require the expansion of existing access and/or internal roads, culverts or similar drainage crossing infrastructure collectively exceeding 100 m^2 or more beyond existing road or road reserves located within delineated watercourses on site, or within 32 m of the outer extent of the delineated watercourses on site. *This activity would therefore be triggered.*
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.	The access points off the gravel sections of the D823 and D619 roads and existing onsite gravel roads may be widened by more than 6 m in some places to provide access to the SEF site. Internal access roads will be up to 20 m wide. Where possible existing gravel roads will be upgraded, and may be widened by more than 6 m and/or lengthened by more than 1 km. *This activity would therefore be triggered.*
Listing Notice 2, GN R325		
Activity 1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs — (a) within an urban area; or	The proposed Vhuvhili SEF project will entail the construction of a Solar PV facility (i.e., a facility for the generation of electricity from a renewable resource), with a capacity of up to 300 MW. It will be constructed on various affected farm portions, south-east of the town of Secunda in the Govan Mbeki Local Municipality and Gert Sibande

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
	(b) on existing infrastructure.	District Municipality, in the Mpumalanga Province. Hence the proposed project will take place outside of an urban area. *This activity would therefore be triggered.*
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 Vhuvhili SEF will have an estimated footprint of approximately 650 ha. As a result, more than 20 ha of indigenous vegetation would be removed for the construction of the proposed solar PV facility. *This activity would therefore be triggered.*
GN R324 (Listing notice 3)		
Activity 4 (f) (i) (ee)	The development of a road wider than 4 meters with a reserve less than 13.5 meters. f. Mpumalanga i. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	The proposed Vhuvhili SEF project will be constructed on various affected farm portions, south-east of the town of Secunda in the Govan Mbeki Local Municipality and Gert Sibande District Municipality, in the Mpumalanga Province. Hence the proposed project will take place outside of an urban area. Internal roads will be constructed within the footprint of the proposed Vhuvhili SEF. The internal roads are expected to be composed of gravel and will extend approximately 4 to 5 m wide. The total internal road length will be confirmed during the final design. In 2014, the Mpumalanga Parks and Tourism Agency developed the Mpumalanga Biodiversity Sector Plan (MBSP). In essence the MBSP is a map

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
		guiding areas of conservation concern for the Mpumalanga Province. Two maps have been developed, namely one for terrestrial biodiversity, and the other for freshwater biodiversity. Based on the terrestrial MBSP, the majority of the site is classified as CBA I (mostly in Habitats 4 & 5 (natural and disturbed grassland – low sensitivity rating in current survey) and on the rocky grassland habitat (Habitat 3 – medium sensitivity rating) in the southeast of the site) with medium to large areas classified as heavily or moderately modified. Old lands also occupy some sections especially in the south. A large section associated with the Klipspruit River is classified as a CBA. The freshwater map indicated that the aquatic ecosystems in and around the study site are classified as Other Natural Areas (ONAs). There is also an Ecological Support Area (ESA) to the west of the study site. Refer to the Terrestrial Biodiversity and Species Scoping Level Assessment (Appendix G.2 of this Draft Scoping Report), and Aquatic Biodiversity Scoping Level Assessment (Appendix G.3 of this Draft Scoping Report) for additional information on the CBAs, ESAs and species recorded on site. Therefore, the proposed internal road network may be constructed within CBA and/or 'Heavily or moderately modified' areas as captured in the MBSP Terrestrial Biodiversity CBA Map. *This activity would therefore be triggered.*
Activity 12 (f) (ii)	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is	The proposed Vhuvhili SEF will have an estimated footprint of approximately 650 ha. As a result, more than 300 m^2 of indigenous vegetation may be cleared for the construction of the proposed Vhuvhili SEF and associated

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
	required for maintenance purposes undertaken in accordance with a maintenance management plan. f. Mpumalanga ii. Within critical biodiversity areas identified in bioregional plans;	infrastructure. The proposed project site contains areas of CBA in terms of the Mpumalanga Terrestrial Biodiversity CBA Map. *This activity would therefore be triggered.*
Activity 14 (ii) (a) and (c); (f), (i) (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; f. Mpumalanga i. Outside urban 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 Vhuvhili SEF project will be constructed on various affected farm portions, south-east of the town of Secunda in the Govan Mbeki Local Municipality and Gert Sibande District Municipality, in the Mpumalanga Province. Hence the proposed project will take place outside of an urban area. The proposed Vhuvhili SEF will entail the construction of various building infrastructure and structures (such as the solar fields, offices, warehouses/workshops, ablution facilities, guard houses, O&M control centres, inverter/transformer stations, on-site substation complexes, laydown areas and BESS etc.). The infrastructure and structures will exceed a footprint of 10 m^2 and some will occur within minor watercourses and drainage features and within 32 m of these aquatic features. The aquatic features within the study area for the Vhuvhili SEF comprise of several un/channelled valley bottom wetlands, seepage wetlands and floodplain wetlands, most of which are captured in the CBA. Several of the above-mentioned wetlands and rivers are located on the study site and all drain into the Klipspruit River (which is classified as a floodplain wetland) in

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
		the middle of the study site. The Klipspruit River drains into Trichardspruit and then into the Kleinspruit approximately 10 km west of the study site. The study site is situated within an upstream FEPA. Upstream FEPA's are areas in which human activities need to be managed to prevent damage to downstream FEPA's. The Klipspruit River and associated wetlands that drain into the Klipspruit River are all classified as NFEPA Wetlands. The sensitivity model that was applied in the Aquatic Scoping Assessment classified the drainage lines in the FEPA as being of high sensitivity with most of the area classified as low sensitivity and a few areas of medium sensitivity. Refer to Appendix G.3 of this Draft Scoping Report (Aquatic Biodiversity Scoping Level Specialist Assessment) for additional feedback on the aquatic features within the study area. In addition, the proposed project site contains areas of CBA in terms of the MBSP CBA Map within which the proposed infrastructure will be constructed. The road upgrading may also occur within these areas. Based on an access investigation conducted for the site by the Traffic Specialist (Wink, 2021)), two site access points are recommended for the site. The access points are proposed off the gravel sections of the D823 and D619 road. The access points are located off existing gravel access roads thus access spacing restrictions are not envisaged. Sight lines along the access points are within the recommended limits. The final site access points will be

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
		based on the access investigation findings, geometric considerations and site layout restrictions. This existing gravel road will be widened and upgraded for the proposed project, with an upgraded width ranging up to approximately 10 m. Exact specifications of the widening and upgrading of the farm gravel road will be confirmed during the detailed design phase. The road widening and upgrading will exceed a footprint of 100 m^2. *This activity would therefore be triggered.*
Activity 18 (f) (i)(ee)	The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometre: f. Mpumalanga i. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	The proposed Vhuvhili SEF project will be constructed on various affected farm portions, south-east of the town of Secunda in the Govan Mbeki Local Municipality and Gert Sibande District Municipality, in the Mpumalanga Province. Hence the proposed project will take place outside of an urban area. In 2014, the Mpumalanga Parks and Tourism Agency developed the MBSP. In essence the MBSP is a map guiding areas of conservation concern for the Mpumalanga Province. Two maps have been developed, namely one for terrestrial biodiversity, and the other for freshwater biodiversity. Based on the terrestrial MBSP the majority of the site is classified as CBA 1 (mostly in Habitats 4 & 5 (natural and disturbed grassland – low sensitivity rating in current survey) and on the rocky grassland habitat (Habitat 3 – medium sensitivity rating) in the southeast of the site) with medium to large areas classified as heavily or moderately modified. Old lands also occupy some section especially in the south.

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
		The freshwater map indicated that the aquatic ecosystems in and around the study site are classified as ONAs. There is also an ESA to the west of the study site. The aquatic features within the study area for the Vhuvhili SEF comprise of several un/channelled valley bottom wetlands, seepage wetlands and floodplain wetlands, most of which are captured in the CBA. Several of the above-mentioned wetlands and rivers are located on the study site and all drain into the Klipspruit River (which is classified as a floodplain wetland) in the middle of the study site. Refer to Appendix G.3 of this Draft Scoping Report (Aquatic Biodiversity Scoping Level Specialist Assessment) for additional feedback on the aquatic features within the study area. In addition, the proposed project site contains areas of CBA in terms of the MBSP CBA Map and the road upgrading may occur within these areas. Based on an access investigation conducted for the site by the Traffic Specialist (Wink, 2021)), two site access points are recommended for the site. The access points are proposed off the gravel sections of the D823 and D619 road. The access points are located off existing gravel access roads thus access spacing restrictions are not envisaged. Sight lines along the access points are within the recommended limits. The final site access points will be based on the access investigation findings, geometric considerations and site layout restrictions. This existing gravel road will be widened and upgraded for the proposed project, with an upgraded width ranging up to approximately 10 m. Exact specifications of the widening and upgrading of the farm gravel road will be

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
		confirmed during the detailed design phase. The road widening and upgrading will exceed a footprint of 100 m^2. *This activity would therefore be triggered.*
Activity 23 (ii) (a)(c) **(f) (i) (ee)**	The expansion of— (ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; where such expansion 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; f. Mpumalanga i. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	The proposed Vhuvhili SEF may entail development of infrastructure or structures where the physical footprint is expanded by 10 square metres or more; where such expansion occurs within a watercourse; or within 32 m from a watercourse within an area marked as a CBA 1 on farms near Secunda in the Mpumalanga Province. *This activity would therefore be triggered.*

4.3 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 Vhuvhili SEF project has accordingly been run through the Screening Tool, and the associated report generated and attached to the combined Application for EA.

Based on the selected classification, the National Web Based Environmental 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 classification that applies to the proposed project is **Utilities Infrastructure; Electricity; Generation; Renewable; Solar, PV and Solar PV**.

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 Report notes that it is the responsibility of the EAP to confirm this list and to motivate in the Scoping Report, the reason for not including any of the identified specialist assessments, where relevant.

Table 4.2: List of Specialist Assessments identified by the Screening Tool for the proposed Vhuvhili SEF

Specialist Assessment Required by the Screening Tool		Assessment undertaken in Scoping and EIA Process	Type of Assessment undertaken in Scoping and EIA Process	Appendix of Scoping Report
1	Agriculture and Soils	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): **Impact Assessment**	Appendix G.1
2	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 and Terrestrial Plant Species is combined in one report. The reporting for Avifauna is included in the separate Avifauna study listed below (please refer to Appendix G.4).	Appendix G.2
3	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**	Appendix G.2

Specialist Assessment Required by the Screening Tool		Assessment undertaken in Scoping and EIA Process	Type of Assessment undertaken in Scoping and EIA Process	Appendix of Scoping Report
			Please note that one combined report was provided to address the Terrestrial Biodiversity and Species and the Terrestrial Plant Species Protocols (please refer to Appendix G.2). The report also addressed faunal species and includes a Site Sensitivity Verification report for the Terrestrial Animal Species Themes. However, the Avifuana specialist on the specialist team conducted a Terrestrial Animal Species Assessment based on the Terrestrial Animal Species Protocols (please refer to Appendix G.4).	
4	Animal Species Assessment	Yes	Protocol GN 1150: Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species: **Impact Assessment** The Terrestrial Biodiversity and Species report also addressed faunal species and includes a Site Sensitivity Verification report for the Terrestrial Animal Species Themes (please refer to Appendix G.2). However, the Avifuana specialist on the specialist team conducted a Terrestrial Animal Species Assessment based on the Terrestrial Animal Species Protocols (please refer to Appendix G.4).	Appendix G.2 and G.4
5	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** The Impact Assessment to be undertaken as part of this Scoping and EIA Process is referred to as an Aquatic Biodiversity and Species Impact Assessment. Note there is currently no Species Protocol applicable to Aquatic Plants and Animals.	Appendix G.3
6	Avifauna Impact Assessment	Yes	Protocol GN 1150: Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species: **Impact Assessment**	Appendix G.4

Specialist Assessment Required by the Screening Tool		Assessment undertaken in Scoping and EIA Process	Type of Assessment undertaken in Scoping and EIA Process	Appendix of Scoping Report
7	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.6
8	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.7
9	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** The specialist has compiled a Site Sensitivity Verification. The Palaeontological specialist indicated that since the site visit by the archaeologist for this project confirmed that the land has been ploughed and planted in the last few decades, it is unlikely that any fossils will be seen before excavations commences. Therefore, a desktop study with a Fossil Chance Find Protocol, that should be added to the EMPr, is strongly recommended.	Appendix G.8
10	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
11	Civil Aviation Assessment	Yes, if required	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 and/or Compliance Statement** The Screening Tool indicates that the south-eastern portion and a small portion on the north-western section of the proposed project area is of "medium" sensitivity with the classification of "within 8 km of another civil aviation aerodrome". This still needs to be verified on site. Should the medium sensitivity, or a higher sensitivity, be verified, then a Compliance Statement is to be undertaken during the EIA Phase. Should the site be verified	To be provided during EIA Phase

Specialist Assessment Required by the Screening Tool		Assessment undertaken in Scoping and EIA Process	Type of Assessment undertaken in Scoping and EIA Process	Appendix of Scoping Report
			as low sensitivity, then only a Site Sensitivity Verification will be required. The South African Civil Aviation Authority is included on the I&AP database and will be provided with access to the Draft Scoping Report to seek comment during the Scoping and EIA Process.	
12	Defence Assessment	Yes, if required	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 and/or Compliance Statement** The Screening Tool indicates that the proposed project area is of "low" sensitivity in terms of Defence. This still needs to be verified on site. Should the site be confirmed as being of low sensitivity, then only a Site Sensitivity Verification will be required. Should the site be verified as medium, high or very high sensitivity, then a Compliance Statement is to be undertaken during the EIA Phase. The Department of Defence and ARMSCOR are included on the I&AP database and will be provided with access to the Draft Scoping Report in order to seek comment during the Scoping and EIA Process.	To be provided during EIA Phase
13	Radio Frequency Interference (RFI) Assessment	No	Protocol GN 320: Part B: RFI (Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on RFI): Site Sensitivity Verification and/or Compliance Statement The Screening Tool indicates that the proposed project area is of "medium" sensitivity in terms of RFI. This still needs to be verified on site. Should the site be verified as low sensitivity, then only a Site Sensitivity Verification will be required. Should the site be verified as medium, high or very high sensitivity, then a Compliance Statement is to be undertaken during the EIA Phase. The SKA Office is included on the I&AP database and will be provided with access to the Draft	Not applicable

Specialist Assessment Required by the Screening Tool		Assessment undertaken in Scoping and EIA Process	Type of Assessment undertaken in Scoping and EIA Process	Appendix of Scoping Report
			Scoping Report to seek comment during the Scoping and EIA Process.	
14	Geotechnical Assessment	Yes	A desktop Geotechnical study will be undertaken during the EIA phase. It should be noted that this is a technical study and therefore will not comply with Appendix 6 of the 2014 NEMA EIA Regulations (as amended):	To be provided during EIA Phase

4.3.1 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 in order to ensure that all potential impacts resulting from the proposed project are considered and assessed as best as possible:

- **Traffic Impact Assessment**: Scoping inputs have been included in Appendix G.10 of this Draft Scoping Report, and will be supplemented and updated, as required, during the EIA Phase. The Traffic Impact Assessment is being undertaken in compliance with Appendix 6 of the 2014 NEMA EIA Regulations (as amended); and
- **Battery Energy Storage System (BESS) High Level Safety, Health and Environment Risk Assessment:** The Scoping Level inputs are included in Appendix G.5 of this Draft Scoping Report, and will be supplemented and updated, as required, during the EIA Phase. As indicated above, this is a technical report, and does not need to fulfil the requirements of the 2014 NEMA EIA Regulations (as amended).

4.3.2 Geotechnical Assessment

The Screening Tool also identified the need for a Geotechnical Assessment. A Geotechnical Assessment has not been undertaken as part of the Scoping and EIA Process as this will be undertaken during the detailed design phase, if preferred bidder status is obtained in terms of the Renewable Energy Independent Power Producer Programme (REIPPPP) or similar processes.

Contractors and suppliers will only be selected and appointed if preferred bidder status is obtained (should it be granted). In line with best practice, and to ensure that all aspects are covered in the assessment, suppliers of sub-structures, inverters and transformers and civil sub-contractors are required to provide input into the scope of work of the Geotechnical Assessment. Therefore, Geotechnical Assessments can only be undertaken during detailed design, if preferred bidder status is obtained.

This motivation for exclusion was acknowledged and approved by the Mpumalanga DARDLEA during the pre-application meeting, with the recommendation for such motivation to also be included in the Draft Scoping Report. All correspondence relating to the pre-application meeting is addressed in Appendix F of this Draft Scoping Report.

4.4 Principles for Scoping and Public Participation

4.4.1 Objectives of the Scoping Phase

This Scoping Process is being planned and conducted in a manner that is intended to identify and provide sufficient information to enable the authorities to reach a decision regarding the scope of issues to be addressed in this EIA Process, and in particular to convey the range of specialist assessments that will be included as part of the EIA Phase, as well as the approach to these specialist assessments.

As highlighted in Chapter 1 of this Draft Scoping Report, within this context, the objectives of this Scoping Process (as per the 2014 NEMA EIA Regulations (as amended)) are to:

- Identify the relevant policies and legislation relevant to the proposed activity;
- Motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- Clarify the project scope to be covered;
- Identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks;
- Identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- Clarify the alternatives being considered and ensure due consideration of alternative options regarding the proposed development, including the “No-go” option;
- Conduct an open, participatory and transparent approach and facilitate the inclusion of stakeholder issues in the decision-making process;
- Identify and inform a broad range of stakeholders about the proposed development;
- Confirm the process to be followed and opportunities for stakeholder engagement;
- Identify and document the key issues to be addressed in the impact assessment phase (through a process of broad-based consultation with stakeholders) and the approach to be followed in addressing these issues;
- Confirm the level of assessment to be undertaken during the impact assessment, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
- Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

4.4.2 Introduction to the Public Participation Process

This section provides an overview of the tasks being undertaken in the Scoping Phase, with a particular emphasis on providing a clear record of the Public Participation Process (PPP) to be followed.

The PPP is being driven by a stakeholder engagement process that will include inputs from authorities, I&APs, technical specialists and the Project Developer. 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 views 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 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 key steps in the PPP for this Scoping and EIA Process are described below. 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 well as the approved Public Participation Plan, 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.

The Draft Scoping Report is currently being released to I&APs, Stakeholders and Organs of State (including the Mpumalanga DARDLEA and the National DFFE) for a 30-day comment period. The Application for EA will be submitted to the CA (Mpumalanga DARDLEA) at the same time as the Draft Scoping Report.

4.4.3 Pre-Application Consultation with the Competent Authority

A request for a Pre-Application Meeting was submitted to the Mpumalanga DARDLEA, on 11 May 2022 after which the EAP received verbal response from the Mpumalanga DARDLEA on 13 May 2022 confirming that a Pre-Application Meeting was scheduled for 23 May 2022. The Pre-Application Meeting was undertaken in order to discuss and agree on various aspects prior to release of the Draft Scoping Report. The following points were discussed with the Mpumalanga DARDLEA:

- An overview of the proposed project;
- A description of the proposed project
- Findings of the National Web-Based Screening Tool Report;
- Discussion and confirmation on the specialist assessments and compliance statements to be undertaken;
- Discussion and confirmation on the approach towards the specialist reporting, including that of the Assessment Protocols (GN 320, dated 20 March 2020; and GN1150, dated 30 October 2020);
- Approach to the PPP;
- Identification of environmental sensitivities on site and Findings of the National Web-Based Screening Tool Report;

- Discussion and confirmation on the proposed project schedule and overall process for the Scoping and EIA, including the Cumulative Impact Assessment approach; and
- Points for clarification.

The Mpumalanga DARDLEA confirmed that a Public Participation Plan is not required for this project. Refer to Appendix F.1 of this Draft Scoping Report for a copy of the Agenda for the Pre-Application Meeting with Mpumalanga DARDLEA; Appendix F.2 for a copy of the presentation delivered at the Pre-Application Meeting and Appendix F.3 for a copy of the Pre-Application Meeting Notes. The Pre-Application Meeting Notes were submitted to the Mpumalanga DARDLEA via email on 1 June 2022 and approved by the Mpumalanga DARDLEA on 8 June 2022.

4.4.4 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; and (c) strategic integrated project as contemplated in the Infrastructure Development Act, 2014*".

The proposed Vhuvhili SEF project constitutes non-linear activities, and landowner consent is therefore required for the following land portions to be affected by this proposed Solar PV development:

Farm name	Farm No.	Farm Portion	SG code
GROOTVLEI	584	RE	T0IS00000000058400000
GROOTVLEI	293	23	T0IS00000000029300023
GROOTVLEI	293	18	T0IS00000000029300018
GROOTVLEI	293	20	T0IS00000000029300020
GROOTVLEI	293	21	T0IS00000000029300021
POVERTY ACRES	585	RE	T0IS00000000058500000
VLAKSPRUIT	292	21	T0IS00000000029200021
VLAKSPRUIT	292	22	T0IS00000000029200022

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 has been included as an appendix to the Application for EA, which is being submitted to the CA, together with the Draft Scoping Report for comment.

For the access road leading to the proposed Vhuvhili SEF, which will be upgraded and potentially widened, landowner consent is not legally required in terms of Regulation 39 of the 2014 NEMA EIA Regulations (as amended) as the access road constitutes a linear activity.

4.4.5 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 Processes (and advertising the EA Process 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 Processes. This was undertaken based on research. Appendix D of this Draft Scoping Report includes a copy of the I&AP Database, which includes 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 (Ward 5 of the Govan Mbeki Local Municipality);
- The municipality which has jurisdiction in the area (i.e. Govan Mbeki Local Municipality and Gert Sibande District Municipality);
- Relevant Organs of State that have jurisdiction in respect of any aspect of the activity; and
- Any other party as required by the Competent Authority.

The I&AP database contains, as a minimum, the Competent Authority (i.e. Mpumalanga DARDLEA); relevant state departments (e.g. DFFE), Department of Water and Sanitation (DWS), Department of Agriculture, Land Reform and Rural Development (DALRRD), Department of Mineral Resources and Energy (DMRE) etc.); relevant organs of state (e.g. Govan Mbeki Local Municipality and Gert Sibande District Municipality), Eskom SOC Ltd, etc.); as well as potential and registered I&APs (e.g. landowners, neighbours etc.).

The above stakeholders, Organs of State and I&APs will accordingly receive written notification of the commencement of the Scoping and EIA Processes, and the release of the Draft Scoping Report as well as Draft EIA Report for comment for the Vhuvhili SEF project.

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.

4.4.6 Site Notices

One specific mechanism of informing I&APs of the proposed project 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 English, Afrikaans and Zulu languages have been placed at the entrance of the key affected farm portions on which the proposed project will be constructed, as well as at the Secunda Library. Refer to Appendix E.1 of this Draft Scoping Report for a copy of the content of the site notice boards. Proof of placement of the site notice boards will be included in the Final Scoping Report.

Site notice boards will include the following, in compliance with Regulation 41 (3) of the 2014 NEMA EIA Regulations (as amended):

- The details of the proposed project that are subjected to public participation;
- Explanation that a Scoping and EIA procedure is applicable to the proposed Vhuvhili SEF;
- 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 project can be made.

4.4.7 Newspaper Advertisements

Regulation 41 (2) (c) of the 2014 NEMA EIA Regulations (as amended) requires the placement of a newspaper advertisement in one local newspaper or any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of the NEMA EIA Regulations.

In line with this, in order to notify and inform the public of the proposed project, to invite I&APs to register on the project database, as well as to inform I&APs of the release of the Draft Scoping Report for comment, the Scoping and EIA Processes will be advertised in a local newspaper, i.e., the ""Ridge Times" at the commencement of the 30-day comment period for the Draft Scoping Report. The content of the newspaper advertisement will comply with Regulation 41 (3) of the 2014 NEMA EIA Regulations (as amended) and will also include the details of the project website, where information available on the proposed project can be downloaded from. Refer to Appendix E.2 of this Draft Scoping Report for a copy of the content of the newspaper advertisements. Proof of placement of the newspaper advertisements will be included in the Final Scoping Report.

At this stage, there are no official Gazettes published specifically for the purpose of providing public notice of applications or other submissions made in terms of the 2014 NEMA EIA Regulations (as amended).

4.4.8 Technical Scoping with the Project Proponent and EIA Team

The scoping process has been designed to incorporate two complementary components: a stakeholder engagement process that includes the relevant authorities and wider I&APs; and a technical process involving the EIA team and the project proponent.

The purpose of the technical scoping process is to draw on the past experience of the EIA team and the project proponent to identify environmental issues and concerns related to the proposed project and confirm that the necessary specialist assessments have been identified. Most of the specialists have worked with the CSIR on several other projects, as well as having experience from EIAs for other renewable energy projects in the Mpumalanga province. The specialists were therefore able to identify issues (as shown in Chapter 6 of this Draft Scoping Report) to be addressed in the EIA Phase based on their experience and knowledge of the area and type of activity. Their inputs have informed the scope and Terms of Reference for the specialist assessments (as included in Chapter 7 of this Draft Scoping Report). The findings of the scoping process with input from the stakeholders and the authorities will inform the specialist assessments, which will only be completed after the 30-day public comment period on the Draft Scoping Report has been finalised.

4.4.9 Scoping Report Phase

In terms of Regulation 41 (6) of GN R326 the section below outlines the PPP for 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.

4.4.9.1 Review of the Draft Scoping Report

As noted above, the Draft Scoping Report for the proposed project is currently being released to I&APs, Stakeholders and Organs of State for a 30-day comment period. The section below summarises the PPP for the review of the Draft Scoping Report.

- **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 Processes and will be updated throughout the process.
- **Site Notice Boards:** As noted in Section 4.4.6 above, notice boards were placed for the proposed project at the project site and at the Secunda Library. A copy of the content of the notice boards is included in Appendix E.1 of this Draft Scoping Report. Proof of placement of the site notice boards will be included in the Final Scoping Report.
- **Advertisements to Register Interest:** As noted in Section 4.4.8 above, an advertisement will be placed in Afrikaans and English in a local newspaper, i.e., the "*Ridge Times*") at the commencement of the 30-day comment period for the Draft Scoping Report. A copy of the content of the newspaper advertisements is included in Appendix E.2 of this Draft Scoping Report. Proof of placement of the newspaper advertisements for the release of the Draft Scoping Report will be included in the Final Scoping Report.
- **Submission of the Application for EA and Draft Scoping Report to the Mpumalanga DARDLEA**: A hard copy of the Application Form for EA and a hard copy of the Draft Scoping Report will be submitted to the Mpumalanga DARDLEA via courier. Proof of submission of the Draft Scoping Report to the Mpumalanga DARDLEA will be included in the Final Scoping Report.
- **Letter 1 to I&APs (Release of the Draft Scoping Report for the Vhuvhili SEF):** Written notification of the availability of the Draft Scoping Report (i.e., Letter 1) will be sent to all I&APs, stakeholders and Organs of State included on the project database via email, where email addresses are available. This letter will be sent at the commencement of the 30-day review period on the Draft Scoping Report and will include information on the proposed project and notification of the release and availability of the report. Letter 1 will be written in English. Proof of email, as well as copies of the Letter 1 and emails sent will be included in the Final Scoping Report that will be submitted to the Mpumalanga DARDLEA for decision-making.
- **Text Messaging:** SMS texts will also be sent to all I&APs on the database, where cell phone numbers are available, to inform them of the proposed project and how to access the Draft Scoping Report.
- **Executive Summary of the Draft Scoping Report:** An Executive Summary of the Draft Scoping Report will be emailed to I&APs on the database Rand uploaded to the project website.
- **30-day Comment Period:** As noted above, potential I&APs, including authorities and Organs of State, will be notified via Letter 1, of the 30-day comment and registration period within which to submit comments on the Draft Scoping Report and/or to register on the I&AP database.
- **Broader Networks**: Where possible, the ward councillor (Ward 5) or Rate Payers Association will be contacted to request that they send notifications of the project as well as report availability and the Executive Summary via their local networks (such as WhatsApp groups, Neighbourhood Watch groups, other social media mechanisms, etc.).
- **Availability of Information:** The Draft Scoping Report is currently being made available for a 30-day comment period and is being distributed to ensure access to information on the project and to communicate the plan of study for the EIA Phase. The Draft Scoping Report will be 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 Scoping Report will also be uploaded to other alternative web-platforms such as Dropbox or Google Drive. If an I&AP cannot access the report via the project website, via the alternative web-platforms such as Dropbox or Google Drive, and if additional

information is required (other than what is provided in the Executive Summary), then the I&AP can contact the EAP, who will then make an electronic copy available (where feasibly possible).

- **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 review of the Draft Scoping Report will be included as an Appendix to the Final Scoping Report and in the Comments and Responses Report.

4.4.10 Compilation of Final Scoping Report for Submission to the Mpumalanga DARDLEA

Following the 30-day commenting period of the Draft Scoping Report and incorporation of the comments received into the report, the Final Scoping Report will be submitted to the Mpumalanga DARDLEA in line with Regulation 21 (1) of the 2014 NEMA EIA Regulations (as amended). A hard copy and electronic copy of the report will be submitted to the Mpumalanga DARDLEA via courier, as recommended by the Mpumalanga DARDLEA.

In line with best practice, I&APs on the project database will be notified via Letter 2 via email (where email addresses are available) of the submission of the Final Scoping Report to the Mpumalanga DARDLEA for decision-making. To ensure ongoing access to information, a copy of the Final Scoping Report that will be submitted for decision-making, will be placed on the project website (i.e. https://www.csir.co.za/environmental-impact-assessment). As a supplementary mechanism, the Final Scoping Report will also be uploaded to other alternative web-platforms such as Dropbox or Google Drive.

The Final Scoping Report that will be submitted for decision-making to the Mpumalanga DARDLEA will include proof of the PPP that was undertaken to inform Organs of State, Stakeholders and I&APs of the availability of the Draft Scoping Report for the 30-day review (as explained above).

The Mpumalanga DARDLEA will have 43 days (from receipt of the Final Scoping Report) to either a) accept the scoping report, with or without conditions, and advise the applicant to proceed with the tasks contemplated in the plan of study for EIA; or b) refuse EA (respectively in line with Regulation 22 (a) and (b) of the 2014 NEMA EIA Regulations, as amended). In line with best practice, I&APs on the project database will be notified via Letter 3 via email (where email addresses are available) of the outcome of the decision-making on the Final Scoping Report and commencement of the EIA Phase.

This step marks the end of the PPP for the Scoping Phase. The PPP for the subsequent EIA Phase is presented in the Plan of Study for the EIA i.e. Chapter 7 of this Draft Scoping Report.

4.5 Schedule for the Scoping and EIA Process

The proposed schedule for the Scoping and EIA Processes, based on the legislated EIA timeframes, is presented in Table 4.3. It should be noted that this schedule could be revised during the EIA Process, depending on factors such as the time required for decisions from authorities.

Table 4.3: Provisional Schedule for the proposed Vhuvhili SEF Project

Key Milestones	**Proposed Timeframe**
Project Initiation and Pre-Application Consultation with the Mpumalanga DARDLEA	23 May 2022
Prepare Draft Scoping Report and Plan of Study for EIA including specialist inputs for the Vhuvhili SEF EIA Project	April 2022 to June 2022
Submit Application Form to Mpumalanga DARDLEA for the Vhuvhili SEF EIA Project	Mid-June 2022
Release Draft Scoping Report for the Vhuvhili SEF EIA Project for 30 day commenting period	Mid-June 2022 to Mid-July 2022
Submit Final Scoping Report for the Vhuvhili SEF EIA Project to the Mpumalanga DARDLEA for Decision-Making	July 2022
Mpumalanga DARDLEA to Accept Final Scoping Report for the Vhuvhili SEF EIA Project or Refuse EA	**August/September 2022**
Specialist Assessments for the Vhuvhili SEF EIA Project	May 2022 to June 2022
Prepare Draft EIA Report for the Vhuvhili SEF EIA Project	June 2022 to September 2022
Release Draft EIA Report for the Vhuvhili SEF EIA Project for 30-day commenting period	End September 2022 to End October 2022
Submit Final EIA Report for the Vhuvhili SEF EIA Project to Mpumalanga DARDLEA for Decision-Making	End November 2022
Mpumalanga DARDLEA Decision-Making on the Final EIA Report and issue of Decision (i.e. grant or refuse EA): 107 days	**March 2023**
EAP to Notify I&APs of Decisions (14 days)	Within 14 days of Environmental Decision being issued: March/April 2023

DRAFT SCOPING REPORT

Draft Scoping Report for the proposed development of the Vhuvhili Solar Photovoltaic (PV) Facility near Secunda in the Mpumalanga Province.

CHAPTER 5:

Project Alternatives

ENERTRAG

CSIR
Touching lives through innovation

CONTENTS

TABLES

FIGURES

5. APPROACH TO THE ASSESSMENT OF ALTERNATIVES

This chapter discusses the alternatives that have been considered as part of the Scoping Phase, as well as the selection process of the preferred alternatives that will be considered and assessed 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 2 of the 2014 NEMA EIA Regulations (as amended) provides the following objectives, *inter alia*, of the Scoping Process in relation to alternatives:

- To identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks; and
- To identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment.

The Scoping Report is therefore required to provide a full description of the process followed to reach the proposed preferred activity and technology alternative, 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. It should be noted that an initial area of approximately 13 000 to 14 000 ha was considered for the

development of the proposed Vhuvhi SEF. Based on initial screening and sensitivities identified by ENERTRAG, an initial layout area of 3 115 ha was looked at, however the total initial area (14 000 ha) is still being investigated as part of this application. This will be further refined in the EIA process.

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 Vhuvhili Solar Energy Facility (SEF) and associated infrastructure that would generate up to 300 MW of power and have a footprint of approximately 650 hectares (ha). It should also be noted that the project footprint may be refined as part of the detailed specialist studies to be undertaken in the EIA phase. Hence, an updated, refined footprint may be presented in the EIA Report. 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 of up to 300 MW 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) (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 private off-taker agreement between ENERTRAG and Sasol, or the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) or similar bidding processes, will not be realised, and socio-economic contribution payments into the local community trust will not be realised;
- The development of a solar PV Facility at a time when coal fired power stations are reaching the end-of-life and being closed down, can directly contribute to South Africa's response to climate mitigation and our international commitments under the Paris Agreement;
- Wind and solar PV energy are the cheapest sources of new electricity generation in South Africa. This has been shown in national modelling conducted by CSIR and in the REIPPPP Bid Window 5 Preferred Bidder announcements on 28 October 2021. The development of the proposed Vhuvhili SEF can

contribute to Sasol's international competitiveness to produce Sustainable Aviation Fuel; or to the competitive nature of the REIPPPP (should it be entered into this bidding process) to drive prices down even further to ensure that South Africans have access to affordable yet clean electricity; and

- The local, national and international benefits associated with the production of Sustainable Aviation Fuels and Green hydrogen will not be realised. Sustainable Aviation Fuels[1] are predicted to become a highly tradable global commodity.

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 species of special concern (flora and fauna) 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 Vhuvhili SEF;
- No modification 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 artefacts or palaeontological resources will be impacted upon;
- No noise impacts associated with construction activities will occur;
- No avifaunal impacts will occur due to the establishment of the project;
- No bat impacts will occur due to the construction and operation of the proposed Vhuvhili SEF; and
- No additional water use will be required.

The no-go alternative will be considered further by the specialists during the EIA Phase. Some of the specialists have discussed the no-go alternative in the current Scoping Level Specialist Assessments captured in Appendix G of this Draft Scoping Report. It is important to note that none of the Scoping Level Specialist Assessments have identified any environmental fatal flaws, and overall the high-level Scoping Phase Impact Assessments (as captured in Chapter 6 of this Draft Scoping Report) have not resulted in any unacceptable residual impacts.

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 proposed Vhuvhili SEF) will not result in any additional negative environmental impacts in the area (besides the ongoing impacts of existing farming activities, such as grazing), it will also not have any positive community development or socio-economic benefits. In addition, it will not assist government building capacity to address the decarbonisation of the aviation sector and green hydrogen production. The no-go alternative will also impede the government in addressing climate change and reaching its set targets for

[1] **Sustainable aviation fuels** provide a large reduction of greenhouse gas emissions with little changes to current technology, as they are very similar in chemistry to traditional fossil jet fuel. They are therefore an alternative in that they are produced primarily from non-petroleum sources of hydrocarbons using a potentially broad range of biochemical and thermochemical conversion processes. The energy source is from renewable energy, the hydrogen can be sourced from water and the carbon can be sourced from biomass, waste, extracted from the air etc.

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 Scoping Process**.

5.1.2 Land-Use Alternatives

The Agricultural Assessment (Appendix G.1) states that the site is in a grain farming agricultural region, but the soils vary in their suitability for crop production. Because of the favourable climate and the potentially high grain yields, farmers in the area, and particularly the large-scale farmer on whose land the site is located, utilise all suitable soil for grain production. Only soil that is not suitable for grain production is used for cattle grazing. The long-term grazing capacity of the farm is high at 5 hectares per large stock unit.

Limitations that render the soil unsuitable for grain production are depth limitations due to rock or dense clay in the subsoil, and the limited drainage associated with the dense, poorly drained clay layers in the subsoil.

The study area has **moderate agricultural potential** predominantly because of favourable climatic conditions which favour grain production.

The footprint of the Vhuvhili SEF has been deliberately laid out so that it avoids the areas that have suitable soils and are therefore used for grain production. The grazing lands are rooigras (*Themeda triandra*) grasslands. Grass fields are burned or mowed from time to time. In addition, most of the farm portions on which the proposed Vhuvhili SEF is located, form only a small part of a much bigger farming operation that utilises many different farms with a total cropland of approximately 6000 hectares and cattle grazing of around 7000 to 8000 hectares (Lanz, 2022).

According to the National Web-based screening Tool, the study area is predominantly of medium agricultural sensitivity but includes some areas of high sensitivity. Findings from the Agricultural Agro-Ecosystem Specialist Assessment indicated that most of the areas identified as high sensitivity (i.e. crop land) by the Screening Tool are no longer or have never been used as cropland. Instead, as can be seen from photographs and the latest Google Earth image (please refer to the Agriculture Assessment in Appendix G.1), they are used for pasture. Therefore, these areas should not be classified as cropland or allocated high sensitivity because of it (Lanz, 2022).

The proposed development offers some positive impact on agriculture by way of an additional income stream to the landowners, as well as enhanced agricultural potential through improved security against stock theft and other crime and wider, societal benefits (Lanz, 2022). Based on this, the proposed Vhuvhili SEF project is viable and from the EIA process perspective, it is preferred. It is important to note that there are no flaws from an agricultural perspective and that the proposed Vhuvhili SEF project is not seen as a significant negative impact to the current farming practices on site.

The Agricultural specialist concluded in his report (Appendix G.1) that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. According to the land capability rating for the site, which includes a land capability value of 8, any solar facility will not

be within the allowable development limits. However, a land capability of 8 is disputed for the proposed agricultural footprint of the development, and the proposed Vhuvhili SEF is therefore within the allowable limits. The evidence for this is detailed in the Agricultural Assessment included in Appendix G.1 of this report.

5.1.3 Renewable Energy Alternatives

In terms of the type of activity, this relates to the generation of up to 300 MW of electricity from a renewable energy source, and in this particular case, from **solar** resources. ENERTRAG South Africa focuses on solar, wind and hydrogen technologies and works with landowners, technology providers, regulators and investors to source and develop renewable energy projects. In addition, the project will form an integral component of the proposed production of Sustainable Aviation Fuel at the Sasol Secunda Synfuels plant in Mpumalanga (should EA be granted) and contribute to the developing green hydrogen economy within South Africa. Therefore, the **generation of electricity from a renewable energy source** was the only activity considered by the Project Applicant, and thus considered in this Draft Scoping 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 renewable energy technologies such as Biomass, Hydro Energy, Wind Energy and Solar Energy. However, based on the preliminary investigations undertaken by the Project Applicant, **Solar PV development is the preferred technology alternative** and no other renewable energy technologies are deemed to be feasible for the study area. The unsuitability of other renewable energy technologies in the study area, and impacts of each, are discussed below.

5.1.3.1 Biomass Energy

The proposed project study area does not contain any abundant or sustainable supply of biomass. As indicated in Figure 5-1, the proposed project area has less than 5 500 t/a commercial forest residue and between 9 000 and 30 000 exploitable alien invasive plants, which are the among the lowest for both categories. Therefore, the study area does not have any viable 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.

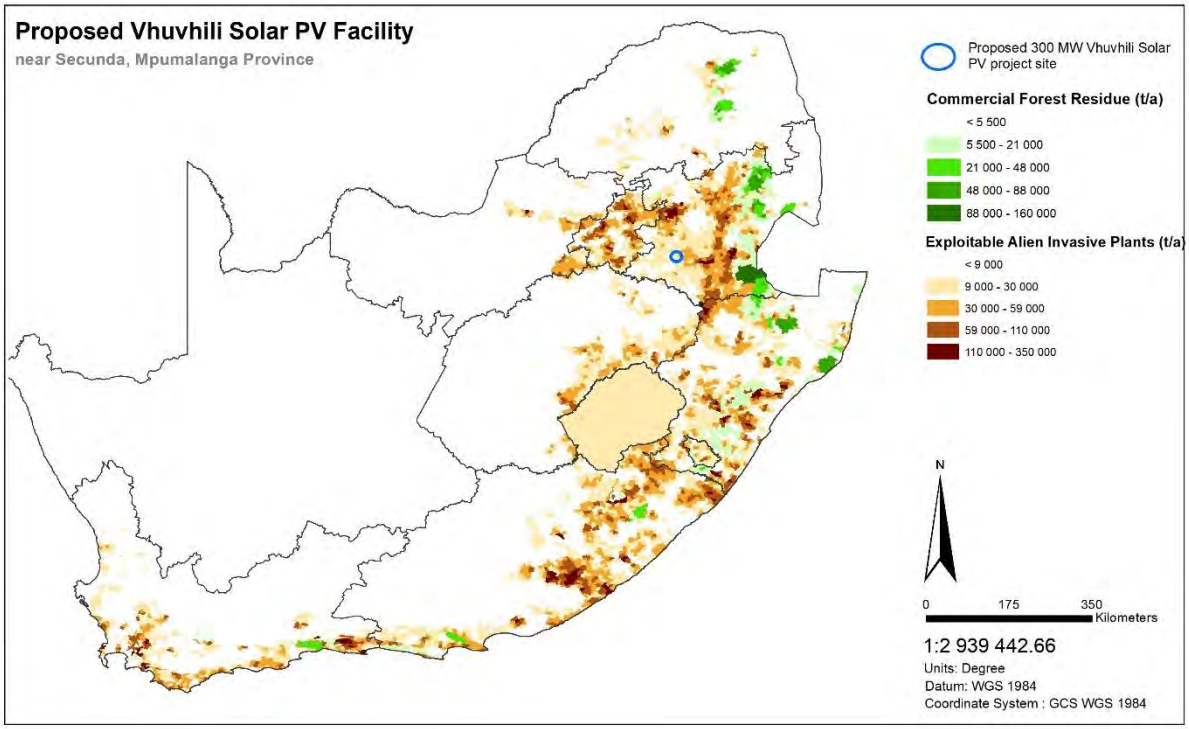


Figure 5-1: Biomass Potential in terms of Commercial Forest Residue and Exploitable Alien Invasive Plants. Note that the Vhuvhili SEF study area is depicted in red (Source: De Lange, 2013; Hugo, 2014).

5.1.3.2 Hydro Energy

The proposed project study area does not contain any large inland water bodies, nor suitable topography, which excludes the possibility of renewable energy from small- or large-scale hydro energy generation. In terms of micro hydropower potential (Figure 5-2), 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.**

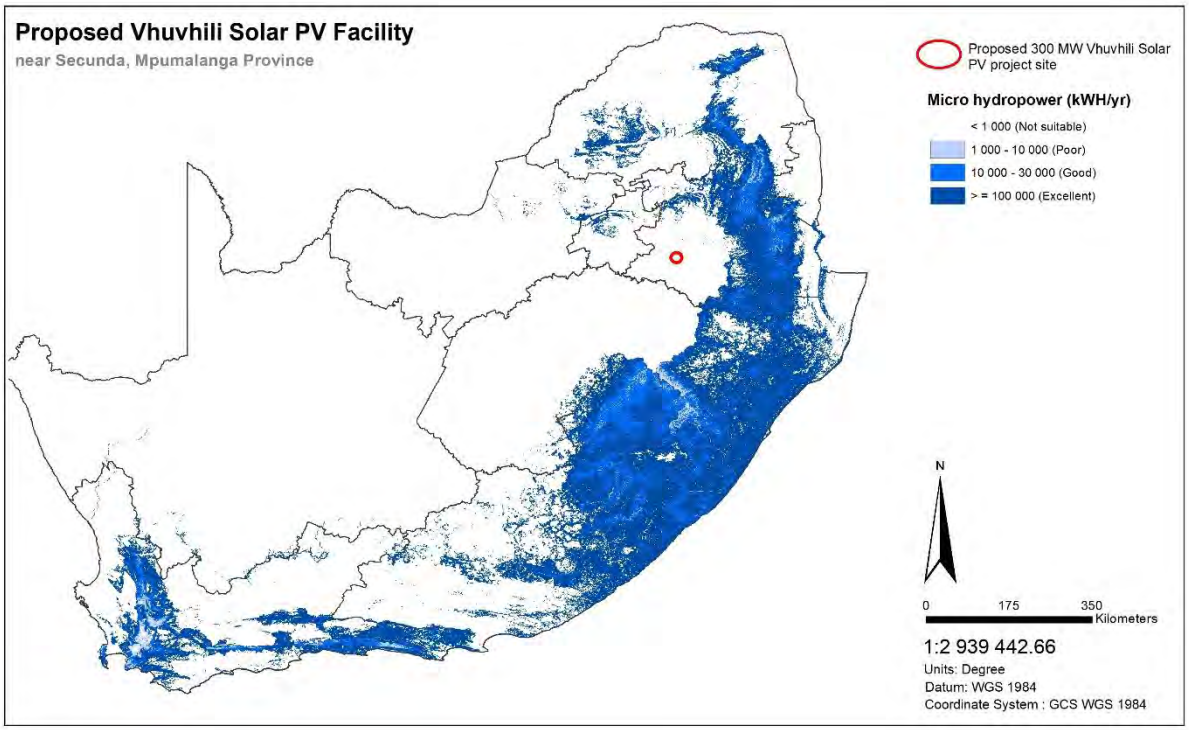


Figure 5-2: Micro Hydropower Potential (kWH/year). Note that the Vhuvhili SEF study area is depicted in red (Source: Eskom and CSIR, 1999).

5.1.3.3 Wind and Solar Energy

5.1.3.3.1 National Planning: Integrated Resource Plan (IRP) 2019

The 2019 IRP was published in Government Gazette 42784, Government Notice (GN) 1360 on 18 October 2019 for the period 2019 to 2030. As indicated in Figure 5-3 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 the Government Gazette of 18/10/2019).

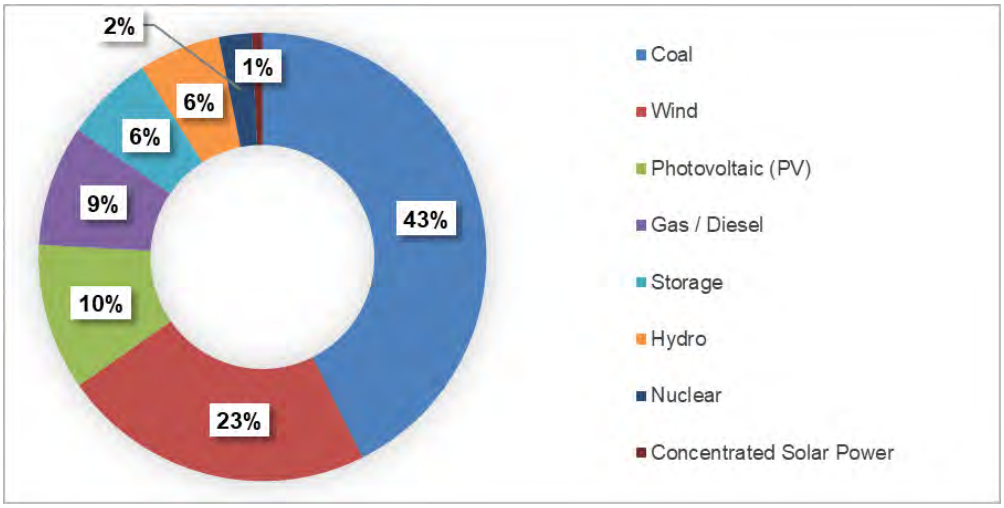


Figure 5-3: Total Installed Capacity for 2030 (% of MW) in the IRP of 2019.

The 2019 IRP proposes to secure 26 630 MW of renewable energy capacity by 2030 (for Wind, Solar PV and Concentrated Solar Power). This amount excludes Hydropower and Storage. Of this total, 1 474 MW of Solar PV, 1 980 MW of Wind and 300 MW of Concentrated Solar Power 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 Concentrated Solar Power 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 5-4 for additional information.

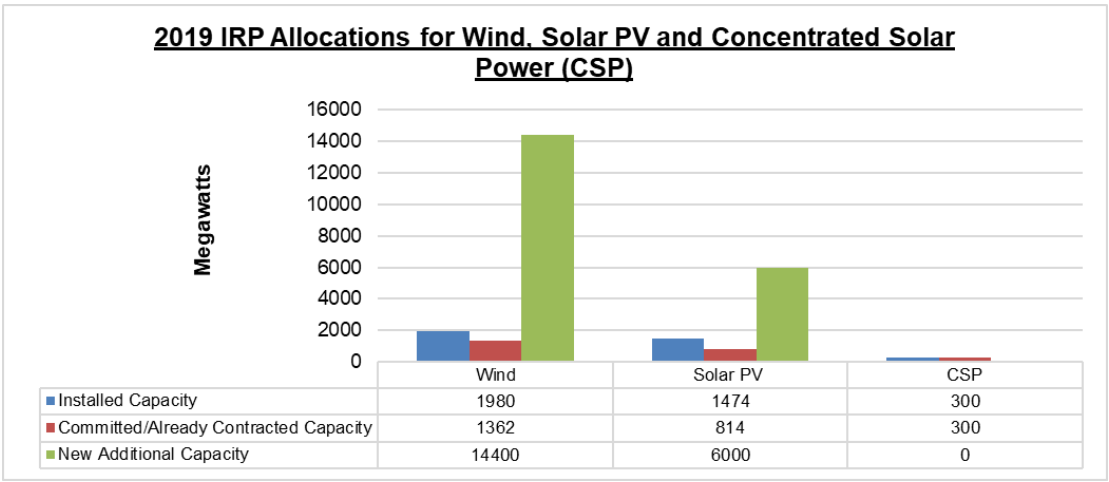


Figure 5-4: 2019 IRP Allocations for Wind, Solar and Concentrated Solar Power in MW.

As indicated in Chapter 1 and Chapter 2 of this Draft Scoping Report, the proposed Vhuvhili SEF has a generation capacity of up to 300 MW. It is intended for this project to supply the Sasol hydrogen electrolyser with renewable energy for the production of Sustainable Aviation Fuel (SAF) at the Sasol Secunda Synfuels plant in Mpumalanga. The capacity of the SAF production project at the Secunda Synfuels plant is expected to comprise of up to 500 MW of renewable energy (i.e. using wind and solar technology) and a 150 MW hydrogen electrolyser to produce approximately 60,000 t/a of SAF (please refer to Figure 1-

5 in Chapter 1). Should the proposed Vhuvhili SEF be acceptable and authorised, the facility will form one of two Renewable Energy Facilities which will feed into the hydrogen electrolyser at the Secunda Synfuels plant, contributing 300 MW of the required 500 MW.

Should the proposed Vhuvhili SEF not provide energy to Sasol, it is intended that it will be bid into a future bidding program such as the REIPPPP or another suitable tender process.

5.1.3.3.2 Wind Energy

In order to ensure that a Wind Energy Facility (WEF) 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 also 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 700 W/m^2 (Figure 5.5).

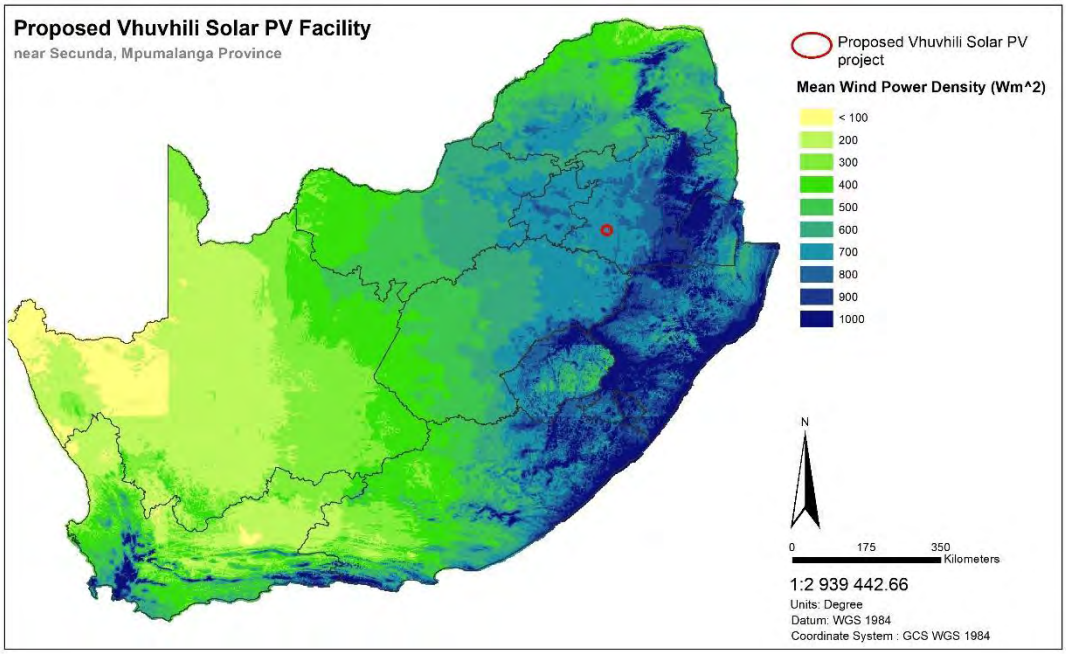


Figure 5-5: Annual Mean Wind Power Density for South Africa (W/m^2). Note that the Vhuvhili study area is depicted in red (Source: CSIR, 2018).

Overall, wind energy development can occur within this area but other localities in South Africa may be more favourable for such development. Site specific requirements for **Wind Energy Facility** however make this proposed project study area a **less feasible alternative** when compared to solar PV. **Therefore, the implementation of a WEF within the proposed project study area is not considered to be a feasible alternative to be assessed as part of this current Application for EA**.

5.1.3.3.3 Solar Energy

In terms of the suitability of solar energy development at this location, the proposed project area falls within the third **highest** Global Horizontal Irradiation[2] (GHI) category, relevant to PV installations (Figure 5-6). As indicated in this figure, the site for the proposed Vhuvhili SEF has a GHI between 1 900 – 2 000 kWh/m^2 in terms of the long-term yearly total.

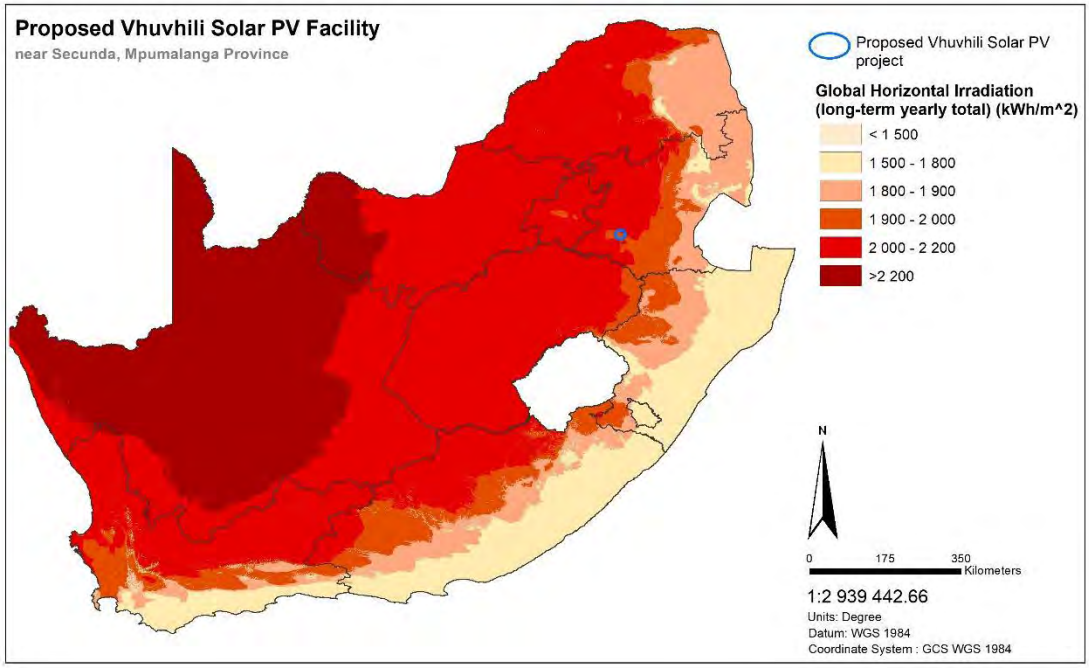


Figure 5-6: Solar Resource Availability for South Africa (kWh/m^2). Note that the Vhuvhili study area is depicted in blue (Source: CSIR, 2018).

Therefore, this area is deemed as one of the most suitable for the construction and operation of a SEF 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 5-6), which is not completely feasible for the proposed Vuvhili SEF project. Furthermore, as indicated in the earlier discussion on the outcomes of Bid Window 5 in October 2021, solar PV is currently the least cost energy generation option for South Africa. These factors substantiate that the use of solar resources in the area is extremely viable and support the development of Solar PV within the proposed project study area.

During the Screening Phase, ENERTRAG also commissioned an Agricultural Screening Assessment to determine the environmental suitability of the site for the development of Wind Energy Facility and/or Solar PV Facility, and to eliminate areas that are considered unsuitable from an agricultural perspective. The study was undertaken by Johann Lanz (dated August 2021), and it concluded the following in terms of Solar Energy development (Lanz, 2021):

[2] Global Horizontal Irradiance is the total amount of shortwave radiation received from above by a surface horizontal to the ground

- There is no land identified as Category 1 (i.e. Very high land capability (11-15); or irrigated land; or dryland horticulture or viticulture; Solar development is not permissible and would not be granted).
- The Vhuvhili site comprises of land comprising of different viability categories (i.e. Figure 5-7). However, there are fairly large contiguous pieces of land (up to about 300 ha) on which solar technology could potentially be developed from an agricultural approval point of view.

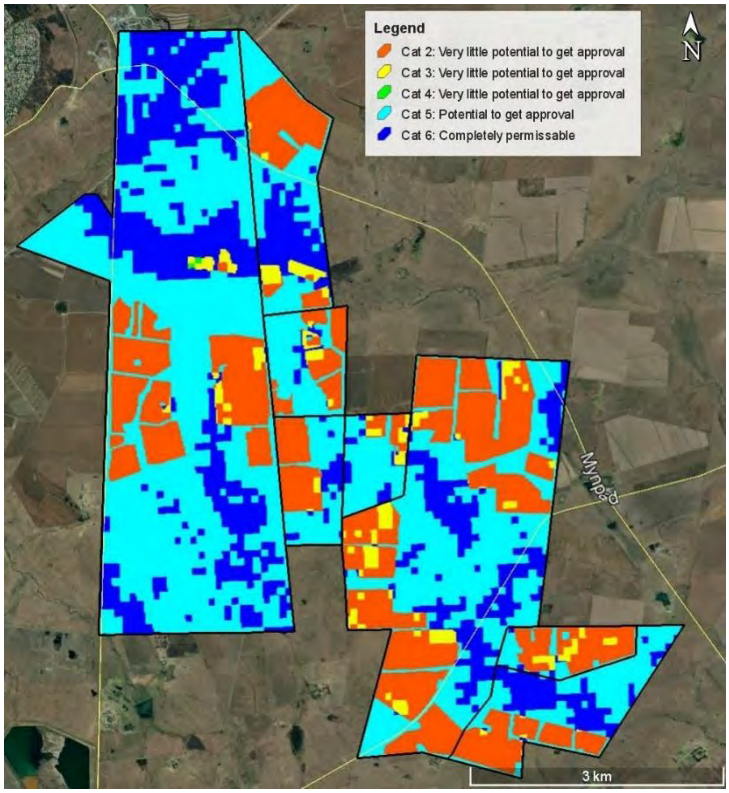


Figure 5-7: The distribution of different viability categories of the likelihood of achieving agricultural approval on land for solar development across the Vhuvhili SEF site (Source: Lanz, 2021).

Therefore, the implementation of a solar energy facility within the study area 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 Vhuvhili Solar PV Energy project is the most feasible and preferred Renewable Energy Alternative.

Furthermore, the detailed Agricultural Specialist Assessment confirmed that the areas identified during the Screening Phase as Category 2 land, indicated in Orange in Figure 5-7 above (i.e. All other cultivated land; Is not permissible and is highly unlikely to be granted) are no longer or have never been used as cropland, most of these land portions are used for pasture. The Agricultural specialist therefore recommended that most of the Category 2 land (with the exception of one land portion located near the western boundary of the proposed site) should not be allocated a Category 2 rating. Please refer to Appendix G.1 for the detailed Agricultural Specialist Assessment.

In addition, unlike opencast coal mining within the broader Mpumalanga coal area, the proposed Project facilitates multiple land use functions within the development area. As solar modules are clustered on surface developments this allows multiple land use functions such as operating the solar farm in tandem with underground coal mining. This will boost the economic activities in the area which will in turn increase job opportunities in that area and help improve the local community's welfare without jeopardizing the environment.

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.

5.1.3.3.4 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.

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 5 500 t/a commercial forest residue and less between 9 000 and 30 000 t/a exploitable alien invasive plants (which are the among the lowest for both categories).	▪ 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), lack of water and topography unsuitable.	▪ 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 development.	▪ No
Wind Energy	▪ Yes (approximately 700 W/m^2) but less economically	▪ Visual impacts as a result of construction activities and presence of turbines during operation;	▪ No

Type of Renewable Energy Alternative	Are suitable resources available at the proposed project site?	Main Potential Impacts and Risks	Is this the preferred Alternative?
	competitive than solar PV and other regions in South Africa have better wind resources.	▪ Noise generation as a result of construction activities and turbines during operation; ▪ Bird and bat collisions during the operational phase as well as mortalities to bats due to barotrauma. ▪ Blanket curtailment for all turbines from January to May each year to reduce the impact on vultures; ▪ Shut down on demand from June to December for vultures and raptors; ▪ Implementation of a system of carcass removal to ensure vultures are not attracted to the site; ▪ Impacts on aquatic ecology and terrestrial ecology; ▪ Impact on archaeology and palaeontology; and ▪ Impact on Civil Aviation due to nearby aerodromes.	
Solar Energy	▪ Yes – 1 900 – 2 000 kWh/m^2	▪ Visual impacts as a result of construction activities and the presence of PV panels during operation; ▪ Noise generation as a result of construction activities; ▪ Loss of agricultural land (i.e. grain farming and 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 Vhuvhili SEF.

The preferred site was selected based on national level considerations (high solar radiation levels) and various local factors as described below. It was selected based on national level considerations (i.e. high Horizontal Irradiation levels), close proximity to the Sasol Secunda Synfuels plant and to the Eskom substation (should the project be entered into the REIPPPP or similar bidding process) and various local factors as described below. Based on the initial screening and sensitivities identified by the Project Developer, this area was reduced to a total study area of approximately 3 115 ha.

The proposed affected farm portions for the development of the Vhuvhili SEF were selected as they were already heavily disturbed by agricultural and coal mining activities. Thus, preliminary investigations indicated that the development of these farms would have a minimal impact on the region's flora, fauna and water resources. Furthermore, from an impact and risk assessment perspective, the implementation of the Vhuvhili SEF at the **preferred site** will most likely result in fewer risks in comparison to its implementation at alternative sites within Mpumalanga (i.e. regions with similar GHI 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 solar facility 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 the Sasol Secunda Synfuels plant to enable connection to the proposed Green Hydrogen electrolyser. The further away a project is from the Synfuels plant, the higher the potential for significant environmental and economic impacts and the production of Sustainable Aviation fuels being unfeasible.
- There is no guarantee that other sites will be located close to existing or proposed electrical infrastructure 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.

5.1.4.1 Site Specific Considerations

As indicated above, the preferred site for the proposed Vhuvhili SEF extends over the following farm portions:

- Remainder of Grootvlei No.584;
- Portion 23 of Grootvlei No. 293;
- Portion 18 of Grootvlei No. 293;
- Portion 21 of Grootvlei No. 293;
- Portion 20 of Grootvlei No. 293;
- Remainder of Poverty Acres No. 585;
- Portion 21 of Vlakspruit No.292; and
- Portion 22 of Vlakspruit No.292.

On a site specific (local) level, the preferred site was deemed suitable due to all the site selection factors (such as land availability, environmental sensitivities, distance to the Sasol Secunda Synfuels plant and the

national grid, site accessibility, topography, current land use and landowner willingness) being favourable. The site selection criteria considered by ENERTRAG are discussed in detail below in Table 5.2.

Table 5-2: Site selection factors and suitability of the preferred site for the development of the proposed Vhuvhili SEF

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 the proposed Vhuvhili SEF is approximately 3 115 ha in extent. Therefore, sufficient land will be available for the development of the proposed Vhuvhili SEF.
Environmental Sensitivity	After a thorough evaluation of the regional farms, the specific farms were selected because they were already heavily disturbed by agricultural and coal mining activities. Thus, it was concluded that the development of these farms would have a minimal impact on the region's flora, fauna and water resources. The initial area assessed was approximately 13 000 to 14 000 ha for the development of proposed Vhuvhili SEF. Based on the initial screening and sensitivities identified by the Project Developer, this area was reduced to a total study area of approximately 3 115 ha. Other reasons for significantly reducing the area were due to large number of landowners to be engaged to secure land, the vast majority of the land was utilized for cultivation – as such the Project Developer did not want to negatively impact the agricultural land, and lastly the solar resource tended to be less attractive in other areas as compared to the area selected. Although the preferred site for the proposed Vhuvhili SEF 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 Draft Scoping 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 Project site was also selected on the availability of solar resource in the Mpumalanga region (i.e. Good to Very Good, between 1 900 – 2 000 kWh/m^2). The availability of the solar resource is the main drivers of project viability. The Project site was identified by the Project Developer through a desktop pre-feasibility analysis based on the estimation of the solar energy resource. 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 indirect benefits for the South African economy.
Distance to the proposed Hydrogen Electrolyser at the Sasol Secunda Synfuels plant	The proposed Vhuvhili SEF is located approximately 9 km east of the Hydrogen Electrolyser at the Sasol Secunda Synfuels plant. It is proposed that the proposed project would connect to the electrolyser directly or via a nearby third-party substation to aid in the production of Sustainable Aviation Fuels. The Electrical

Factor	Suitability of the Preferred Site
	Grid Infrastructure to connect the proposed Vhuvhili SEF to the grid at Sasol will undergo a separate Basic Assessment process.
Distance to and availability of the Grid	The Project is located adjacent to the Sasol Secunda to reduce the environmental, social, and financial impacts caused by long connection option. Long connection lines have vast environmental impacts as well as added increased costs from a development, construction and operational perspective. Thus, this Project site has ideal grid connection potential as the Project will connect to the planned step-down substation to be constructed at the Sasol Secunda plant, which is located approximately 15 km from the Project. Existing powerlines are located within close proximity to the site, allowing for potential direct connection to these existing lines where insufficient allocation may be available at the Sasol plant, or where Eskom planning indicate different future use should the project be bid in the REIPPPP. The proposed Vhuvhili SEF is located approximately 14 km East of the Eskom Sol Substation. Therefore, should the proposed SEF not be used in the production of Sustainable Aviation Fuels (as mentioned above), it is proposed that Vhuvhili SEF would connect to the Eskom Sol Substation, either directly or via a nearby third-party substation. The Electrical Grid Infrastructure to connect the proposed Vhuvhili SEF to the national grid will be subject to a separate Basic Assessment process. With regards to renewable energy facilities, there is minimal competition in the area. Should the project proceed, it will be the one of the first commercial scale solar PV facilities in the province and will act as one of the pioneering developments and open opportunities for other renewable developments. It will also serve as a case study for solar resource in the province, showing that commercially viable solar energy facilities are suitable for certain parts of Mpumalanga Province.
Site Accessibility	The Project site can be accessed easily via the tarred N17 national roads which run along the northern boundary of the site. There are existing roads that go through the land parcels to allow for direct access to the project development area. Based on an access investigation conducted for the site by the Traffic Specialist (Wink, 2021), two site access points are recommended for the site. The access points are proposed off the gravel sections of the D823 and D619 road. The access points are located off existing gravel access roads thus access spacing restrictions are not envisaged. Sight lines along the access points are within the recommended limits. The final site access points will be based on the access investigation findings, geometric considerations and site layout restrictions. The existing gravel road will be widened and upgraded for the proposed project, with

Factor	Suitability of the Preferred Site
	an upgraded width ranging up to approximately 10 m. Exact specifications of the widening and upgrading of the farm gravel road will be confirmed during the detailed design phase. Internal roads will also be constructed within the footprint of the PV Facility. The internal roads are expected to be composed of gravel and will extend approximately 4 to 5 m wide. The total internal road length may vary slightly, depending on the final design.
Topography	The Scoping Level Visual Impact Assessment (Appendix G.6 of this Draft Scoping Report) notes that the broader area surrounding the proposed is characterised by relatively flat to slightly undulating terrainwhich is suitable for the development of a solar project. Areas of slightly higher elevation occur along the south-eastern boundary of the study area. Slopes across the study area are relatively gentle to moderate, with steeper slopes being largely associated with the more incised river valleys. Average gradients across the study area are generally between 1:50 – 1:20. The proposed Vhuvhili SEF site is located on the flattest ground near the Sasol facility and thus in combination with suitable solar resource within the study area is optimized from a construction and technical perspective.
Current Land Use	Agriculture - the wider study area is mainly used for grain cultivation and livestock grazing and the current site extent for the project is limited to grazing areas.
Landowner Willingness	The landowners have signed letters of consent for the use of the land for the proposed project (should 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 Vhuvhili SEF project being undertaken on the affected farm portions).

Furthermore, one of the main determining points for the Project Developer was to find suitable, developable land in one contiguous block to (i) consolidate and optimize design, (ii) minimize construction and operational costs, and (iii) minimize sprawling development and limit the impact footprints. In addition, the proximity of the proposed Vhuvhili SEF to the Sasol Secunda Synfuels plant and the Eskom Sol Substation was also a major determinant for identifying a suitable site for the proposed development. Further motivation for the proposed project is provided in Chapter 1 of this Draft Scoping Report.

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 SEA[3] 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 project, 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 Facility 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 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 Vhuvhili SEF is located approximately 29 km away (at its closest point) from the Emalahleni REDZ (i.e. REDZ 9). In addition, the proposed Vhuvhili SEF is located approximately 34 km away (at its closest points) from the International Strategic Transmission Corridor (as gazetted on 16 February 2018 in GN 113). While the proposed Vhuvhili SEF is not located within the Emalahleni REDZ or International Strategic Transmission Corridor, the proposed project 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 as well the development of the Green Hydrogen economy in South Africa.

Given the site selection requirements associated with the solar energy facility and the suitability of the land available on the **preferred site**, and the fact that no initial fatal flaws are present on the site, **no other site alternatives were considered as part of this Scoping and EIA Process. Therefore, the site for the Vhuvhili SEF is therefore deemed feasible and selected as the preferred site.**

5.1.5 Location Alternatives – Development Footprint within the Preferred Site

The 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 and illustrated in Figure 5-8.

As an initial step, the Project Developer consulted the National Web-Based Environmental Screening Tool (https://screening.environment.gov.za/screeningtool/#/pages/welcome) to determine a baseline description of the prevalent environmental sensitivities within the proposed preferred project site. An initial study area of approximately 13 000 to 14 000 ha was considered by the Project Developer for the development of the proposed Vhuvhili SEF. Subsequent research and consultation with the affected landowners was then also undertaken in order to identify possible areas within the initial study area that should be excluded from development. This then guided the selection of the best suitable study area to be assessed by the specialists from an environmental sensitivities and practical/technical perspective. The

[3] More information on the SEA can be accessed at https://redzs.csir.co.za

study area that was subjected to specialist assessment for purposes of this S&EIA Process comprises the aforementioned affected farm portions (see Section 5.1.4.1) and covers approximately 3 115 ha.

As discussed above, ENERTRAG then commissioned an Agricultural Screening Assessment to determine any high-level no-go areas and the suitability of the site.

ENERTRAG then determined the **Original Scoping Buildable Area** based on the sensitivities identified in the Screening Study. Following this, the Environmental Assessment Practitioner (CSIR) and Specialists were appointed by ENERTRAG to undertake the Scoping and EIA Processes for the proposed Vhuvhili SEF. The specialists then undertook the Scoping Level Specialist Assessments (included in Appendix G of this Draft Scoping Report), and site verifications, where necessary. The specialists assessed the full extent of the preferred site (i.e. approximately **3 115 ha**), which serves as the **Study Area** for this Scoping and EIA Process. The Scoping Level Specialist Assessments resulted in the determination and verification of environmental sensitivities present on the preferred site.

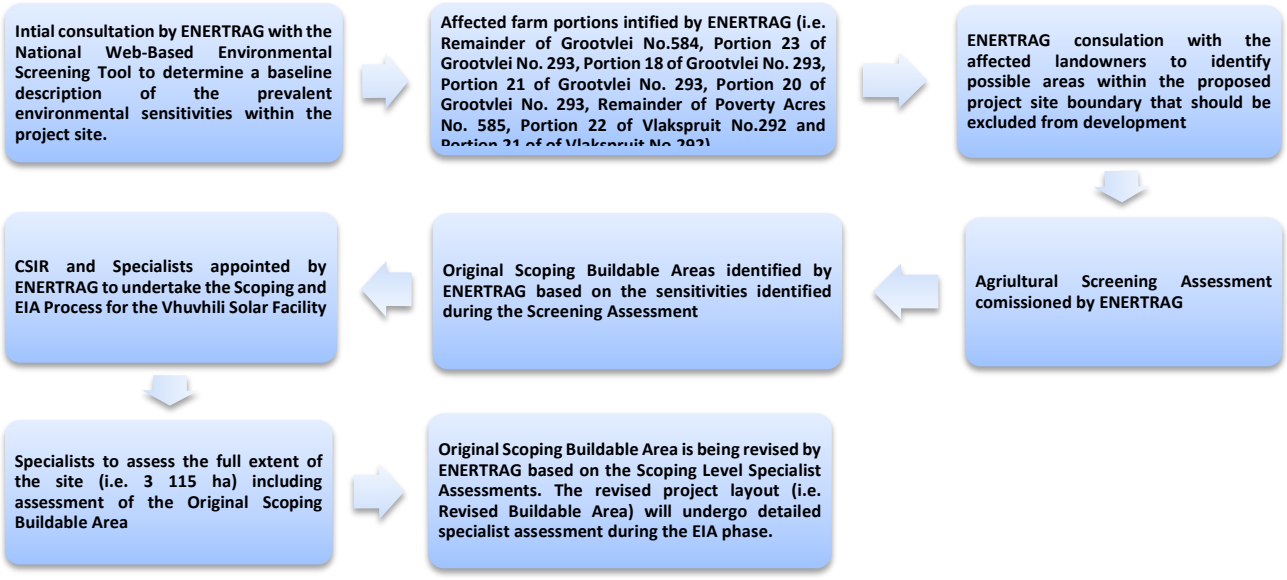


Figure 5-8: Process flow for the identification of the Preferred Site and Development Footprint

Based on these Scoping Level Specialist Assessments, a development footprint area was proposed for the development of the proposed Vhuvhili SEF. The development footprint area will be further refined in the EIA phase. An environmental sensitivity map has been produced (included as Figure 3-99 of Chapter 3 of this Draft Scoping Report). This map shows the no-go sensitive environmental features found within the preferred site, as described in the Scoping Level Specialist Assessments (Appendix G) and discussed in Chapter 3 of this Draft Scoping Report. 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. The sensitivity map will be further refined in the EIA phase.

The sensitivities identified and verified by the specialists during the scoping phase will be used to develop the Revised Buildable Area (or the revised development footprint area) which will be included and assessed

by the specialists in the EIA phase. During the EIA Phase, the specialists will, based on their impact assessment of the proposed development footprint of the Vhuvhili SEF following the Scoping Phase, refine their sensitivity mapping of the proposed project layout with recommendations regarding micro-siting and selection of infrastructure location alternatives, as well as required mitigation measures and management actions. As a result, the preferred project layout of the proposed Vhuvhili SEF within the identified development footprint area will be determined, whereby any sensitive features identified and confirmed by the specialist impact assessments, will be avoided, remedied or mitigated by the proposed project layout. The layout will therefore be further refined in the EIA phase.

Although all existing access roads will be utilised for the proposed project, the planned internal road network, including all additional access service roads to be constructed, will be confirmed as part of the project layout, and will be assessed by the specialists during the EIA Phase.

5.1.5.1 Project Infrastructure Location Alternatives

Various infrastructure alternatives are being considered and will be assessed in this S&EIA Process. This includes alternative locations for the substation hubs, as well as alternative technologies for the Battery Energy Storage Systems (BESS).

- **Substation Complex**

The proposed project will also include a substation and BESS complex on site. The on-site substation and BESS complex will extend approximately up to 10 ha and will have a height of up to 10 m.

The capacity of the proposed substation varies according to the detailed design and requirements from potential clients. A transformation capacity of 200 - 250 MVA is assumed, and generally stepped up from 22 kV or 33 kV to 132 kV for connection to the Eskom grid (or to the Sasol grid via the proposed 150 MW Hydrogen electrolyser). It is estimated that the on-site substation will have a 200 - 250 MVA transformation capacity and will generally step up from 22 kV or 33 kV to 132 kV for connection to the national grid.

The on-site substation and BESS complex will comprise the following components:

- On-site Independent Power Producer (IPP) or Facility Substation (+-2 ha). This will include the relevant section that will be maintained by the IPP or the Project Developer; and/or
- Switching Station and Collector Station (+-2 ha); and/or
- BESS (+-5 ha).

Two potential location alternatives for the substation and BESS complex have been identified at the proposed Vhuvhili SEF project site. These are listed below:

- Substation and BESS complex (preferred alternative) is located on Remainder of the Farm Grootvlei No. 584.
- Substation and BESS complex (Alternative 1) is located on Portion 20 of the Farm Grootvlei No. 293.

Substation and BESS (Alternative 1) was ruled out by the Project Developer as a viable alternative during the Scoping Phase. Therefore, Alternative 1 will not be taken forward for further assessment by the specialists in the EIA Phase.

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. Due to the scarcity of water in the proposed project area and the large volume of water required for Concentrated Solar Power (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 for the proposed Vhuvhili SEF.

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 for 2019, 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 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); Fixed Axis Tracking (aligned east-west); Dual Axis Tracking (aligned east-west and north-south); Fixed Tilt Mounting Structure or Bifacial Solar Modules.

5.1.6.3 Battery Energy Storage Systems

It is proposed that Lithium Battery Technologies, such as Lithium-Ion Phosphate, Lithium Nickel Manganese Cobalt oxides or Vanadium Redox flow technologies will be considered as the preferred battery technology, however, the specific technology will only be determined following Engineering, Procurement and Construction (EPC) procurement. As indicated in Chapter 2 of this Draft Scoping Report, Lithium-Ion BESS and Redox Flow BESS technologies have been considered by ENERTRAG for the proposed project during the Scoping Phase. ENERTRAG considered the advantages and disadvantages of Lithium-Ion BESS and Redox Flow BESS technologies (Table 5-3). Refer to Appendix G.5 of this Draft Scoping Report for a High-Level Safety, Health and Environment Risk Assessment Scoping Input Report, which provides high level information on the safety, health and environmental risks of the BESS technology.

Table 5-3: Advantages and disadvantages associated with the BESS technologies that were considered for the proposed Vhuvhili Solar Energy Facility (Sources: Parsons, 2017; Zhang *et al.*, 2016)

BESS technologies being considered	Advantages	Disadvantages
Lithium-ion BESS	▪ Sealed 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. ▪ Does not require active cooling unlike other BESS technologies. ▪ 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.
Redox Flow Batteries (RFB): Vanadium-Vanadium Redox Flow Battery (VRFB)	▪ RFBs are self-discharging systems therefore generally require little maintenance. However, RFBs are more difficult to install, i.e. formal brick and mortar structures, and will potentially require many permanent staff. ▪ High economic efficiency as 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.

5.2 Summary of Legislative Requirements for the Assessment of Alternatives

As noted in Chapter 1 of this Scoping 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 5.4 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 5.4 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 5-4: Requirements for the consideration of Alternatives based on the 2014 NEMA EIA Regulations (as amended)

	Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended)	Response from EAP
1	Appendix 2 – 2 – 1 – g – (i)	2. (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: (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;	Refer to Sections 5.1, 5.2 (i.e. this section) and 5.3 of this chapter which provides a description of the process that led to the identification of the preferred alternatives and which alternatives will be taken further into the EIA Phase for assessment.
2	Appendix 2 – 2 – 1 – g – (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 Draft Scoping Report and Appendix E, which details the process followed in terms of Public Participation and includes the supporting documentation.
3	Appendix 2 – 2 – 1 – g – (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;	This will be completed following the release of the Draft Scoping Report for comment.
4	Appendix 2 – 2 – 1 – g – (iv)	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Refer to Section 5.1.3 and 5.1.4 of this chapter for a description of the environmental sensitivities associated with the **preferred site** (i.e. Remainder of Grootvlei Farm No.584, Portion 23 of Grootvlei Farm No. 293, Portion 18 of Grootvlei Farm No. 293, Portion 20 of Grootvlei Farm No. 293, Portion 21 of Grootvlei Farm No. 293, Remainder of Poverty Acres No. 585, Portion 21 of Vlakspruit Farm No.292 and Portion 22 of of Vlakspruit No.292).

	Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended)	Response from EAP
			Section 5.1.4 of this chapter also provides information on environmental attributes that were considered in the selection of the preferred site for the proposed Vhuvhili SEF. Chapter 3 of this Draft Scoping Report also includes a description of the wider affected environment.
5	Appendix 2 – 2 – 1 – g – (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; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	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 will be unpacked during the EIA Phase. 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 Scoping Report. This chapter includes a high-level assessment of impacts and risks of the proposed Vhuvhili SEF at the preferred site and location of the development footprint within the 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.

	Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended)	Response from EAP
			Furthermore, various technologies for the BESS have been considered and assessed in terms of impacts and risks in the Scoping Phase. It is proposed that Lithium Battery Technologies, such as Lithium-Ion Phosphate, Lithium Nickel Manganese Cobalt oxides or Vanadium Redox flow technologies will be considered as the preferred battery technology, however, the specific technology will only be determined following EPC procurement.
6	Appendix 2 – 2 – 1 – g – (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 7 of this Draft Scoping Report for the impact assessment methodology that was used in the assessment of impacts captured in Chapter 6. The same impact assessment methodology will be used in the EIA Phase and as such has only been mentioned once in the Scoping Report.
7	Appendix 2 – 2 – 1 – g – (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 and location of the development footprint within the site is captured in Chapter 6 of this Draft Scoping Report. This chapter includes a high-level assessment of impacts and risks of the proposed Vhuvhili SEF at the preferred site and location of the development footprint within the site.
8	Appendix 2 – 2 – 1 – g – (viii)	(viii) the possible mitigation measures that could be applied and level of residual risk;	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 Draft Scoping Report. This chapter includes a high-level assessment of impacts and risks of the

	Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended)	Response from EAP
			proposed Vhuvhili SEF at the preferred site and location of the development footprint within the site.
9	Appendix 2 – 2 – 1 – g – (ix)	(ix) the outcome of the site selection matrix;	Refer to Section 5.1.4 and Section 5.1.5 of this chapter for information on the process that led to the identification of the preferred site.
10	Appendix 2 – 2 – 1 – g – (x)	(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.
11	Appendix 2 – 2 – 1 – g – (xi)	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Refer to Section 5.3 of this chapter for a concluding statement.

5.3 Concluding Statement of Preferred Alternatives

As per Appendix 2, Section 2 (1) (g) (xi) of the 2014 NEMA EIA Regulations (as amended), and based on Section 5.1 above, the following alternatives or preferred alternatives will be taken forward into the EIA Phase for further assessment:

- **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 Vhuvhili SEF. This alternative would result in no environmental impacts (positive and negative) on the site or surrounding local area, as a result of the proposed Vhuvhili SEF. It will provide a baseline 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 Scoping Phase, the no-go alternative is not preferred**.

- **Land-Use Alternative:**
    - The current land-use is agriculture, specifically grain farming and cattle grazing. The study area has **moderate agricultural potential** predominantly because of favourable climatic conditions which favour grain production. The footprint of the Vhuvhili SEF has been deliberately laid out so that it avoids the areas that have suitable soils and are therefore used for grain production.

      Findings from the Agricultural Agro-Ecosystem Specialist Assessment indicated that most of the areas identified as high sensitivity (i.e., crop land) by the Screening Tool are no longer or have never been used as cropland. Instead, as can be seen from photographs and the latest Google Earth image (please refer to the Agriculture Assessment in Appendix G.1), they are used for pasture. Therefore, these areas should not be classified as cropland or allocated high sensitivity because of it (Lanz, 2022). In addition, most of the farm portions on which the proposed Vhuvhili SEF (covering approximately 650 hectares) is located, form only a small part of a much bigger farming operation that utilises many different farms with a total cropland of approximately 6000 hectares and cattle grazing of around 7000 to 8000 hectares. It should also be noted that the project footprint may be refined as part of the detailed specialist studies to be undertaken in the EIA phase. Hence, an updated, refined footprint may be presented in the EIA Report.

      The proposed development offers some positive impact on agriculture by way of an additional income stream to the landowners, as well as enhanced agricultural potential through improved security against stock theft and other crime and wider, societal benefits (Lanz, 2022). Based on this, the proposed Vhuvhili SEF project is viable and from the EIA process perspective, it is preferred. It is important to note that there are no flaws from an agricultural perspective and that the proposed Vhuvhili SEF project is not seen as a significant impact to the current farming practices on site.

- **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 Draft Scoping Report. **No other activity types were considered or deemed appropriate** based on the expertise of the Applicant.

- **Renewable Energy Alternatives:**
  - Given the above, the development of Solar PV is the preferred and only renewable energy technology to be developed on site because the site has a **good to very good solar resource availability** (i.e. GHI of between 1 900 – 2 000 kWh/m^2 in terms of the long-term yearly total) and the **local conditions are favourable**.
  - In addition, **Hydro Power and Biomass Energy** are deemed **unsuitable**.
  - The study area does have wind resources (i.e. 700 W/m^2), however other sites might have better wind resources.

- **Preferred Site and Development Footprint within the site:**
  - The preferred site for the proposed Vhuvhili SEF comprises the following farm portions which cover a combined footprint of approximately 3 115 ha, which serves as the study area for this Scoping and EIA Process:
    - Remaining Extent (RE) of the Farm Grootvlei No. 584 (SG Code: T0IS00000000058400000);
    - Portion 23 of Farm Grootvlei No. 293 (SG code: T0IS00000000029300023);
    - Portion 18 of Farm Grootvlei No. 293 (SG code: T0IS00000000029300018);
    - Portion 20 of Farm Grootvlei No. 293 (SG code: T0IS00000000029300020);
    - Portion 21 of Farm Grootvlei No. 293 (SG code: T0IS00000000029300021);
    - RE of Farm Poverty Acres No. 585 (SG code: T0IS00000000058500000);
    - Portion 21 of Farm Vlakspruit No. 292 (SG code: T0IS00000000029200021); and
    - Portion 22 of Farm Vlakspruit No. 292 (SG code: T0IS00000000029200022
  - The development footprint within the preferred site was determined based on the initial Screening Studies undertaken by Lanz (2021). This led to the identification of the Original Scoping Buildable Area within the preferred site. Furthermore, a screening and site verification exercise of the study area was undertaken by the specialist team during this Scoping Phase. The Scoping Level Specialist Assessments are included in Appendix G of this Draft Scoping Report.
  - The preferred project layout will be confirmed following the input from the various specialists during the EIA Phase.

- **Project Infrastructure Location Alternatives**
  - Two possible locations for the substation complex have been considered in the Scoping Phase by the Project Proponent. However, the Alternative 1 Substation was ruled out as

a feasible alternative and will therefore not be taken forward for further assessment by the specialists in the EIA Phase.

- **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.
  - It is proposed that Lithium Battery Technologies, such as Lithium-Ion Phosphate, Lithium Nickel Manganese Cobalt oxides or Vanadium Redox flow technologies be considered as the preferred battery technology, however, the specific technology will only be determined following Engineering, Procurement and Construction (EPC) procurement.:
  - These different BESS technologies will therefore be taken forward for further assessment by the in the BESS Risk Assessment to be undertaken by ISHECON in the EIA phase.

DRAFT SCOPING REPORT

Draft Scoping Report for the proposed development of the Vhuvhili Solar Photovoltaic (PV) Facility near Secunda in the Mpumalanga Province.

CHAPTER 6:

Issues and Potential Impacts

ENERTRAG

CSIR
Touching lives through innovation

CONTENTS

TABLES

6. ISSUES AND POTENTIAL IMPACTS

The purpose of this chapter is to present a synthesis of the key issues and potential impacts that have been identified thus far as part of the Scoping Process. These issues and impacts have been identified via the environmental status quo of the receiving environment (environmental, social and heritage features present on site) (discussed in Chapter 3 of this Draft Scoping Report), a review of environmental impacts from other similar solar energy projects, and scoping inputs from the specialists that form part of the project team (which are included in Appendix G of this Draft Scoping Report). The Terms of Reference (ToRs) for the Specialist Assessments that have been deemed necessary, based on the relevant issues and impacts discussed within this chapter, are incorporated into the Plan of Study for the EIA (PSEIA) that is discussed in Chapter 7 of this Draft Scoping Report. It is emphasised that this chapter and the Scoping Report in general provide preliminary impacts, sensitivities and impact significance ratings which will be updated and finalised, as relevant, and presented in more detail in the detailed Specialist studies and in the EIA Report.

6.1 Key Issues

The proposed Vhuvhili SEF will result in a number of actions that will arise in the construction, operational and decommissioning phases of the project and include inter alia:

- Possible levelling of topographic features;
- Some clearance of vegetation;
- Establishment of hard panned roadways and related surfaces;
- Excavation and construction of structures;
- Establishment of transformers and on-site substations;
- Establishment of solar panel arrays;
- Cabling at a sub-surface level;
- Fencing of the site; and
- Other supportive infrastructure.

The construction phase is a relatively short-term undertaking, although “intensive” in terms of the rapid physical changes that arise on site. The operational phase is more benign in nature, with limited staff and minor activity in and around the proposed projects.

6.2 Summary of Key Issues from the Scoping Level Inputs

The issues and impacts presented in this section have been identified based on the scoping level assessments. These issues are further described in the impact assessment tables in this Chapter (sub-sections below) and will also be assessed in further detail during the EIA Phase through the specialist assessments, however, they have been summarised below in Table 6.1 for ease of reference. It must be noted that additional issues may be raised during the Scoping Phase, which could potentially be assessed during the EIA Phase.

Table 6.1: Summary of the Issues and Impacts from the Scoping Phase per Specialist Theme

Specialist Assessment / Input	Key issues to be addressed
Agriculture and Soils	**Construction Phase:** ▪ Loss of agricultural potential by occupation of land. ▪ Loss of agricultural potential by soil degradation. **Operational Phase:** ▪ Agricultural potential enhancement through increased financial security for farming operations *(positive impact).* **Decommissioning Phase:** ▪ Agricultural potential loss by soil degradation.
Aquatic Biodiversity and Species	**Construction, Operational and Decommissioning Phases:** ▪ Alteration in flow regime. ▪ Changes in sediment regimes. ▪ Introduction and spread of alien vegetation. ▪ Loss and disturbance of riparian/watercourse habitat and vegetation. ▪ Alteration in water quality due to pollution. ▪ Loss of aquatic biota.
Terrestrial Biodiversity and Species	**Construction Phase:** ▪ The clearing of natural vegetation. ▪ The loss of threatened, protected, CITES listed and/or endemic plants/animals. ▪ Loss of faunal habitat. ▪ Direct faunal mortalities due to construction and increased traffic. ▪ Increased dust deposition. ▪ Increased human activity, noise and light levels. ▪ Establishment of alien vegetation. ▪ Increased water run-off and erosion. ▪ Changes in animal behaviour. **Operational Phase:** ▪ Direct faunal mortalities. ▪ Establishment of alien vegetation. ▪ Increased water run-off and erosion. ▪ Changes in animal behaviour. **Decommissioning Phase:**

Specialist Assessment / Input	Key issues to be addressed
	▪ Establishment of alien vegetation. ▪ Increased water run-off and erosion.
Avifauna Impact Assessment	**Construction Phase:** ▪ Displacement due to disturbance and habitat transformation associated with the construction of the solar PV plants and associated infrastructure. **Operational Phase:** ▪ Displacement due to habitat transformation associated with the presence of the solar panels. ▪ Collisions with the solar panels. ▪ Entrapment in perimeter fences. ▪ Electrocutions in the onsite substations. **Decommissioning Phase:** ▪ Displacement due to disturbance associated with the decommissioning of the solar PV plants and associated infrastructure.
Heritage Impact Assessment (including Archaeology and Cultural Landscape)	**Construction Phase** ▪ Potential impacts on archaeological remains. ▪ Potential impacts on graves. ▪ Potential impacts on the cultural landscape. **Operational Phase** ▪ Impacts to the cultural landscape. **Decommissioning Phase** ▪ Impacts to the cultural landscape.
Palaeontology Impact Assessment	**Construction and Decommissioning Phases:** ▪ Damage and/or destruction of scientifically valuable fossils preserved at or beneath the ground due to surface clearance or excavations. **Operational Phase:** Note: No impacts identified for the Operational Phase.
Socio-Economic Assessment	**Construction Phase:** ▪ Creation of employment and business opportunities during the construction phase, and the opportunity for skills development and on-site training. ▪ Potential impacts on family structures and social networks associated with the presence of construction workers. ▪ Potential impacts on family structures, social networks and community services associated with the influx of job seekers. ▪ Potential risk to farmers and farm workers, livestock and damage to farm infrastructure associated with the presence and activities of construction workers on site.

Specialist Assessment / Input	Key issues to be addressed
	▪ Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires. ▪ Potential noise, dust and safety impacts associated with construction related activities. ▪ Impact on productive farmland. **Operational Phase:** ▪ The establishment of infrastructure to improve energy security and support the renewable sector. ▪ Creation of employment opportunities. ▪ Generation of additional income for affected landowners. ▪ Visual impacts and associated impacts on rural sense of place. ▪ Impact on property values. ▪ Impact on existing and future tourism operations. **Decommissioning Phase:** ▪ Social impacts associated with retrenchment including loss of jobs, and source of income. ▪ Creation of temporary employment opportunities, which would represent a positive temporary impact.
Visual Impact Assessment	**Construction Phase:** ▪ Potential alteration of the visual character and sense of place resulting from construction activities. ▪ Potential visual intrusion resulting from large construction vehicles and equipment. ▪ Potential visual effect of construction laydown areas and material stockpiles. ▪ Potential impacts of increased dust emissions from construction activities and related traffic. ▪ Potential visual scarring of the landscape as a result of site clearance and earthworks. ▪ Potential visual pollution resulting from littering on the construction site. **Operational Phase:** ▪ Potential alteration of the visual character and sense of place. ▪ Potential visual intrusion resulting from the presence of PV arrays, particularly in more natural undisturbed settings. ▪ Potential visual clutter caused by substation and other associated infrastructure on-site. ▪ Potential impacts of increased dust emissions from maintenance vehicles accessing the site via gravel roads. ▪ Potential visual scarring of the landscape as a result of site clearance and earthworks. ▪ Potential glint and glare impacts on passing motorists and nearby receptors. ▪ Potential visual impact on the night-time visual environment. **Decommissioning Phase:**

Specialist Assessment / Input	Key issues to be addressed
	▪ Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process. ▪ Potential impacts of increased dust emissions resulting from decommissioning activities and related traffic. ▪ Potential visual scarring of the landscape as a result of decommissioning activities. ▪ Potential visual intrusion of any remaining infrastructure on the site.
Battery Energy Storage Facility	**The following issues are for consideration for the proposed BESS:** ▪ Toxic smoke and fires/explosions and proximity to occupied residences. ▪ Suitable secondary spill containment for the large volume of electrolyte.

6.3 Assessments to be undertaken during the EIA Phase

The specialist assessments listed in Table 6.2 below are required during the EIA Phase, in adherence to Appendix 6 of the 2014 NEMA EIA Regulations, as amended, as well as any other additional relevant legislation, policies and guidelines that may be deemed necessary, if applicable (i.e. relevant gazette protocols, as described below). The relevant mitigation and management actions will be incorporated into the Environmental Management Programme (EMPr) that will form part of the EIA Report. Refer to Chapter 7 of this Draft Scoping Report for a detailed outline of the ToRs for the specialist assessments to be undertaken during the EIA Phase.

Table 6.2: Specialist Assessments and Additional Inputs to be undertaken as part of the EIA Phase and relevant applicable legislation

Specialist Assessment / Input	Assessment to be undertaken in the EIA Phase
Agriculture and Soils Assessment	The Agricultural Assessment must comply with the Assessment Protocols that were published on 20 March 2020, in Government Gazette 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
Terrestrial Biodiversity and Species	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); 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).
Aquatic Biodiversity and Species	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.
Avifauna Impact Assessment	The Avifauna 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 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

Specialist Assessment / Input	Assessment to be undertaken in the EIA Phase
	in southern Africa[1] to determine the level of survey effort that is required.
Visual Impact Assessment	▪ The Visual Specialist is required to undertake a Specialist Assessment in adherence to the gazetted Environmental Assessment Protocols, specifically 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.
Heritage Impact Assessment (including Archaeology and Cultural Landscape)	▪ The Heritage Specialist is required to undertake a Specialist Assessment in adherence to the gazetted Environmental Assessment Protocols, specifically 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 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 the South African Heritage Resources Agency (SAHRA).
Palaeontology Assessment	▪ The Palaeontologist is required to undertake a Specialist Assessment in adherence to the gazetted Environmental Assessment Protocols, specifically 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 site visit and field surveys in order to identify the level of sensitivity assigned to the project area, and to verify and confirm this sensitivity and land use as per the National Web-Based Screening Tool. Based on the findings of the site visit, a Site Sensitivity Verification report was prepared in accordance with Part A of the aforementioned Assessment Protocols (GG 43110 / GNR 320, 20 March 2020) and a full specialist assessment is not required.
Socio-Economic 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.

[1] BirdLife South Africa by Jenkins, A.R., Ralston-Patton, Smit- Robinson, A.H. 2017.

Specialist Assessment / Input	Assessment to be undertaken in the EIA Phase
Battery Energy Storage Systems (BESS) High Level Risk Assessment	This assessment is not classified as a specialist study as per Appendix 6 of the NEMA EIA Regulations, as it is a risk assessment.
Civil Aviation	A Civil Aviation Assessment is required to comply with the gazetted Environmental Assessment Protocols, specifically 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). Additional detail will be provided in the EIA Phase. Refer to Chapters 3, 4 and 7 of this Draft Scoping Report for additional information.
Defence	A Defence Assessment is required to comply with the gazetted Environmental Assessment Protocols, specifically the 'Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Defence Installations" (GG 43110 / GN R320, 20 March 2020). Additional detail will be provided in the EIA Phase. Refer to Chapters 3, 4 and 7 of this Draft Scoping Report for additional information.

6.4 Scoping-level Impact Assessment

Based on the scoping-level inputs from the various specialists, a **high-level preliminary** scoping impact assessment was conducted and outlined in Table 6.3 below. The impact ratings will be confirmed and detailed during the EIA Phase based on more detailed studies being undertaken, including modelling where required. The mitigation measures provided in this section are also high-level for the purposes of Scoping and will be detailed during the EIA Phase.

Please see Chapter 7 of this Scoping Report for the PSEIA, which includes the Methodology for the assessment of impacts (Section 7.4) and the ToR for the specialist assessments (Section 7.7).

Table 6.3: Scoping Level Assessment of Potential Risks/Impacts of the proposed Vhuvhili solar PV facility, including high-level mitigation measures

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
AGRICULTURE AND SOILS						
CONSTRUCTION PHASE						
Agricultural potential loss by land occupation	Status	Negative	Low (4)	• None possible	Low (4)	High
	Spatial Extent	Site Specific				
	Duration	Long-term				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	High				
	Irreplaceability	Low				
Agricultural potential loss by soil degradation	Status	Negative	Very low (5)	• Maintain vegetation and facilitate re-vegetation. • Strip, stockpile and re-spread topsoil.	Very low (5)	High
	Spatial Extent	Site Specific				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Duration	Long-term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	Moderate				
	Irreplaceability	Low				
OPERATIONAL PHASE						
Agricultural potential enhancement through increased financial security for farming operations	Status	Positive	Very low (5)	• None possible	Very low (5)	High
	Spatial Extent	Local				
	Duration	Long-term				
	Consequence	Slight				
	Probability	Likely				
	Reversibility	High				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Irreplaceability	Moderate				
DECOMMISSIONING PHASE						
Agricultural potential loss by soil degradation	Status	Positive	Very low (5)	• Maintain vegetation and facilitate re-vegetation. • Strip, stockpile and re-spread topsoil.	Very low (5)	High
	Spatial Extent	Local				
	Duration	Long-term				
	Consequence	Slight				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Moderate				
AQUATIC BIODIVERSITY AND SPECIES						
CONSTRUCTION PHASE						
Changes in water flow regime	Status	Negative	Moderate (3)		Low (4)	Medium

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Spatial Extent	Regional		● The proposed layout should be revisited, and every effort made place the photovoltaic structures outside of the wetland and wetland buffer zones ● A temporary fence or demarcation must be erected around No-Go Areas outside the proposed works area prior to any construction taking place as part of the contractor planning phase when compiling work method statements to prevent access to the adjacent portions of the watercourse. ● Where development activities are located upslope from wetlands, effective stormwater management should be a priority during both construction and operational phase. This should be monitored as part of the EMP. ● Where development activities are located upslope from wetlands, high energy stormwater input into the watercourses should be prevented at all cost. ● Effective culverts should be incorporated into the design of access roads.		
	Duration	Long term				
	Consequence	Moderate Negative				
	Probability	Very likely				
	Reversibility	Low				
	Irreplaceability	Moderate				
Changes in sediment entering and exiting the system	Status	Negative	Moderate (3)	● The proposed layout should be revisited, and every effort made place the photovoltaic structures outside of the wetland and wetland buffer zones ● Where development is located upslope from wetlands, a temporary fence or demarcation must be erected around No-Go Areas outside the proposed works area prior to any construction taking place as part of the contractor planning phase when compiling	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Medium term				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Consequence	Moderate Negative		work method statements to prevent access to the adjacent portions of the watercourse. ● Where development is located upslope from wetlands, effective stormwater management including sediment barriers should be a priority during both construction and operational phase. This should be monitored as part of the EMP. ● Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/earthworks in that area. ● Protect all areas susceptible to erosion and ensure that there is no undue soil erosion as a result of activities within and adjacent to the construction camp and work areas. ● Monitoring should be done to ensure that sediment pollution is timeously dressed.		
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	High				
Introduction and spread of alien vegetation	Status	*Negative*	Moderate (3)	● The proposed layout should be revisited, and every effort made place the photovoltaic structures outside of the wetland and wetland buffer zones ● Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish. ● Undertake an Alien Plant Control Plan which specifies actions and measurable targets ● Retain vegetation and soil in position for as long as	Low (4)	Medium
	Spatial Extent	*Local*				
	Duration	*Medium term*				
	Consequence	*Moderate Negative*				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Probability	*Likely*		possible, removing it immediately ahead of construction/earthworks in that area and returning it where possible afterwards. ● Long-term monitoring for the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish, as specified in the Alien Vegetation Management Plan. ● Rehabilitate or revegetate disturbed areas		
	Reversibility	*Low*				
	Irreplaceability	Low				
Loss and disturbance of watercourse habitat and fringe vegetation	Status	Negative	Moderate (3)	● The proposed layout should be revisited and every effort made place the photovoltaic structures outside of the wetland and wetland buffer zones ● Monitor the establishment of alien invasive species within the areas affected by the construction and take immediate corrective action where invasive species are observed to establish. ● Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed. ● Operational activities should not take place within watercourses or buffer zones, nor should edge effects impact on these areas. ● Operational activities should not impact on rehabilitated or naturally vegetated areas	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate Negative				
	Probability	Likely				
	Reversibility	Non-reversible				
	Irreplaceability	High				
Changes in water quality due to pollution	Status	*Negative*	Moderate (3)	● located outside of the watercourse or its associated buffer zone.	Low (4)	Medium

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Spatial Extent	*Local*		• Implementation of appropriate stormwater management around the excavation to prevent the ingress of run-off into the excavation and to prevent contaminated runoff into the watercourse. • The development footprint must be fenced off from the watercourses and no related impacts may be allowed into the watercourse i.e. water runoff from cleaning of equipment, vehicle access etc. • Maintenance of construction vehicles/equipment should not take place within the watercourse or watercourse buffer. • Ensure that no operational activities impact on the watercourse or buffer area. This includes edge effects. • Control of waste discharges and do not allow dirty water from operational activities to enter the watercourse. • Regular independent water quality monitoring should form part of operational procedures in order to identify pollution. • Treatment of pollution identified should be prioritized according to best practice guidelines. • Develop norms and practices for the treatment of spills such as oil or hydraulic fluid. Ensure that the required equipment is available on hand to contain any spills. • Appoint a reliable contractor for the removal of refuse during the construction phase.		
	Duration	*Medium term*				
	Consequence	*Moderate Negative*				
	Probability	*Likely*				
	Reversibility	*Low*				
	Irreplaceability	Low				
Loss of aquatic biota	Status	Negative	Moderate (3)		Low (4)	Medium

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Spatial Extent	Local		● This impact is not easily mitigated. Further loss in diversity can be minimised by following the mitigation measures mentioned above		
	Duration	Medium term				
	Consequence	Moderate Negative				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
OPERATIONAL PHASE						
Changes in water flow regime	Status	Negative	Moderate (3)	● The proposed layout should be revisited and every effort made place the photovoltaic structures outside of the wetland and wetland buffer zones. ● Where development activities are located upslope from wetlands, effective stormwater management should be a priority during both construction and operational phase. This should be monitored as part of the EMP. ● Effective culverts should be incorporated into the design of access roads.	Low (4)	Medium
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Moderate Negative				
	Probability	Very likely				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Reversibility	Low				
	Irreplaceability	Moderate				
Changes in sediment entering and exiting the system	Status	Negative	Moderate (3)	• The proposed layout should be revisited and every effort made place the photovoltaic structures outside of the wetland and wetland buffer zones. • Where development is located upslope from wetlands, effective stormwater management including sediment barriers should be a priority during both construction and operational phase. This should be monitored as part of the EMP. • Monitoring should be done to ensure that sediment pollution is timeously dressed.	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Moderate Negative				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	High				
Introduction and spread of alien vegetation	Status	Negative	Moderate (3)	• Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish. • Undertake an Alien Plant Control Plan which specifies actions and measurable targets	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Medium term				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Consequence	Moderate Negative		• Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/earthworks in that area and returning it where possible afterwards. • Long-term monitoring for the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish, as specified in the Alien Vegetation Management Plan.		
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
Loss and disturbance of watercourse habitat and fringe vegetation	Status	Negative	Moderate (3)	• Amend SEF designs to exclude wetlands as well as buffer areas. • Monitor the establishment of alien invasive species within the areas affected by the construction and take immediate corrective action where invasive species are observed to establish. • Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed. • Operational activities should not take place within watercourses or buffer zones, nor should edge effects impact on these areas. • Operational activities should not impact on rehabilitated or naturally vegetated areas	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate Negative				
	Probability	Likely				
	Reversibility	Non-reversible				
	Irreplaceability	High				
Changes in water quality due to pollution	Status	Negative	Moderate (3)	• Amend SEF designs to exclude wetlands as well as buffer areas.	Low (4)	Medium

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Spatial Extent	Local		• Provision of adequate sanitation facilities located outside of the watercourse or its associated buffer zone. • Maintenance of construction vehicles/equipment should not take place within the watercourse or watercourse buffer • Ensure that no operational activities impact on the watercourse or buffer area. This includes edge effects. • Control of waste discharges and do not allow dirty water from operational activities to enter the watercourse. • Regular independent water quality monitoring should form part of operational procedures in order to identify pollution. • Treatment of pollution identified should be prioritized according to best practice guidelines. • Develop norms and practices for the treatment of spills such as oil or hydraulic fluid. Ensure that the required equipment is available on hand to contain any spills. • Appoint a reliable contractor for the removal of refuse during the operational phase.		
	Duration	Medium term				
	Consequence	Moderate Negative				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
Loss of aquatic biota	Status	Negative	Moderate (3)	• This impact is not easily mitigated. Further loss in diversity can be minimised by following the mitigation measures mentioned above	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Long term				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Consequence	Moderate Negative				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
DECOMMISSIONING PHASE						
Changes in water flow regime	Status	Negative	Moderate (3)	● The proposed layout should be revisited and every effort made place the PV structures outside of the wetland and wetland buffer zone so that during decommissioning these sensitive ecosystems are not disturbed ● Do not increase hardened surfaces and compaction of the soils after the removal of the solar panels and related infrastructure. ● Rehabilitation of exposed soil surfaces should commence as soon as practical after completion of removal of the solar panels and related infrastructure. ● Culverts must remain in place and must not be removed if the given road is not removed during the decommissioning phase. ● Vehicle movement should be restricted to designated decommissioning areas to prevent the increase in hardened surfaces an subsequent increase in runoff	Low (4)	Medium
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Moderate Negative				
	Probability	Very likely				
	Reversibility	Low				
	Irreplaceability	Moderate				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
Changes in sediment entering and exiting the system	Status	Negative	Moderate (3)	• The proposed layout should be revisited and every effort made place the PV structures outside of the wetland and wetland buffer zones. • Vehicle movement should be restricted to the minimum that is required for decommissioning. Unnecessary movement of vehicles will increase the degradation of paths and dirt roads leading to increased erosion risk. • Progressive rehabilitation must occur. Rehabilitation has to take place as soon as decommissioning commences to prevent soil erosion. • Monitoring should be done to ensure that sediment pollution is timeously dressed	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Moderate Negative				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	High				
Introduction and spread of alien vegetation	Status	Negative	Moderate (3)	• Monitor the establishment of alien invasive species within the areas affected by the decommissioning and take immediate corrective action where invasive species are observed to establish. • Undertake an Alien Plant Control Plan which specifies actions and measurable targets • Retain vegetation and soil in position for as long as possible, removing it immediately ahead of decommissioning /earthworks in that area and returning it where possible afterwards. • Rehabilitation must occur concurrently with decommissioning.	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Moderate Negative				
	Probability	Likely				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Reversibility	Low		• The mixture of vegetation seed must be used during rehabilitation. The mix must include: Annual and perennial species, pioneer species, species which are indigenous to the area to ensure there is no ecological imbalance in the area. • Long-term monitoring for the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish, as specified in the Alien Vegetation Management Plan.		
	Irreplaceability	Low				
Loss and disturbance of watercourse habitat and fringe vegetation	Status	Negative	Moderate (3)	• Amend SEF designs to exclude wetlands as well as buffer areas. • Vehicle movement should be restricted to the minimum that is required for decommissioning. • Rehabilitation of decommissioned areas must commence concurrently with decommissioning. • Monitor the establishment of alien invasive species within the areas affected by the decommissioning and take immediate corrective action where invasive species are observed to establish. • Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed. • Decommissioning activities should not impact on rehabilitated or naturally vegetated areas.	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate Negative				
	Probability	Likely				
	Reversibility	Non-reversible				
	Irreplaceability	High				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
Changes in water quality due to pollution	Status	Negative	Moderate (3)	• This impact is not easily mitigated. Further loss in diversity can be minimised by following the mitigation measures mentioned above.	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate Negative				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Low				
TERRESTRIAL BIODIVERSITY AND SPECIES						
CONSTRUCTION PHASE – DIRECT IMPACTS						
The clearing of natural vegetation	Status	Negative	Moderate (3)	• The impact of the vegetation clearance can be mitigated to a moderate level by maintaining a vegetative ground layer beneath the solar arrays and only clearing for underground cabling and solar array stands. Alternatively, vegetation clearance can be	Low (4)	Medium
	Spatial Extent	Site specific				
	Duration	Medium term				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Consequence	Moderate (considering entire site)		mitigated by allowing a ground layer to develop after construction. ● Construction crew, in particular the drivers, should undergo environmental training (induction) to increase their awareness of environmental concerns. This includes awareness as to remaining within demarcated construction areas, no littering, handling of pollution and chemical spills, avoiding fire hazards and minimising wildlife interactions. ● Ensure that all temporary use areas e.g. laydown areas and construction camp, are located in areas of low sensitivity. ● Footprints of the solar panels, roads, construction and substation locations should be clearly demarcated. Vegetation clearance should be confined to the footprint of the development and unnecessary clearance should be avoided. ● Water courses, wetlands, rocky outcrops and rocky sheets should be avoided (Habitats 1, 3 & 7). ● Observe buffer zones along drainage lines (see Environmental Impact Report of aquatic specialist). ● All vehicles are to remain on demarcated roads and no driving through the veld should be allowed. ● The ECO is to provide supervision on vegetation clearing activities and other activities that may cause damage to the environment, especially when		
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
				construction commences and most vegetation clearing is taking place. ● River/stream crossings should be placed in areas without extensive wetlands and preferably in areas where the risk of disruption and erosion is low. All river/stream crossings should be inspected by the aquatic specialist to ensure that optimal and acceptable locations have been chosen for river crossings. River/stream crossings should be specifically designed not to impede or disrupt the direction and flow of the water. Specific guidelines of the aquatic specialist should be followed. ● No plants may be translocated or otherwise uprooted or disturbed without express permission from the ECO.		
The loss of threatened, protected & endemic plant and animal species	Status	Negative	Low (4)	● Placement of infrastructure should be done in such a way as to minimise the impact on protected species. ● The construction crew should undergo environmental training (induction) to make them aware of the importance of protected species.	Very Low (5)	Medium
	Spatial Extent	Site specific				
	Duration	Long-term				
	Consequence	Slight				
	Probability	Unlikely				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Reversibility	Low				
	Irreplaceability	Moderate				
Loss of faunal habitat	Status	Negative	Moderate (3)	• Vegetation clearance should be confined to the smallest possible footprint of the development and unnecessary clearance should be avoided. • Construction crew should undergo environmental training (induction) to increase their awareness of environmental concerns. • Speed limits should be set on all roads and strictly adhered to. • Development should avoid water courses, wetlands, rocky sheets and rocky outcrops. The outcrops may be favoured habitat for reptiles. • Proper waste management procedures should be in place to avoid waste lying around and to remove all waste material from the sites. • Observe buffer zones along drainage lines.	Low (4)	Medium
	Spatial Extent	Site-specific				
	Duration	Long-term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Direct faunal mortalities	Status	Negative	Low (4)	• Construction crew, in particular the drivers, should undergo environmental training to increase their awareness of environmental concerns in order to reduce the number of kills during construction and on roads. The crew should also be made aware of not	Very Low (5)	Medium
	Spatial Extent	Site specific				
	Duration	Short-term				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Consequence	Slight		harming or collecting species such as snakes, tortoises and owls which are often persecuted. ● Proper waste management procedures should be in place to avoid litter, food or other foreign material from lying around and all waste material should be removed from the site. ● No activity, including night driving, should be allowed at the site. ● Speed limits should be set on all roads on site. ● Personnel should not be allowed to roam into the veld. ● Ensure that cabling and electrical infrastructure at the site is buried sufficiently deeply to avoid being excavated by fauna and that where such infrastructure emerges above-ground that it is sufficiently protected from gnawing animals. ● Any dangerous fauna (e.g. snakes, scorpions) that are encountered during construction should not be handled or molested by construction staff and the ECO or other suitably qualified persons should be contacted to remove the animals to safety. ● Holes and trenches should not be left open for extended periods of time and should only be dug when needed for immediate construction. Trenches that may stand open for some days, should have an escape ramp to allow any fauna that fall in to escape		
	Probability	Likely				
	Reversibility	Moderate reversibility				
	Irreplaceability	Low irreplaceability				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
				• If there is any part of the site that needs to be lit at night for security reasons, then appropriate lighting should be installed to minimise negative effects on nocturnal animals. • Should electrical fences be erected it must be done according to the norms and standards of the Nature Conservation Authorities in Mpumalanga. • Access to the site should be regulated to reduce the opportunities for poaching.		
Increased dust deposition	Status	Negative	Low (4)	• Excessive dust can be reduced by spraying water onto the soil	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Short-term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	-				
Increased human activity, noise & light levels	Status	Negative	Moderate (3)	• The SANS standards should be adhered to in terms of noise levels.	Low (4)	HIgh

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Spatial Extent	Site specific		● No construction should be done at night. ● If there is any part of the site that needs to be lit at night for security reasons, then appropriate lighting should be installed to minimise negative effects on nocturnal animals		
	Duration	Short-term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	-				
CONSTRUCTION PHASE – INDIRECT IMPACTS						
Establishment of alien vegetation	Status	Negative	Low (4)	● Implement a monitoring program for the early detection of alien invasive plant species. ● A control program should be employed to combat declared alien invasive plant species in the most environmentally friendly manner that does not result in undesirable secondary impacts. ● Herbicides for the control of alien species should be applied according to the relevant instructions and by appropriately trained personnel. ● No alien species should be used in rehabilitation or landscaping.	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Long-term				
	Consequence	Moderate				
	Probability	Likely				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Reversibility	Moderate		• Use only plants and seed collected on-site for revegetation. • Cleared areas may need to be fenced-off during rehabilitation to exclude livestock and wildlife. • Material brought onto site e.g. building sand should be regularly checked for the germination of alien species.		
	Irreplaceability	Low				
Increased erosion and water run-off	Status	Negative	Moderate (3)	• Clearing of vegetation and compaction should be restricted to the footprint of the proposed development. • All roads should have structures to deflect water run-off to disperse the water into the receiving area. • A rehabilitation and revegetation plan should be developed as part of the EMPr. • Regular monitoring of the site during construction for erosion problems. • Silt traps should be used where there is a danger of topsoil eroding and entering streams and other sensitive areas. • If applicable, topsoil should be removed and stockpiled, then reapplied as soon as possible in order to facilitate regeneration of the natural vegetation on cleared areas. • Reduce activity on site after large rainfall events when the soils are wet. No driving off hardened roads until soils have dried out and the risk of bogging down has decreased.	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Long-term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Moderate				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
				• A suitably qualified person should plan, design and supervise the proper construction of roads to minimise the impact on the environment.		
Changes in animal behaviour	Status	Negative	Moderate (3)	• Construction crew should undergo environmental training, by way of an induction course, to increase their awareness of environmental concerns. • Development should avoid wetlands and rocky outcrops. • Soil compaction should be kept to a minimum by restricting driving to designated roads. • Appropriate lighting should be installed to minimise negative effects on nocturnal animals. • No activity should be allowed at the site between sunset and sunrise. • The mitigation measures as indicated by the noise specialist must be adhered to.	Low (4)	Medium
	Spatial Extent	Site-specific				
	Duration	Medium-term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				
OPERATIONAL PHASE: DIRECT IMPACTS						
Direct faunal mortalities	Status	Negative	Very Low (5)	• Maintenance crew should undergo environmental training, by way of an induction course, to increase their awareness of environmental concerns. • Access to the site should be strictly controlled.	Very Low (5)	Medium
	Spatial Extent	Site specific				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Duration	Long-term		● All excess wires, cables and waste material should be removed from the site. ● All vehicles at the site should adhere to a low speed limit and slow-moving fauna such as tortoises on roads should be moved off the road. ● No activity should be allowed at the site between sunset and sunrise.		
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	Moderate				
	Irreplaceability	Low				
OPERATIONAL PHASE: INDIRECT IMPACTS						
Establishment of alien vegetation	Status	Negative	Low (4)	● Implement a monitoring program for the early detection of alien invasive plant species and a control program to combat declared alien invasive plant species should be employed. ● No alien species should be used for landscaping, rehabilitation or any other purpose. ● Clearing of alien species should be done on a regular basis.	Very Low (5)	Medium
	Spatial Extent	Local				
	Duration	Long-term				
	Consequence	Slight				
	Probability	Likely				
	Reversibility	Moderate				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Irreplaceability	Low				
Increased erosion and water run-off	Status	Negative	Low (4)	• Proper road maintenance procedures should be in place. • Regular monitoring of the site during operation for erosion problems. • Should new sections of the road be needed, a suitably qualified person should plan, design and supervise the proper construction of roads. • Reduced activity at the site after large rainfall events when the soils are wet.	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Long-term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				
Changes in animal behaviour	Status	Negative	Low (4)	• Changes to the vegetation should be kept to a minimum.	Low (4)	Medium
	Spatial Extent	Site-specific				
	Duration	Long-term				
	Consequence	Moderate				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				
DECOMMISSIONING PHASE: DIRECT IMPACTS						
Increased dust deposition	Status	Negative	Low (4)	• Excessive dust can be reduced by spraying water onto the soil.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Short-term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	-				
Direct faunal mortalities	Status	Negative	Very Low (5)		Very Low (5)	Medium

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Spatial Extent	Site specific		• Decommissioning crew should undergo environmental training to increase their awareness of environmental concerns. • Speed limits should be adhered to. • Proper waste management procedures should be in place and no material should be left on site in order to prevent instances of ensnarement or ingestion of foreign material.		
	Duration	Short-term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	Moderate				
	Irreplaceability	Low				
DECOMMISSIONING PHASE: INDIRECT IMPACTS						
Establishment of alien vegetation	Status	Negative	Low (4)	• Implement a monitoring program for at least three years after decommissioning to document vegetation recovery and alien infestation across the site. • A control program to combat declared alien invasive plant species should be employed. • Areas where infrastructure is removed, must be revegetated with indigenous plant species. • No alien species should be used for rehabilitation/revegetation or any other purpose	Very Low (5)	Medium
	Spatial Extent	Local				
	Duration	Long-term				
	Consequence	Slight				
	Probability	Likely				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Reversibility	Moderate				
	Irreplaceability	Low				
Increased erosion and water run-off	Status	Negative	Low (4)	• No new roads should be built. • Proper road maintenance procedures should be in place. • Removal of all infrastructure components from the site. • Rehabilitation of all cleared and disturbed areas with local species. • Off-site disposal of all facility components. • Monitoring programme for at least three years after decommissioning to document vegetation recovery on site.	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Long-term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				
VISUAL						
CONSTRUCTION PHASE (Direct impacts)						
	Status	Negative	Moderate (3)	• Carefully plan to minimise the construction period and avoid construction delays.	Low (4)	Medium

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
Potential visual impacts of construction affecting receptors in the study area, including: ▪ Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction. ▪ Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil (scarring) which could visually contrast with the surrounding environment. ▪ Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these	Spatial Extent	Negative		● Where possible, restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting. ● Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible. ● Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ● Vegetation clearing should take place in a phased manner. ● Inform receptors within 500 m of the site of the construction programme and schedules. ● Make use of existing gravel access roads where possible. ● Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible. ● Ensure that suitable dust suppression techniques are implemented: associated with the facilities o on all access roads; o in all areas where vegetation clearing has taken place; o on all soil stockpiles. ● Maintain a neat construction site by removing litter, rubble and waste materials regularly.		
	Duration	Local				
	Consequence	Short Term				
	Probability	Substantial				
	Reversibility	Very Likely				
	Irreplaceability	High				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
disturbed areas could result in dust which would have a visual impact. ▪ Litter on the construction site may result in visual pollution.						
OPERATIONAL PHASE (Direct Impacts)						
Potential visual impacts of operations affecting receptors in the study area, including: ▪ The PV arrays may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ The proposed solar PV facility will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts.	Status	Negative	Moderate (3)	● Restrict vegetation clearance on the site to that which is required for the correct operation of the facility. ● As far as possible, limit the number of maintenance vehicles which are allowed to access the site. ● Ensure that suitable dust suppression techniques are implemented on all gravel access roads. ● As far as possible, limit the amount of security and operational lighting present on site. ● Light fittings for security at night should reflect the light toward the ground and prevent light spill. ● Lighting fixtures should make use of minimum lumen or wattage. ● Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used.	Moderate (3)	Medium
	Spatial Extent	Local				
	Duration	Long-term				
	Consequence	Substantial				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
▪ Glint and glare may impact nearby receptors. ▪ Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. ▪ The night time visual environment will be altered as a result of operational and security lighting at the proposed PV facility.	Probability	Very likely		● If economically and technically feasible, make use of motion detectors on security lighting. ● Buildings on the site should be painted with natural tones that fit with the surrounding environment. ● Non-reflective surfaces should be utilised where possible.		
	Reversibility	Moderate				
	Irreplaceability	Low				
DECOMMISSIONING PHASE – DIRECT IMPACTS						
Potential visual impacts of decommissioning affecting receptors in the study area, including: ▪ Vehicles and equipment required for decommissioning will alter the natural character of the	Status	Negative	Moderate (3)	● All infrastructure that is not required for post-decommissioning use should be removed. ● Carefully plan to minimize the decommissioning period and avoid delays. ● Maintain a neat decommissioning site by removing rubble and waste materials regularly. ● Ensure that dust suppression procedures are maintained on all gravel access roads associated with the facilities throughout the decommissioning phase.	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Short Term				
	Consequence	Substantial				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
study area and expose visual receptors to visual impacts. ▪ Decommissioning activities may be perceived as an unwelcome visual intrusion. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during decommissioning would expose bare soil (scarring) which could visually contrast with the surrounding environment. ▪ Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	Probability	Very likely		● All cleared areas should be rehabilitated as soon as possible.		
	Reversibility	High				
	Irreplaceability	Low				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
▪ Decommissioned infrastructure left on the site may be visually intrusive.						
HERITAGE (ARCHAEOLOGY AND CULTURAL LANDSCAPE)						
CONSTRUCTION PHASE						
Damage or destruction of archaeological materials	Status	Negative	Moderate (3)	▪ Preconstruction survey. ▪ Micrositing of infrastructure where possible to minimise impacts. ▪ Sampling of any sites that cannot be avoided (waypoint 419 seems a likely candidate).	Very Low (5)	High
	Spatial Extent	Local				
	Duration	Permanent				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Non-reversible				
	Irreplaceability	High				
Damage or destruction of graves	Status	Negative	Low (4)	▪ Preconstruction survey. ▪ Micro-siting of infrastructure to avoid impacts. ▪ Report any chance finds. ▪ Protect in situ and appoint archaeologist to exhume.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Permanent				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Consequence	Extreme				
	Probability	Very unlikely				
	Reversibility	Non-reversible				
	Irreplaceability	High				
Intrusion of SEF and equipment into the landscape	Status	Negative	Moderate (3)	▪ Minimise duration of construction period ▪ Minimise cut-and-fill and landscape scarring in general ▪ Ensure effective rehabilitation of areas not needed during operation	Low (4)	High
	Spatial Extent	Regional				
	Duration	Short term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Damage to built heritage resources	Status	Negative	Moderate (3)	▪ Ensure sufficient clearance along roads for abnormal vehicles ▪ Micro siting of roads to minimise chances of impacts ▪ Demarcate no-go areas where space is constrained and risk is higher	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Permanent				
	Consequence	Substantial				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Probability	Unlikely				
	Reversibility	Non-reversible				
	Irreplaceability	High				
OPERATIONAL PHASE						
Intrusion of SEF into the landscape	Status	Negative	Low (4)	▪ Ensure that all maintenance vehicles stay within designated areas	Low (4)	High
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
DECOMMISSIONING PHASE						
Intrusion of solar PV facility and equipment into the landscape	Status	Negative	Moderate (3)	▪ Minimise duration of decommissioning period ▪ Minimise cut-and-fill and landscape scarring in general	Low (4)	High
	Spatial Extent	Regional				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Duration	Short term		▪ Ensure effective rehabilitation of areas not needed during operation		
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
AVIFAUNA						
CONSTRUCTION PHASE						
Displacement due to disturbance associated with the construction of the solar PV plants and associated infrastructure.	Status	Negative	Moderate (3)	▪ 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 current best practice in the industry. ▪ 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.	Low (4)	High
	Spatial Extent	Site-specific				
	Duration	Short-term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	High				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Irreplaceability	Low		▪ A 200 m exclusion zone should be placed around all surface water (drainage lines, wetlands, dams, and pans).		
OPERATIONAL PHASE						
Total or partial displacement of avifauna due to habitat transformation associated with the presence of the solar PV plants and associated infrastructure.	Status	Negative	High (2)	▪ 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. ▪ All surface water (pans and water troughs) must be buffered by 200 m to ensure unhindered access of priority species to the water. No PV panels should be constructed in this zone (see sensitivity map Figure 9 in the Avifauna Assessment (Appendix G.4 of this Draft Scoping Report).	Moderate (3)	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 (5)	▪ No mitigation is required due to the very low significance	Very Low (5)	Medium
	Spatial Extent	*Site specific*				
	Duration	*Long term*				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	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 (4)	▪ If possible, a single perimeter fence should be used. ▪ Increasing the spacing between at least the top two wires (to a minimum of 30 cm) and ensuring they are correctly tensioned will reduce the snaring risk for owls.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Low				
Electrocution of priority species in the onsite substations.	Status	Negative	Moderate (3)	▪ 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	Very Low (5)	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Severe				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Probability	Unlikely		priority species are unlikely to frequent the substation and be electrocuted.		
	Reversibility	High				
	Irreplaceability	Low				
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 (3)	▪ 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 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	Low (4)	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	High				
	Irreplaceability	Negative				
SOCIO-ECONOMIC						

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
CONSTRUCTION PHASE						
Creation of employment and business opportunities during the construction phase	Status	Positive	Low (4)	▪ Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase. ▪ Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area. ▪ Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria. ▪ Before the construction phase commences the proponent should meet with representatives from the MM to establish the existence of a skills database for the area. If such as database exists, it should be made available to the contractors appointed for the construction phase. ▪ The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.	Medium (3)	High
	Spatial Extent	Regional				
	Duration	Medium Term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	N/A				
	Irreplaceability	N/A				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
				▪ Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase. ▪ The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. ▪ The proponent should liaise with the MM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work.		
Potential impacts on family structures and social networks associated with the presence of construction workers.	Status	Negative	Low (4)	▪ Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase. ▪ Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase. ▪ The SEP and CHSSP should include a Grievance Mechanism that enables stakeholders to report and resolve incidents. ▪ Where possible, the proponent should make it a requirement for contractors to implement a 'locals	Low (4)	High
	Spatial Extent	Regional				
	Duration	Medium Term				
	Consequence	Slight				
	Probability	Unlikely				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Reversibility	Moderate		first' policy for construction jobs, specifically for semi and low-skilled job categories. ▪ The proponent should consider the option of establishing a Monitoring Committee (MC) for the construction phase with representatives from local landowners, farming associations, and the local municipality. This MC should be established prior to commencement of the construction phase and form part of the SEP. ▪ The proponent and contractor should develop a Code of Conduct (CoC) for construction workers. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be subject to appropriate disciplinary action and/or dismissed. All dismissals must comply with the South African labour legislation. The CoC should be signed by the proponent and the contractors before the contractors move onto site. The CoC should form part of the CHSSP. ▪ The proponent and the contractor should implement an HIV/AIDS, COVID-19 and Tuberculosis (TB) awareness programme for all construction workers at the outset of the construction phase. The programmes should form part of the CHSSP. ▪ The contractor should provide transport for workers to and from the site on a daily basis. This will enable		
	Irreplaceability	Low				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
				the contractor to effectively manage and monitor the movement of construction workers on and off the site. ▪ The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end. ▪ No construction workers, with the exception of security personnel, should be permitted to stay overnight on the site.		
Potential impacts on family structures and social networks associated with the influx of job seekers.	Status	Negative	Low (4)	▪ Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase. ▪ Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase. ▪ The proponent, in consultation with the LM, should investigate the option of establishing a MC to monitor and identify potential problems that may arise due to the influx of job seekers to the area. The MC should also include the other proponents of solar energy projects in the area. ▪ The proponent should implement a "locals first" policy, specifically with regard to unskilled and low skilled opportunities. ▪ The proponent should implement a policy that no employment will be available at the gate.	Low (4)	High
	Spatial Extent	Regional				
	Duration	Medium Term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	Moderate				
	Irreplaceability	Low				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
				▪ Set up a recruitment office in the nearby towns and local areas within proximity (where feasible) and adhere to strict labour recruitment practices that would reduce the desire of potential job seekers to loiter around the properties in the hope of finding temporary employment. ▪ Discuss with local associations (i.e., farmer associations, SAPS, etc) how crime related issues that may be linked to the proposed development may be mitigated. ▪ Control the movement of workers between the site and areas of residence to minimise loitering around the construction site. This should be achieved through the provision of scheduled transportation services between the construction site and area of residence (where feasible). ▪ Employ locals as far as feasible through the creation of a local skills database. ▪ Establish a management forum comprising key stakeholders to monitor and identify potential problems that may arise due to the influx of job seekers to the area. ▪ Assign a dedicated person to deal with complaints and concerns of affected parties.		
Potential risk to safety of scholars, farmers and farm workers,	Status	Negative	Moderate (3)		Low (4)	High

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
livestock and damage to farm infrastructure associated with the presence of construction workers on site.	Spatial Extent	Local		▪ Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase. ▪ Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase. ▪ The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences. ▪ All farm gates must be closed after passing through. ▪ Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site. ▪ The proponent should establish a MC and CoC for workers (see above). ▪ The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover losses and costs associated with fires caused by construction workers or construction related activities (see below).		
	Duration	Medium Term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Replaceable				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
				▪ The proponent should implement a Grievance Mechanism that provides local farmers with an effective and efficient mechanism to address issues related to report issues related to damage to farm infrastructure, stock theft and poaching etc. ▪ The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested. ▪ Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms. ▪ Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the CoC. All dismissals must be in accordance with South African labour legislation. ▪ It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay overnight on the site.		
Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human	Status	Negative	Moderate (3)	▪ Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.	Low (4)	High
	Spatial Extent	Local				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
life associated with increased incidence of grass fires.	Duration	Medium Term		▪ Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase. ▪ The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences. ▪ Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas. ▪ Smoking on site should be confined to designated areas. ▪ Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy summer months. ▪ Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle. ▪ Contractor should provide fire-fighting training to selected construction staff. ▪ No construction staff, with the exception of security staff, to be accommodated on site overnight.		
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Replaceable				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
				▪ As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.		
Potential noise, dust and safety impacts associated with construction related activities.	Status	Negative	Low (4)	▪ Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase. ▪ Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase. ▪ Timing of construction activities should be planned to avoid / minimise impact on key farming activities, including planting and harvesting operations. ▪ The proponent should establish a MC to monitor the construction phase and the implementation of the recommended mitigation measures. The MC should be established before the construction phase commences, and should include key stakeholders, including representatives from local farmers and the contractor(s). The MF should also address issues associated with damage to roads and other construction related impacts.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium Term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Replaceable				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
				▪ Ongoing communication with land owners and road users during construction period. This should be outlined in the SEP. ▪ The proponent should implement a Grievance Mechanism that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads. ▪ Implementation of a road maintenance programme throughout the construction phase to ensure that the affected roads maintained in a good condition and repaired once the construction phase is completed. ▪ Repair of all affected road portions at the end of construction period where required. ▪ Dust suppression measures must be implemented on un-surfaced roads, such as wetting on a regular basis and ensuring that vehicles used to transport building materials are fitted with tarpaulins or covers. ▪ All vehicles must be roadworthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.		
Damage to farmland and loss of grazing and or crops.	Status	Negative	Moderate (3)	▪ The loss of high-quality agricultural land should be avoided and or minimised by careful planning of the final layout of the proposed SEF facilities. The	Low (4)	High
	Spatial Extent	Local				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Duration	Medium Term		recommendations of the agricultural / soil assessment should be implemented. ▪ Affected landowners should be consulted about the timing of construction related activities in advance. ▪ The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be minimised. ▪ An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase. ▪ All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase. ▪ The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme should be drawn up by the Environmental Consultants appointed to manage the EIA. ▪ The implementation of the Rehabilitation Programme should be monitored by the ECO.		
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Low				
OPERATIONAL PHASE						
	Status	Positive	Moderate (3)	▪ Maximise the number of employment opportunities for local community members.	High (2)	High

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
Improve South Africa's energy security and reduce reliance on coal	Spatial Extent	National		▪ Implement training and skills development programs for members from the local community. ▪ Maximise opportunities for local content and procurement.		
	Duration	Long Term				
	Consequence	Moderate				
	Probability	Very Likely				
	Reversibility	N/A				
	Irreplaceability	N/A				
Creation of employment and business opportunities associated with the operational phase.	Status	Positive	Low (4)	▪ Implementation of a Stakeholder Engagement Plan (SEP) during the operational phase. ▪ Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area. ▪ Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria. ▪ Before the operational phase commences the proponent should meet with representatives from	Moderate (3)	High
	Spatial Extent	Regional				
	Duration	Long Term				
	Consequence	Slight				
	Probability	Very Likely				
	Reversibility	N/A				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Irreplaceability	N/A		the MM to establish the existence of a skills database for the area. If such as database exists, it should be made available to the contractors appointed for the operational phase. ▪ The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the operational phase of the project. ▪ Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the operational phase. ▪ The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. ▪ The proponent should liaise with the MM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work.		

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
				▪ The proponent should investigate providing training and skills development to enable locally based service providers to provide the required services for the operational phase		
Generation of additional income for affected landowners.	Status	Positive	Low (4)	▪ Implement agreements with affected landowners. ▪ The loss of high-quality agricultural land should be avoided and or minimised by careful planning in the final layout of the proposed SEF facilities. The recommendations of the agricultural / soil assessment should be implemented.	Moderate (3)	High
	Spatial Extent	Local				
	Duration	Long Term				
	Consequence	Slight				
	Probability	Very Likely				
	Reversibility	N/A				
	Irreplaceability	N/A				
Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.	Status	Negative	Low (4)	▪ The mitigation measures proposed by the visual specialist should be adhered to. ▪ Natural areas that are not affected by the footprint should remain as such. Efforts should also be made to avoid disturbing such sites during operation.	Low (4)	High
	Spatial Extent	Regional				
	Duration	Long Term				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
Impact on rural sense of place and associated impact on property values.	Status	Negative	Low (4)	▪ The mitigation measures proposed by the visual specialist should be adhered to. ▪ Natural areas that are not affected by the footprint should remain as such. Efforts should also be made to avoid disturbing such sites during operation.	Low (4)	High
	Spatial Extent	Regional				
	Duration	Long Term				
	Consequence	Slight				
	Probability	Very Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
Impact on existing and future tourism operations.	Status	Negative	Low (4)	▪ The mitigation measures proposed by the visual specialist should be adhered to.	Low (4)	High

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Spatial Extent	Regional		▪ Natural areas that are not affected by the footprint should remain as such. Efforts should also be made to avoid disturbing such sites during operation.		
	Duration	Long Term				
	Consequence	Slight				
	Probability	Very Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
	Reversibility	Negative				
	Irreplaceability	Regional				
DECOMMISSIONING PHASE						
Social impacts associated with retrenchment including loss of jobs, and source of income.	Status	Negative	Moderate (3)	▪ The proponent should ensure that retrenchment packages are provided for all staff retrenched when the plant is decommissioned. ▪ All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning.	Low (4)	High
	Spatial Extent	Local				
	Duration	Short term				

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation / Enhancement)	Potential mitigation measures / enhancement measures	Significance and Ranking (Post-Mitigation / Enhancement)	Confidence Level
	Consequence	Moderate-Low		▪ Revenue generated from the sale of scrap metal during decommissioning should be allocated to funding closure and rehabilitation of disturbed areas.		
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Low				

6.5 Conclusion

The effect of potential on-site 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 of this proposed development. Therefore, based on the scoping level specialist input potential negative impacts associated with the Vhuvhili SEF project are anticipated to mainly be of **low significance after mitigation**, whilst some positive socio-economic impacts of moderate significance are expected.

6.6 Cumulative Impacts

The Specialists will assess potential cumulative impacts by identifying other renewable energy generation facilities, within a 50 km radius of the proposed Vhuvhili SEF project, that have been approved (i.e. positive EA has been issued) or which have a BA/EIA process underway as at May 2022.

Cumulative impacts, which were identified by the Specialists during the Scoping Phase and that are associated with these similar types of development projects include *inter alia*:

- **AGRICULTURE**: Regional loss (including by degradation) of agricultural land, with a consequent decrease in agricultural production.

- **TERRESTRIAL BIODIVERSITY AND SPECIES:**
  - Loss of vegetation, habitat and threatened species;
  - Compromising integrity of CBA, ESA and NPAES;
  - Reduced ability to meet conservation obligations and targets;
  - Loss of landscape connectivity and disruption of broad-scale ecological processes.

- **AQUATIC BIODIVERSITY:**
  - CONSTRUCTION AND OPERATIONAL PHASE:
    - Changes in water flow regime
    - Invasive alien plant growth and modification of runoff characteristics.

- **AVIFAUNA:**
  - CONSTRUCTION PHASE:
    - Displacement due to disturbance associated with the construction of the solar PV plant and associated infrastructure.
  - OPERATIONAL PHASE:
    - Habitat transformation, collisions with the solar panels, entrapment in fences, and electrocution in onsite substations.
  - DECOMMISSIONING PHASE:
    - The noise and movement associated with the activities at the development area will be a source of disturbance which would lead to the displacement of avifauna from the area.

- **VISUAL (all phases):**
    - Additional renewable energy and associated grid connection infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts.
    - Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings.
    - Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes.
    - The night- time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.

- **HERITAGE (ARCHAEOLOGY AND CULTURAL LANDSCAPE) (all phases):**
    - Impacts to archaeological resources; and
    - Intrusion of SEF and equipment into the landscape

- **SOCIO-ECONOMIC (all phases):**
    - Impact on Sense of Place due to the Change in Visual Characteristics of the Area.
    - Impact on local services specifically medical, education and accommodation
    - Impact on the local economy due to the creation of employment, skills development and training opportunities and creation of downstream business opportunities.

The proposed renewable energy projects located within 50 km of the proposed Vhuvhili SEF Project that will be considered in the Cumulative Impact Assessment in the EIA phase are detailed in Table 7.3 and shown in Figure 7.1 within Chapter 7 of this Draft Scoping Report.

DRAFT SCOPING REPORT

Draft Scoping Report for the proposed development of the Vhuvhili Solar Photovoltaic (PV) Facility near Secunda in the Mpumalanga Province.

CHAPTER 7:

Plan of Study for EIA

ENERTRAG

CSIR
Touching lives through innovation

CONTENTS

TABLES

FIGURES

7. PLAN OF STUDY FOR THE EIA

This chapter presents the Plan of Study for the Environmental Impact Assessment (PSEIA), which sets out the process to be followed in the Environmental Impact Assessment (EIA) Phase as required by the 2014 National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) EIA Regulations, as amended. The PSEIA is based on the outcomes of the Scoping Phase (to date) and provides the Terms of Reference (ToR) for the specialist assessments that have been identified, the alternatives that will be considered and assessed, as well as the public participation process (PPP) that will be undertaken during the EIA Phase.

7.1 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—
    i. nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
    ii. 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
- 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 Mpumalanga DARDLEA 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/assessments required to address the issues raised in the Scoping Phase (Sections 7.5, 7.6 and 7.8 of this chapter).

Table 7.1 below shows the requirements for the PSEIA in accordance with Appendix 2 (2) (1) (h) of the 2014 NEMA EIA Regulations, as amended.

Table 7.1: Requirements for the Plan of Study for EIA in accordance with the 2014 NEMA EIA Regulations, as amended

Section of the EIA Regulations: Appendix 2 (2) (1) (h)	Requirements for a PSEIA in the Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations, as amended (GN R326)	Section of this Chapter of the PSEIA in which the required information is discussed
h	A plan of study for undertaking the EIA 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;	Section 7.7
ii	a description of the aspects to be assessed as part of the environmental impact assessment process;	Section 7.6
iii	aspects to be assessed by specialists;	Section 7.6 and Section 7.8
iv	a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;	Section 7.5
v	a description of the proposed method of assessing duration and significance;	Section 7.5
vi	an indication of the stages at which the Competent Authority will be consulted;	Section 7.4
vii	particulars of the public participation process that will be conducted during the environmental impact assessment process;	Section 7.3
viii	a description of the tasks that will be undertaken as part of the environmental impact assessment process; and	Section 7.2, Section 7.3, Section 7.6 and Section 7.8.
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.	Section 7.8 (note that Chapter 6 includes high-level management actions identified during the Scoping Phase. Section 7.8 of this chapter highlights which specialist studies will include such measures)

7.2 Overview of Approach to Preparing the EIA Report and EMPr

The specialist studies are being undertaken based on compliance with relevant legislation and based on the Terms of Reference indicated in Section 7.8 of this chapter. The results of the specialist assessments and other relevant project information and research undertaken for the proposed Vhuvhili SEF Project will be integrated into the Draft EIA Report. The Draft EIA Report will be released for a 30-day I&AP and authority comment period, as outlined in Sections 7.3 and 7.4 of this chapter. I&APs registered on the project database will be notified in writing of the release of the Draft EIA Report for comment.

Comments raised, through written correspondence (emails and comments), will be captured in a Comments and Responses Report for inclusion in the Final EIA Report that will be submitted to the Mpumalanga DARDLEA for decision-making. Refer to Section 7.3.2 for additional information regarding this process.

The Draft and Final EIA Reports will include an Environmental Management Programme (EMPr), which will be prepared in compliance with the relevant regulations. 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 government notice. As part of the 2016 Electrical Grid Infrastructure (EGI) Strategic Environmental Assessment (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 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 Government Gazette 42323, GN 435. The EMPrs that will be compiled for the proposed Vhuvhili SEF will therefore comply with Appendix 4 of the 2014 NEMA EIA Regulations (as amended), as well as the requirements of the gazetted EMPr for substation infrastructure (Gazette 42323, GN 435), as indicated below:

- Part 1 of the EMPr will cover all infrastructure at the proposed Vhuvhili SEF, excluding the on-site substation complex, in compliance with Appendix 4 of the 2014 NEMA EIA Regulations (as amended); and
- Part 2 of the EMPr will cover the on-site substation complex, in compliance with the Generic EMPr for substation infrastructure.

It is understood that the Generic EMPr for the development and expansion of (a) overhead electricity transmission and distribution infrastructure will not apply to the Vhuvhili SEF as the medium-voltage power lines within the footprint of the Solar PV Facility are planned to be underground and have a capacity of 22 to 33 kV. The Generic EMPr for power lines only applies to aboveground power lines and those that have a capacity of more than 33 kV (i.e., triggering Listed Activity 11 of GN 327 or Listed Activity 9 of GN 325).

The proposed overhead power line and associated EGI for the proposed Vhuvhili SEF project will be subject to a separate Application and BA/EIA process. Therefore, the Generic EMPr for power lines will

be compiled as part of the separate EA process that will be undertaken and will not be included for this application.

The EMPrs will be based broadly on the environmental management philosophy presented in the ISO 14001 standard, which embodies an approach of continual improvement. Actions in the EMPr will be drawn primarily from the 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 will be provided.

7.3 Public Participation Process

The PPP in the EIA Phase will be undertaken in compliance with Chapter 6 of the 2014 NEMA EIA Regulations (as amended). The need for a Public Participation Plan was originally stipulated in the directives published in Government Gazette 43412, GN R650 on 5 June 2020, regarding measures to address, prevent and combat the spread of COVID-19 relating to national environmental management permits and licences. GN 650 is applicable to Alert Level 3 and was repealed by GN 970. GN 970, published on 9 September 2020, contains directions regarding measures to address, prevent and combat the spread of COVID-19 relating to national environmental management permits and licences, and it applies for the period of the national state of disaster. However, GN 650 is repealed, and it is understood that it is no longer required to submit a Public Participation Plan to the CA for approval. This has been confirmed with the Mpumalanga DARDLEA at the pre-application meeting which was held on 23 May 2022.

The key steps in the PPP for the EIA Phase are described below.

The PPP for the Scoping Phase is described in detail in Chapter 4 of this Scoping Report.

7.3.1 Task 1 – I&AP Review of the EIA Report and EMPr

The first stage in the process will entail the release of the Draft EIA Report for a 30-day I&AP and stakeholder comment period. As discussed in Chapter 4, an initial database of I&APs (including key stakeholders and Organs of State) was developed prior to the commencement of the S&EIA process, and advertising the EA process in the local print media, in line with Regulation 41 (2) (c) of GN R326. Appendix D of this Scoping Report includes a copy of the I&AP database, which includes 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 as per Regulation 42 of the GN R326, in terms of the electronic database. I&APs will only be removed or de-registered from the database, upon request.

Relevant stakeholders, Organs of State and I&APs will be informed of the review period in the following manner:

- **Database Maintenance:** As indicated above, in line with Regulation 42 of GN R326, an initial database of potential I&APs was developed for the S&EIA processes, and will be updated throughout the process (Appendix D). The updated database will be used to provide written notification of the release of the Draft EIA Report for comment.
- **Advertisements to Register Interest:** An advertisement will be placed in Afrikaans and English in at least one local newspaper (i.e., "The Ridge Times") at the commencement of the 30-day comment period for the Draft EIA Report. A copy of the content of the advertisement will be included as an Appendix in the Draft EIA Report, with proof of placement included in the Final EIA Report.
- **Letter 2[1] to I&APs (Outcome of decision-making on Final Scoping Report (FSR) and commencement of EIA Phase**): Written notification of the outcome of decision-making on the FSR and the commencement of the EIA Phase (i.e., Letter 2) will be sent to all I&APs and Organs of State included on the updated project database via email, where email addresses are available. This letter will be sent once the outcome of decision making on the FSR is received by the CA (i.e., at most 43 days after acknowledgment of receipt of the Draft Scoping Report by CA). Letter 2 will include notification of the commencement of the EIA Phase for the proposed project, and it will be written in the English language. Proof of email, as well as copies of the Letter 2 and emails sent will be included in the Draft EIA Report that will be submitted to be released for a 30-day review period.
- **Letter 3 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) will be sent to all I&APs and Organs of State included on the updated project database via email, where email addresses are available. This letter will be sent at the commencement of the 30-day comment period on the Draft EIA Report and will include information on the proposed projects and notification of the release and availability of the report. Letter 3 will be written in the English language. Proof of email, as well as copies of the Letter 3 and emails sent will be included in the Final EIA Report that will be submitted to the DFFE for decision-making.
- **Text Messaging:** SMS texts will also be sent to all I&APs on the updated project database, where cell phone numbers are available, to inform them of the proposed projects and how to access the Draft EIA Report.
- **Local Networks**: Where possible, communication will be made with the Municipal Ward Councillor's (Ward 5) and/or similar community forums to request that they send notifications of the project, availability of the report and an Executive Summary via their local networks (such as WhatsApp groups, Neighbourhood Watch groups, other social media mechanisms etc.).
- **30-day Comment Period:** As noted above, potential I&APs, including authorities and Organs of State will be notified via Letter 3, of the 30-day comment and registration period within which to submit comments on the Draft EIA Report.

[1] Note that Letter 1 is addressed in Chapter 4 of this Draft Scoping Report and apply to the Scoping Phase.

- **Executive Summary**: An Executive Summary of the Draft EIA Report will also be emailed to I&APs on the database, where email addresses are available, together with Letter 3, and uploaded to the project website and alternative web-platforms.
- **Availability of Information:** The Draft EIA Report will be 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 will also be uploaded to other alternative web-platforms such as Dropbox or Google Drive. If an I&AP cannot access the report via the project website, via the alternative web-platforms such as Dropbox or Google Drive, and if additional information is required (other than what is provided in the Executive Summary), then the I&AP can contact the EAP, who will then make an electronic copy available (where feasibly possible).

7.3.2 Task 2 – Comments and Responses Report

A key component of the S&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 will be compiled into a Comments and Responses Report for inclusion in an appendix to the Final EIA Report that will be submitted to the Mpumalanga DARDLEA for decision-making. The Comments and Responses Report will indicate the nature of the comment, as well as when and who raised the comment. The comments received will be 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 will indicate how the comment received has been dealt with in the EIA Process and considered in the Final EIA Report and in the project design or EMPrs. Should the comment received fall beyond the scope of this EIA, clear reasoning will be provided.

7.3.3 Task 3 – Compilation of the Final EIA Report for Submission to the Mpumalanga DARDLEA

Following the 30-day commenting period of the Draft EIA Report and incorporation of the comments received into the reports, the Final EIA Report will be submitted to the Mpumalanga DARDLEA for decision-making in line with Regulation 23 (1) (a) of the 2014 NEMA EIA Regulations, as amended. A hard copy and an electronic copy of the report will be submitted to the Mpumalanga DARDLEA via courier, as recommended by the Mpumalanga DARDLEA.

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 Mpumalanga DARDLEA for decision-making. To ensure ongoing access to information, a copy of the Final EIA Report that have 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 have been submitted for decision-making to the Mpumalanga DARDLEA, will include proof of the PPP 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 Mpumalanga DARDLEA 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).

7.3.4 Task 4 – Environmental Authorisation (EA) and Appeal Process

Subsequent to the decision-making phase, if EA is granted by the Mpumalanga DARDLEA 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. All registered I&APs will be informed of the outcome of the EA and the appeal procedure, as well as the respective timelines.

The distribution of the EA (should such authorisation be granted by the Mpumalanga DARDLEA), 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. A copy of the EA will also be emailed with Letter 5. The EA will also be uploaded to the project website (i.e., https://www.csir.co.za/environmental-impact-assessment), and a similar supplementary mechanism (as explained above). 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 (should they be granted).

7.4 Authority Consultation during the EIA Phase

Authority consultation is integrated into the PPP, with additional meetings held on online platforms with the lead authorities, where necessary. It is proposed that the CA (Mpumalanga DARDLEA) 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 proceeds):

- Mpumalanga DARDLEA;
- Mpumalanga Tourism and Parks Agency (MTPA);
- National DFFE;
- Govan Mbeki Local Municipality;
- Gert Sibande District Municipality;
- Birdlife South Africa;
- Department of Agriculture, Land Reform and Rural Development (DALRRD);

- Department of Mineral Resources & Energy (DMRE);
- DFFE: Biodiversity and Conservation Directorate;
- Earthlife Africa;
- Endangered Wildlife Trust;
- Eskom Holdings SOC Ltd;
- South African Heritage Resources Agency (SAHRA);
- Mpumalanga Provincial Heritage Resource Authority (MPHRA);
- Department of Water and Sanitation; (DWS)
- National Energy Regulator of South Africa (NERSA);
- South African National Roads Authority (SANRAL);
- South African Civil Aviation Authority (CAA);
- South African Local Government Association (SALGA) (Mpumalanga);
- South African National Parks (SANParks);
- Independent Communications Authority of South Africa (ICASA);
- Square Kilometer Array (SKA) office;
- South African Radio Astronomy Observatory (SARAO);
- Transnet SOC Ltd; and
- Wildlife and Environmental Society of South Africa (WESSA).

The authority consultation process for the EIA Phase is outlined in Table 7.2 below.

Table 7.2: Authority Communication Schedule

STAGE IN EIA PHASE	FORM OF CONSULTATION
During the EIA Process	Site visit with authorities (including Mpumalanga DARDLEA), if required.
During preparation of EIA Report	Communication (via email or online platforms (i.e., Microsoft Teams) with the Mpumalanga DARDLEA on the outcome of Specialist Studies, if required.
On submission of EIA Report for decision-making	Online meetings with dedicated departments, if requested by the Mpumalanga DARDLEA, with jurisdiction over particular aspects of the project (e.g. Local Authority) and potentially including relevant specialists.

7.5 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.

7.5.1 Impact Assessment Methodology

The Impact Assessment Methodology has been aligned with the requirements for EIA Report 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.

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 have been 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.

The cumulative impacts will be assessed by identifying other renewable energy projects that are in different stages of planning and/or development within 50 km of the proposed Vhuvhili SEF.

The approach for the EIA phase is that the assessment will include renewable energy (i.e., Wind and Solar PV) projects within a 50 km radius that have received an EA, or has a BA/EIA in progress at the start of the Scoping phase, i.e., at May 2022. The information has been sourced from the National DFFE Renewable Energy EIA Application (REEA) database, 2022, Quarter 1 as well as from the South African Heritage Resources Information System (SAHRIS). Table 7.3 provides more details of these projects.

Figure 7.1 provides an illustration of the projects that will be considered in the cumulative impact assessment which will be included in the EIA phase.

Table 7.3: Proposed solar PV facilities located within 50 km of the proposed Vhuvhili SEF, that will be considered in the Cumulative Assessment in the EIA phase (Source: DFFE REEA Quarter 1, 2022; SAHRIS)

DFFE REFERENCE	TECHNOLOGY	MW/KV	STATUS	PROJECT TITLE	EIA REGULATIONS	ASSESSMENT PROCESS	APPLICANT	EAP	LOCAL MUNICIPALITY	DISTRICT MUNICIPALITY
• DEA/EIA/0000991/2012	Solar PV	9.5	In process	• Proposed Forzando North Coal Mine Photovoltaic Solar Facility in Emalahleni Local Municipality, Mpumalanga Province	2010	Basic Assessment	Total Coal South Africa (Pty) Ltd	GCS (Pty) Ltd	Govan Mbeki Local Municipality	Gert Sibande District Municipality
• DEA/EIA/0002646/2014	Solar PV	66	Approved	• Proposed Tutuka Solar Photovoltaic (PV) Energy Facility and Its associated Infrastructure near Standerton within Lekwa, Mpumalanga Province	2010	Scoping and EIA	Eskom Holdings SOC Limited	Savannah Environmental Consultants (Pty) Ltd	Lekwa Local Municipality	Gert Sibande District Municipality
• SE3238	Solar PV	19.99	In process	• Becrux Solar Photovoltaic (PV) Energy Facilit, Mpumalanga Province	2014	Basic Assessment	Becrux Solar PV Project One (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd	Govan Mbeki Local Municipality	Gert Sibande District Municipality

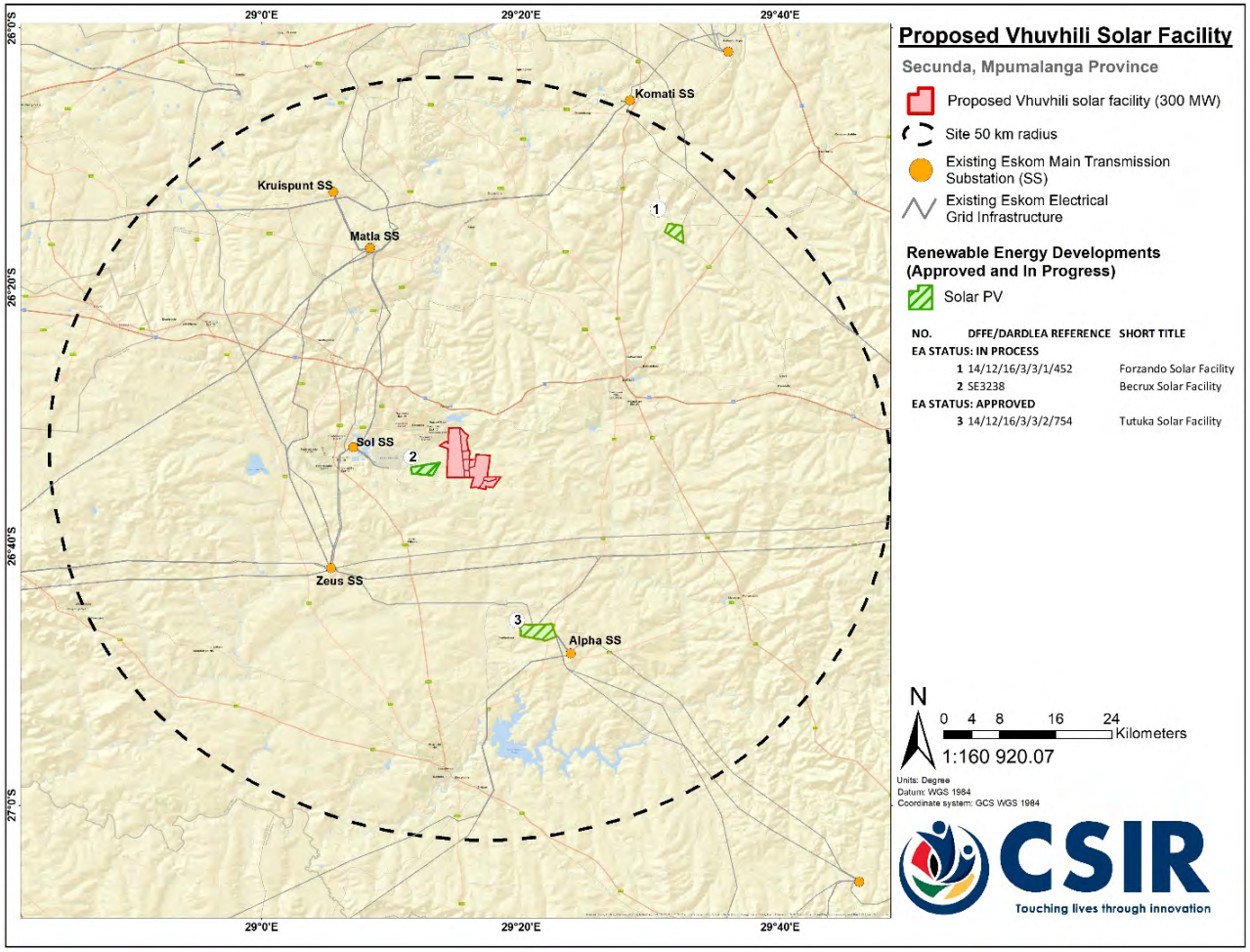


Figure 7.1: Renewable Energy projects within the 50 km radius that will considered for the Cumulative Impact Assessment to be included in the EIA phase (Source: DFEE REEA Quarter 1 2022; SAHRIS).

In addition to the above, the Impact Assessment Methodology includes the following aspects:

Nature of impact - this reviews the type of effect that a proposed activity will have on the environment and should include "what will be affected and how?"

Status - Whether the impact on the overall environment (social, biophysical and economic) will be:

- Positive - environment overall will benefit from the impact;
- Negative - environment overall will be adversely affected by the impact; or
- Neutral - environment overall will not be affected.

Spatial extent – The size of the area that will be affected by the impact:

- Site specific;
- Local (<10 km from site);
- Regional (<100 km of site);
- National; or
- International (e.g. Greenhouse Gas emissions or migrant birds).

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)).

Consequence – The anticipated severity of the impact/risk:

- Extreme (extreme alteration of natural systems, patterns or processes, i.e., where environmental functions and processes are altered such that they permanently cease);
- Severe (severe alteration of natural systems, patterns or processes, i.e., where environmental functions and processes are altered such that they temporarily or permanently cease);
- Substantial (substantial alteration of natural systems, patterns or processes, i.e., where environmental functions and processes are altered such that they temporarily or permanently cease);
- Moderate (notable alteration of natural systems, patterns or processes, i.e., where the environment continues to function but in a modified manner); or
- Slight (negligible alteration of natural systems, patterns or processes, i.e., where no natural systems/environmental functions, patterns, or processes are affected).

Reversibility of the Impacts - the extent to which the impacts are reversible assuming that the project has reached the end of its life cycle (decommissioning phase) will be:

- High reversibility of impacts (impact is highly reversible at end of project life, i.e., this is the most favourable assessment for the environment). For example, the nuisance factor caused by noise impacts associated with the operational phase of an exporting terminal can be considered to be highly reversible at the end of the project life);
- 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). The impact is permanent. For example, the loss of a palaeontological resource on the site caused by building foundations could be non-reversible).

Irreplaceability of Resource Loss caused by impacts – 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) will be:

- 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).

Using the criteria above, the impacts/risk will further be assessed in terms of the following:

Probability – The probability of the impact occurring:

- Extremely unlikely (little to no chance of occurring);
- Very unlikely (<30% chance of occurring);
- Unlikely (30-30% chance of occurring)
- Likely (51 – 90% chance of occurring); or
- Very likely (>90% chance of occurring regardless of prevention measures).

To determine the significance of an identified impact/risk, the consequence is multiplied by probability (qualitatively as shown in Figure 7.2 below). The significance is rated qualitatively against a predefined set of criteria (i.e., probability and consequence) as indicated in Figure 7.2. 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 (as shown in Figure 7.2 below).

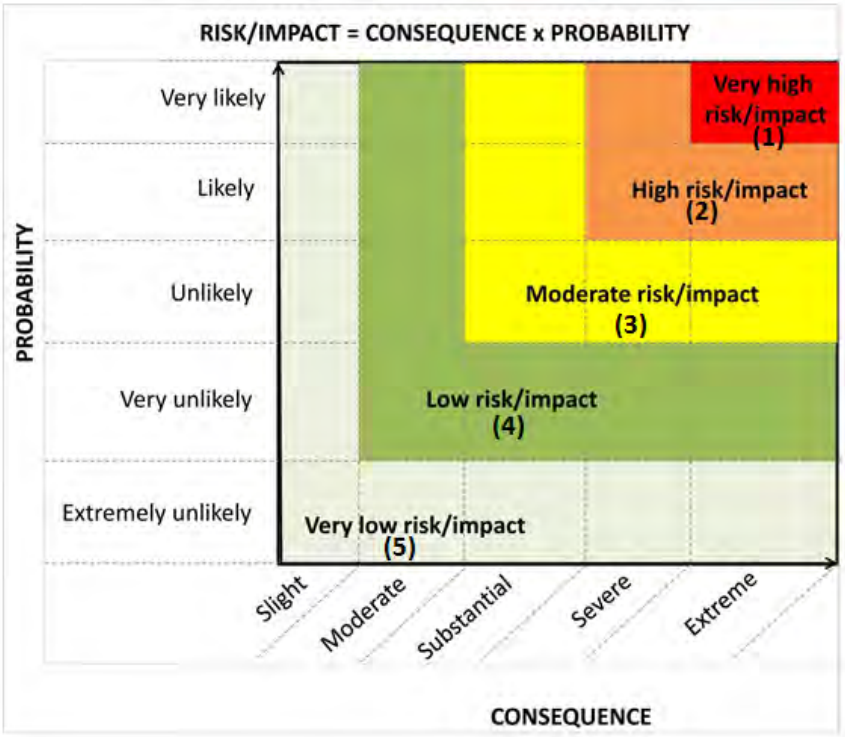


Figure 7.2: Guide to assessing risk/impact significance as a result of consequence and probability

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/impacts will result in a considerable alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making); or
- Very high (the risk/impacts 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 must be ranked as follows in terms of significance (based on Figure 7.2):

- Very low = 5;
- Low = 4;
- Moderate = 3;
- High = 2; and
- Very high = 1.

Confidence – 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 facilities/projects which are either developed or in the process of being developed in the local area (i.e., within 50 km from the proposed Vhuvhili SEF project); 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 7.4 below will be used by the specialists for the rating of impacts, and repeated for the Construction, Operational and Decommissioning Phases.

Table 7.4: Example of Table for Assessment of Impacts/Risks

Impact	Impact Criteria		Significance and Ranking (Pre-Mitigation)	Potential mitigation measures	Significance and Ranking (Post-Mitigation)	Confidence Level
CONSTRUCTION PHASE						
Habitat and species loss as a result of clearance of vegetation for the PV Facility	***Status***	*Negative*	*Moderate (3)*	*Plant search and rescue (EMPr)*	*Low (4)*	*Medium*
	Spatial Extent	*Site Specific*				
	Duration	*Long-term*				
	Consequence	*Substantial*				
	Probability	*Very likely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Moderate*				

7.6 Issues or Impacts to be assessed as part of the EIA Process

The issues and impacts presented in this Section have been identified based on scoping level assessment of the environmental status quo of the receiving environment (environmental, social and heritage features present on site – as discussed in Chapter 3 of this Scoping Report) and input from specialists that form part of the EIA project team. These issues and impacts will be assessed in further detail during the EIA Phase through the specialist assessments and are included in Chapter 6 of this Scoping Report; however, they have been summarised below in Table 7.5 for ease of reference. It must be noted that additional issues may be raised during the Scoping Phase, which could potentially be assessed during the EIA Phase. It is emphasised that this chapter and the Scoping Report in general provide preliminary impacts, sensitivities and impact significance ratings which will be updated and finalised, as relevant, and presented in more detail in the detailed Specialist studies and in the EIA Report.

Table 7.5: Summary of Issues to be addressed during the EIA Phase as part of the specialist assessments / input

Specialist Assessment / Input	Key issues to be addressed
Agriculture and Soils	**Construction Phase:** ▪ Loss of agricultural potential by occupation of land. ▪ Loss of agricultural potential by soil degradation. **Operational Phase:** ▪ Agricultural potential enhancement through increased financial security for farming operations *(positive impact).* **Decommissioning Phase:** ▪ Agricultural potential loss by soil degradation.
Aquatic Biodiversity and Species	**Construction, Operational and Decommissioning Phases:** ▪ Alteration in flow regime. ▪ Changes in sediment regimes. ▪ Introduction and spread of alien vegetation. ▪ Loss and disturbance of riparian/watercourse habitat and vegetation. ▪ Alteration in water quality due to pollution. ▪ Loss of aquatic biota.
Terrestrial Biodiversity and Species	**Construction Phase:** ▪ The clearing of natural vegetation. ▪ The loss of threatened, protected, CITES listed and/or endemic plants/animals. ▪ Loss of faunal habitat. ▪ Direct faunal mortalities due to construction and increased traffic. ▪ Increased dust deposition. ▪ Increased human activity, noise and light levels. ▪ Establishment of alien vegetation. ▪ Increased water run-off and erosion. ▪ Changes in animal behaviour. **Operational Phase:** ▪ Direct faunal mortalities. ▪ Establishment of alien vegetation. ▪ Increased water run-off and erosion. ▪ Changes in animal behaviour. **Decommissioning Phase:** ▪ Establishment of alien vegetation. ▪ Increased water run-off and erosion.
Avifauna Impact Assessment	**Construction Phase:** ▪ Displacement due to disturbance and habitat transformation associated with the construction of the solar PV plants and associated infrastructure.

Specialist Assessment / Input	Key issues to be addressed
	Operational Phase: ▪ Displacement due to habitat transformation associated with the presence of the solar panels. ▪ Collisions with the solar panels. ▪ Entrapment in perimeter fences. ▪ Electrocutions in the onsite substations. **Decommissioning Phase:** ▪ Displacement due to disturbance associated with the decommissioning of the solar PV plants and associated infrastructure.
Heritage Impact Assessment (including Archaeology and Cultural Landscape)	**Construction Phase** ▪ Potential impacts on archaeological remains. ▪ Potential impacts on graves. ▪ Potential impacts on the cultural landscape. **Operational Phase** ▪ Impacts to the cultural landscape. **Decommissioning Phase** ▪ Impacts to the cultural landscape.
Palaeontology Impact Assessment	**Construction and Decommissioning Phases:** ▪ Damage and/or destruction of scientifically valuable fossils preserved at or beneath the ground due to surface clearance or excavations. **Operational Phase:** Note: No impacts identified for the Operational Phase.
Socio-Economic Assessment	**Construction Phase:** ▪ Creation of employment and business opportunities during the construction phase, and the opportunity for skills development and on-site training. ▪ Potential impacts on family structures and social networks associated with the presence of construction workers. ▪ Potential impacts on family structures, social networks and community services associated with the influx of job seekers. ▪ Potential risk to farmers and farm workers, livestock and damage to farm infrastructure associated with the presence and activities of construction workers on site. ▪ Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires. ▪ Potential noise, dust and safety impacts associated with construction related activities. ▪ Impact on productive farmland. **Operational Phase:**

Specialist Assessment / Input	Key issues to be addressed
	▪ The establishment of infrastructure to improve energy security and support the renewable sector. ▪ Creation of employment opportunities. ▪ Generation of additional income for affected landowners. ▪ Visual impacts and associated impacts on rural sense of place. ▪ Impact on property values. ▪ Impact on existing and future tourism operations. **Decommissioning Phase:** ▪ Social impacts associated with retrenchment including loss of jobs, and source of income. ▪ Creation of temporary employment opportunities, which would represent a positive temporary impact.
Visual Impact Assessment	**Construction Phase:** ▪ Potential alteration of the visual character and sense of place resulting from construction activities. ▪ Potential visual intrusion resulting from large construction vehicles and equipment. ▪ Potential visual effect of construction laydown areas and material stockpiles. ▪ Potential impacts of increased dust emissions from construction activities and related traffic. ▪ Potential visual scarring of the landscape as a result of site clearance and earthworks. ▪ Potential visual pollution resulting from littering on the construction site. **Operational Phase:** ▪ Potential alteration of the visual character and sense of place. ▪ Potential visual intrusion resulting from the presence of PV arrays, particularly in more natural undisturbed settings. ▪ Potential visual clutter caused by substation and other associated infrastructure on-site. ▪ Potential impacts of increased dust emissions from maintenance vehicles accessing the site via gravel roads. ▪ Potential visual scarring of the landscape as a result of site clearance and earthworks. ▪ Potential glint and glare impacts on passing motorists and nearby receptors. ▪ Potential visual impact on the night-time visual environment. **Decommissioning Phase:** ▪ Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process. ▪ Potential impacts of increased dust emissions resulting from decommissioning activities and related traffic. ▪ Potential visual scarring of the landscape as a result of decommissioning activities. ▪ Potential visual intrusion of any remaining infrastructure on the site.

Specialist Assessment / Input	Key issues to be addressed
Traffic Impact Assessment	**Construction, Operational and Decommissioning Phases:** ▪ Increase in traffic and associated noise, dust and exhaust pollution due to traffic.
Battery Energy Storage Facility	**The following issues are for consideration for the proposed BESS:** ▪ Toxic smoke and fires/explosions and proximity to occupied residences. ▪ Suitable secondary spill containment for the large volume of electrolyte.

7.7 Alternatives to be assessed in the EIA Phase

A description of the alternatives that will be assessed or considered during the EIA Phase is provided in Chapter 5 of this Scoping Report. However, they have been summarised below for ease of reference:

- **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 Vhuvhili SEF project. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It will provide a baseline against which other alternatives will be compared and considered during the EIA Phase. The no-go alternative will be assessed by all the specialists on the project team.
- **Land Use Alternative:**
  - The Agricultural Assessment (Appendix G.1) states that the site is in a grain farming agricultural region, but the soils vary in their suitability for crop production. Because of the favourable climate and the potentially high grain yields, farmers in the area, and particularly a large-scale farmer on whose land the site is located, utilise all suitable soil for grain production. Only soil that is not suitable for grain production is used for cattle grazing. Limitations that render the soil unsuitable for grain production are depth limitations due to rock or dense clay in the subsoil, and the limited drainage associated with the dense, poorly drained clay layers in the subsoil.

    The footprint of the Vhuvhili SEF has been deliberately laid out so that it avoids the areas that have suitable soils and are therefore used for grain production. The grazing lands are rooigras (*Themeda triandra*) grasslands. Grass fields are burned or mowed from time to time.

    Most of the farm portions on which the proposed Vhuvhili SEF is located, form only a small part of a much bigger farming operation that utilises many different farms with a total cropland of approximately 6,000 hectares and cattle grazing of around 7,000 to 8,000 hectares (Lanz, 2022).

    The proposed Vhuvhili SEF project will generate an additional income stream to the landowners and thus offers some positive impact on agriculture by way of improved financial

security for farming operations, as well as wider, societal benefits (Lanz, 2022). Based on this, the proposed Vhuvhili SEF project is viable and from the EIA process perspective, it is preferred. However, it is important to note that there are no flaws from an agricultural perspective and that the proposed Vhuvhili SEF project is not seen as a significant impact to the current farming practices on site.

The Agricultural specialist concluded in his report (Appendix D.1) that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. According to the land capability rating for the site, which includes a land capability value of 8, any solar facility will not be within the allowable development limits. However, a land capability of 8 is disputed for the proposed agricultural footprint of the development, and the facility is therefore within the allowable limits. The evidence for this is detailed in the Agricultural Assessment included in Appendix D.1 of this report.

- **Type of Activity Alternative:**
  - This relates to the generation of electricity from a renewable energy source, and in this particular case, from solar PV energy. The **generation of electricity from a renewable energy source** was the only activity considered by the Project Developer, and thus considered in this Draft Scoping Report (DSR). No other activity types were considered or deemed appropriate based on the expertise of the Project Developer.
- **Renewable Energy Alternatives:**
  - The development of Solar PV is the preferred and only renewable energy technology to be assessed as part of the EIA Phase, as the site has a very good solar resource availability (i.e., it has a Global Horizontal Irradiation (GHI) of 2 000 – 2 200 kWh/m^2), and the local conditions are favourable.
  - Hydro Power and Biomass Energy are deemed unsuitable.
  - The study area does have good wind resources (i.e., 700 W/m^2), however other sites might have better wind resources. In addition, based on the findings of the initial Screening Studies undertaken by ENERTRAG the development of wind energy would have a higher visual impact as the residential areas within the towns of Secunda and Trichardt are located within the Vhuvhili SEF study area. There would be limited space available based on the Very High and High sensitivities.
- **Preferred Site and Development Footprints within the Study Area:**
  - The preferred site for the proposed Vhuvhili SEF project extends over the following farm portions:

Farm name	Farm No.	Farm Portion	SG code
GROOTVLEI	584	RE	T0IS000000000058400000
GROOTVLEI	293	23	T0IS000000000029300023
GROOTVLEI	293	18	T0IS000000000029300018
GROOTVLEI	293	20	T0IS000000000029300020
GROOTVLEI	293	21	T0IS000000000029300021
POVERTY ACRES	585	RE	T0IS000000000058500000
VLAKSPRUIT	292	22	T0IS000000000029200022
VLAKSPRUIT	292	21	T0IS000000000029200021

- The development footprint within the proposed project site has been determined through a screening exercise of the project site undertaken in 2020 on a desktop basis, as well as a screening and site verification exercise undertaken by the Agricultural specialist, Mr. Johann Lanz, as well as inputs from the current specialist team (specialist inputs have been provided during the Scoping Phase and are included in Appendix G of this Scoping Report), and through consultation with the affected landowners to identify sensitive areas that should preferably be avoided and thus are excluded from development (i.e., 'no-go' areas). The findings of the Scoping Level Specialist Assessments were used to determine the Revised Scoping Buildable Areas, which extend approximately 650 ha (i.e., approximately 21% of the combined area (i.e., 3 115 ha) of the affected farm portions listed above). The preferred project layout will be confirmed following the input from the various specialists during the EIA Phase

- **Technology Alternatives:**
  - It is proposed that Lithium Battery Technologies, such as Lithium-Ion Phosphate, Lithium Nickel Manganese Cobalt oxides or Vanadium Redox flow technologies be considered as the preferred battery technology, however, the specific technology will only be determined following Engineering, Procurement and Construction (EPC) procurement:
  - These different BESS technologies will therefore be taken forward for further assessment in the BESS Risk Assessment to be undertaken by ISHECON in the EIA phase.

It is important to note that where alternatives are not feasible or will not be assessed, a motivation has been provided in Chapter 5 of this Scoping Report. The preferred alternatives will be assessed during the EIA Phase.

7.8 Terms of Reference for the Specialist Assessments

The ToRs for the Specialist Assessments will essentially consist of the generic assessment requirements and the specific issues identified for each discipline. The ToRs will be updated to include relevant comments received from I&APs and authorities during the 30-day commenting period of the Draft Scoping Report.

The following Specialist Assessments have been identified following consultation with the National Environmental Screening Tool[2] to determine a baseline description of the prevalent environmental sensitivities within the proposed project site and based on an understanding of potential issues associated with Solar PV projects. The ToR for each Specialist Assessment is discussed in detail below. The Specialist Assessments and associated Specialists are indicated in Table 7.6 below. Additional Specialist Assessments could possibly be commissioned as a result of concerns raised during the Scoping Phase.

Table 7.6: Specialist Assessments and associated Specialist Consultants commissioned to assess the environmental sensitivities in the EIA Phase

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
Environmental Management Services (CSIR)		
Paul Lochner *(Registered EAP (2019/745))*	CSIR	Technical Advisor and Quality Assurance
Minnelise Levendal (*Pr.Sci.Nat.)*	CSIR	Project Manager and EAP
Dhiveshni Moodley *(Cand.Sci.Nat.)*	CSIR	Project Officer and GIS Specialist
Specialists		
Johann Lanz (*Pr.Sci.Nat.)*	Private	Agriculture and Soils Compliance Statement
Dr Noel van Rooyen *(Pr.Sci.Nat.)*	Ekotrust cc	Terrestrial Biodiversity and Species Impact Assessment
Lorainmari den Boogert (Pr.Sci.Nat.), Antoinette Bootsma Nee van Wyk (Pr.Sci.Nat.), Rudi Bezuidenhoudt (Pr.Sci.Nat.) and André Strydom	Iggdrasil Scientific Services & Limosella Consulting	Aquatic Biodiversity and Species Impact Assessment
Chris van Rooyen and Albert Froneman (*Pr.Sci.Nat.)*	Chris van Rooyen Consulting	Avifauna Impact Assessment
Kerry Schwartz	SiVEST SA (Pty) Ltd	Visual Impact Assessment
Dr Jayson Orton	ASHA Consulting (Pty) Ltd	Heritage Impact Assessment (Archaeology and Cultural Landscape)
Professor Marion Bamford	Private	Palaeontology Site Sensitivity Verification Report
Tony Barbour	Tony Barbour Environmental Consulting	Socio-Economic Impact Assessment
Avheani Ramawa and Iris Wink *(Pr Tech Eng)*	JG Afrika (Pty) Ltd	Traffic Impact Assessment
Debbie Mitchell *(Pr Eng)*	Ishecon cc	Battery Storage High Level Safety, Health and Environment Risk Assessment
Sandile Nkosi	WSP Golder	Geotechnical Desktop Study
Minnelise Levendal (*Pr.Sci.Nat.*) and Rohaida Abed *(Pr.Sci.Nat.)*	CSIR	Civil Aviation Site Sensitivity Verification and, where required, Compliance Statement **(**Note: TBC)
Minnelise Levendal (Pr.Sci.Nat.) and Rohaida Abed (Pr.Sci.Nat.)	CSIR	Defence Site Sensitivity Verification

[2] The National Screening Tool can be accessed at https://screening.environment.gov.za/screeningtool/#/pages/welcome

The requirements for Specialist Assessments are specified in Appendix 6 of the 2014 NEMA EIA Regulations, as amended, as well as, where relevant, the Assessment Protocols that were published on 20 March 2020, in Government Gazette 43110, GN R320; and on 30 October 2020 in Government Gazette 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) as well as 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. The current use of the land and the environmental sensitivity of the site under consideration identified by the National Web-Based Screening Tool, where determined, must be verified and confirmed by undertaking a Site Sensitivity Verification. The Site Sensitivity Verification must be compiled and included as an appendix to the Specialist Assessment. However, in certain instances, there are no sensitivity layers on the Screening Tool for a particular Specialist Assessment. For example, as at November 2021, there are no sensitivity layers on the National Web-Based Screening Tool for socio-economic and traffic features. For all Specialist Assessments that fall within the ambit of Part A of GN R320, Appendix 6 of the 2014 NEMA EIA Regulations, as amended, must be complied with.
- **Part B**: This includes the Site Sensitivity Verification requirements as well as 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 S&EIA:
    - **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 activities requiring EA (based on the classification identified by the Screening Tool);
    - **Aquatic Biodiversity**: Site Sensitivity Verification Report required and specific Assessment Protocol to be followed. This applies to all 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 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 activities requiring EA (based on the classification identified by the Screening Tool); and

The Assessment Protocols in GN R1150 include the following sections which are applicable to the proposed project:

- **Terrestrial animal species**: Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species.

- **Terrestrial plant species**: Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial plant species.

7.8.1 Agricultural Assessment

The Agricultural Assessment must comply with the Assessment Protocols that were published on 20 March 2020, in Government Gazette 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 site includes land that is classified by the national web-based environmental screening tool as high sensitivity for impacts on agricultural resources. The level of agricultural assessment required in terms of the protocol (and hence in terms of NEMA) is therefore an Agricultural Agro-Ecosystem Specialist Assessment. The terms of reference for such an assessment, as stipulated in the protocol, are listed below. The protocol also requires that a Site Sensitivity Verification be done.

1. The assessment must be undertaken by a soil scientist or agricultural specialist registered with the South African Council for Natural Scientific Professions (SACNASP).
2. The assessment must be undertaken on the preferred site and within the proposed development footprint.
3. The assessment must be undertaken based on a site inspection as well as an investigation of the current production figures, where the land is under cultivation or has been within the past 5 years, and must identify:
    1. the extent of the impact of the proposed development on the agricultural resources;
    2. whether or not the proposed development will have an unacceptable negative impact on the agricultural production capability of the site, and in the event where it does, whether such a negative impact is outweighed by the positive impact of the proposed development on agricultural resources.
4. The status quo of the site must be described, including the following aspects which must be considered as a minimum in the baseline description of the agro-ecosystem:
    1. The soil form/s, soil depth (effective and total soil depth), top and sub-soil clay percentage, terrain unit and slope;
    2. Where applicable, the vegetation composition, available water sources as well as agro-climatic information;
    3. The current productivity of the land based on production figures for all agricultural activities undertaken on the land for the past 5 years, expressed as an annual figure and broken down into production units;
    4. The current employment figures (both permanent and casual) for the land for the past 3 years, expressed as an annual figure;
    5. Existing impacts on the site, located on a map where relevant (e.g. erosion, alien vegetation, non-agricultural infrastructure, waste, etc).
5. Assessment of Impacts, including the following which must be considered as a minimum in the predicted impact of the proposed development on the agro-ecosystem:

1. Change in productivity for all agricultural activities based on the figures of the past 5 years, expressed as an annual figure and broken down into production units;
2. Change in employment figures (both permanent and casual) for the past 5 years expressed as an annual figure;
3. Any alternative development footprints within the preferred site which would be of "medium" or "low" sensitivity for agricultural resources as identified by the screening tool and verified through the site sensitivity verification.

6. The findings of the Agricultural Agro-Ecosystem Specialist Assessment must be written up in an Agricultural Agro-Ecosystem Specialist Report that contains as a minimum the following information:
   1. Details and relevant experience as well as the SACNASP registration number of the soil scientist or agricultural specialist preparing the assessment including a curriculum vita;
   2. A signed statement of independence by the specialist;
   3. The duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
   4. A description of the methodology used to undertake the on-site assessment inclusive of the equipment and models used, as relevant;
   5. A map showing the proposed development footprint (including supporting infrastructure) with a 50 m buffered development envelope, overlaid on the agricultural sensitivity map generated by the screening tool;
   6. An indication of the potential losses in production and employment from the change of the agricultural use of the land as a result of the proposed development;
   7. an indication of possible long-term benefits that will be generated by the project in comparison to the benefits of the agricultural activities on the affected land;
   8. Additional environmental impacts expected from the proposed development based on the current status quo of the land including erosion, alien vegetation, waste, etc.;
   9. Information on the current agricultural activities being undertaken on adjacent land parcels;
   10. a motivation must be provided if there were development footprints identified as per point 5.3 above that were identified as having a medium or low agricultural sensitivity and that were not considered appropriate;
   11. Confirmation from the soil scientist or agricultural specialist that all reasonable measures have been considered in the micro-siting of the proposed development to minimise fragmentation and disturbance of agricultural activities;
   12. A substantiated statement from the soil scientist or agricultural specialist with regards to agricultural resources on the acceptability or not of the proposed development and a recommendation on the approval or not of the proposed development;
   13. Any conditions to which this statement is subjected;
   14. Where identified, proposed impact management outcomes or any monitoring requirements for inclusion in the Environmental Management Programme (EMPr);
   15. A description of the assumptions made and any uncertainties or gaps in knowledge or data.
   16. 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);

17. confirmation whether the development footprint is in line with the allowable development limits set in Table 1 above, including where applicable any deviation from the set development limits and motivation to support the deviation, including:
    a. where relevant, reasons why the proposed development footprint is required to exceed the limit;

    b. where relevant, reasons why this exceedance will be in the national interest; and

    c. where relevant, reasons why there are no alternative options available including evidence of alternatives considered; and

a map showing the renewable energy facilities within a 50km radius of the proposed development

The Specialist is also required to:

- Incorporate and address all 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 EMPr for 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 for substations. If so, a list of the required specific impact management outcomes and actions must be provided.

7.8.2 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);
- Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant Species (GG 43855 / GN R1150, 30 October 2020).

The Specialist has conducted a site visit and fieldwork in December 2021 (during the main rainy season when approximately 86% of the annual rainfall occurs) to identify the level of sensitivity assigned to the project study area, and to verify and confirm this sensitivity and land use as per the National Web-Based Screening Tool. Based on the findings from the site visit and the Site Sensitivity Verification Report including the Scoping Level Specialist Assessment (included in Appendix G.2 of this Draft Scoping Report) prepared by the Specialist, it was confirmed that a Terrestrial Biodiversity Specialist Assessment Report, Terrestrial

Plant Species Specialist Assessment Report, and Terrestrial Animal Species Compliance Statement (the input complying with the content requirements of the abovementioned protocols) are required during the EIA Phase.

The Terrestrial Biodiversity and Plant Species Specialist Assessment, and Terrestrial Animal Species Compliance Statement, are 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. 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 was provided to address the Terrestrial Biodiversity and Species and the Terrestrial Plant Species Protocols (please refer to Appendix G.2). The report also addressed faunal species and includes a Site Sensitivity Verification report for the Terrestrial Animal Species Themes.

However, the Avifauna specialist on the specialist team conducted an Avifauna Assessment based on the Terrestrial Animal Species Protocols (please refer to Appendix G.4).

The Terrestrial Biodiversity and Plant Species Specialist Assessment will include the following:

- Contact details of the specialist, their SACNASP registration number, their field of expertise 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 National Web-Based 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;
- 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 on site (e.g. protected tree and provincially protected species);
- 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 renewable energy projects and other applicable (and relevant) projects within 50 km of the proposed project (refer to Table 7.3 above).
    - 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 substantiated statement indicating the acceptability of the proposed development and a recommendation if the development should go ahead or not 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 320);
- A description of the mean density of observations/number of samples sites per unit area of site inspection observations, where possible, as noted in the Species Environmental Assessment Guideline;
- A section indicating how the National Web-Based Screening Tool was interrogated and whether classification of the site is accurate or not, in terms of sensitivity and land-use. 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;
- Provision of recommendations with regards to potential monitoring programmes;
- 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 Terrestrial Animal Species Compliance Statement will be prepared by a specialist registered with SACNASP (with expertise in the field of Zoological Science or Ecological Science) 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 on 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 Specialist is also required to:

- Incorporate and address all 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.

7.8.3 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.

The site visit was conducted in the week of the 1st to the 4th of February 2022 by the wetland specialist, Rudi Bezuidenhoudt. The aquatic specialist, Andre Strydom, conducted the site visits in January (3rd to 7th) but not all sites could be sampled due to access issues. An additional site visit was conducted on 3-5th of February but the aquatic ecosystems were in flood and hence the survey aborted. The final site visit was conducted on the 22nd to 24th of February 2022. The surveys were therefore conducted in the summer or high flow season. No dry season surveys were conducted as part of the assessment.

The site visits were conducted by the specialists, in order to identify the level of sensitivity assigned to the project study area, and to verify and confirm this sensitivity and land use as per the National Web-Based Screening Tool. Based on the findings from the site visit and the Site Sensitivity Verification Report including the Scoping Level Specialist Assessment (included in Appendix G.3 of this Draft Scoping Report) prepared by the Specialist in accordance with the requirements documented in the Assessment Protocol (GG 43110 / GN R320 of 20 March 2020), it was confirmed that an Aquatic Biodiversity and Species Impact Assessment (the input complying with the content requirements of the said Aquatic Biodiversity Protocol) 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 320). 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:

- 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;
- 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;
- 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;
- 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;
- 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;
- Identify and assess the potential direct, indirect and cumulative impacts of the proposed development on aquatic biodiversity and species:

  - Cumulative impacts to be assessed by considering renewable energy projects and other applicable (and relevant) projects within 50 km of the proposed projects (refer to Table 7.3 above).
  - 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.
- An impact statement indicating the acceptability of the proposed development and a recommendation if the development should go ahead or not;
- A description of the assumptions made, any uncertainties or gaps in knowledge or data, and limitations in the report;
- A section indicating how the National Web-Based 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 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;
- Contact details of the specialist, their SACNASP registration number, their field of expertise and a Curriculum Vitae;
- A signed statement of independence by the specialist;
- Provision of 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 all 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.

7.8.4 Avifauna Impact Assessment

The Avifauna 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 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 Africa[3] to determine the level of survey effort that is required.

The specialist conducted a pre-construction monitoring programme at the proposed project site. The pre-construction avifaunal monitoring programme is following an adapted Regime 2 protocol as defined in the Birds and Solar Energy Best Practice Guidelines (Jenkins *et al.* 2017) which require three surveys over a six- month period. Three site visits were undertaken as follow:

- First Site Visit – 22 – 26 July 2021;
- Second Site Visit – 04 December 2021; and
- Third Site Visit - 05 – 08 January 2022.

Based on the findings from the site visit and the Site Sensitivity Verification Report including the Scoping Level Specialist Assessment (included in Appendix G.4 of this Draft Scoping Report) prepared by the Specialist, it was confirmed that an Avifauna Specialist Assessment Report (the input complying with the content requirements of GN1150 and the above-mentioned guidelines, where possible) 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.

Although the general bird community is considered, this assessment will focus on the priority species, specifically those considered to be more sensitive to solar energy development related impacts.

The Avifauna Impact Assessment will include the following tasks:

- Finalise 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.

[3] BirdLife South Africa by Jenkins, A.R., Ralston-Patton, Smit- Robinson, A.H. 2017.

- 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;
- Provide review input on the preferred infrastructure layout following the sensitivity analysis and layout identification (to identify location of areas not suitable for development and to be avoided during construction where relevant);
- 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 National Screening Tool;
- 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;
- Details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;
- Identification and assessment of the potential direct, indirect and cumulative impacts of the proposed development on birds:
    - Cumulative impacts to be assessed by considering renewable energy projects and other applicable (and relevant) projects within 50 km of the proposed projects (refer to Table 7.3 above).
    - 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.
- An reasoned opinion, based on the findings of the specialist assessment, indicating the acceptability of the proposed development and a recommendation if the development should go ahead 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 National Web-Based 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 signed Statement of Independence and Curriculum Vitae;
- Recommendations for mitigation of impacts to acceptable levels (where possible) and potential monitoring programmes.
- Determine mitigation and/or management measures (including monitoring if required) 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 all 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.

7.8.5 Heritage Impact Assessment

The Heritage Specialist is required to undertake a Specialist Assessment in adherence to the gazetted Environmental Assessment Protocols, specifically 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 Specialist conducted a site visit and field surveys during 10 & 13 November 2021 in order to identify the level of sensitivity assigned to the project area, and to verify and confirm this sensitivity and land use as per the National Web-Based Screening Tool. Based on the findings of the site visit, a Site Sensitivity Verification report (included as Appendix G.6) was prepared in accordance with GNR 320.

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;
- 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 renewable energy projects and other applicable (and relevant) projects within 50 km of the proposed projects (refer to Tables 7.3 above).
  - 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) and the Mpumalanga Provincial Heritage Resource Authority (MPHRA) in order to obtain a letter of approval, comments or a Permit in terms of the National Heritage Resources Act, 1999 (Act No. 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 National Web-Based 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.
- 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 all 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.

7.8.6 Palaeontology Impact Assessment

The Palaeontologist is required to undertake a Specialist Assessment in adherence to the gazetted Environmental Assessment Protocols, specifically 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 (Prof. Marion Bamford) conducted a site visit to an adjacent farm on 26 October 2021. The adjacent farm Goedenoeg 290 was surveyed for the Becrux SEF project (Bamford in CTS21_215_Savannah_Secunda_PVs). Prof. Bamford concluded that no fossils of any kind were seen during the site visit. The recently ploughed agricultural land has deep, dark soils, more or less flat topography, and no rocky outcrops.

This site visit was used to identify the level of sensitivity assigned to the project area, and to verify and confirm this sensitivity and land use as per the National Web-Based Screening Tool. Based on the findings of the site visit, a Site Sensitivity Verification report (included as Appendix G.8) was prepared in accordance with Part A of the aforementioned Assessment Protocols (GG 43110 / GNR 320, 20 March 2020).

As documented in the Environmental Assessment Protocols (GG 43110 / GNR 320, 20 March 2020);
"*where a specialist assessment is required and no specific environmental theme protocol has been prescribed, the required level of assessment must be based on the findings of the site sensitivity verification and must comply with Appendix 6 of the EIA Regulations."*

The DFFE screening tool report map for palaeontology indicates a combination of medium and very high sensitivity both within the project area and in the wider surroundings (Appendix G.8). Prof. Bamford indicates that the red areas are indeed very highly sensitive because the rocks are Vryheid Formation and could have fossils of the Glossopteris flora. The orange areas, however, are not sensitive since they are largely dolerite (zero sensitivity) but with some overlying fluvial sediments dolerite along the river and its tributaries in the centre of the site and which would be moderately sensitive). She thus disputes the screening tool map in that the stated sensitivity is too high over some parts and correct in others. No fossils were seen in the study area and the substrate is sandy which precludes any being visible at the surface.

Prof Bamford indicated that since the site visit by the archaeologist for this project confirmed that the land has been ploughed and planted in the last few decades, it is unlikely that any fossils will be seen before excavations commences. Therefore, a desktop study with a Fossil Chance Find Protocol that should be added to the EMPr, is strongly recommended.

7.8.7Socio-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.

As at May 2022, the National Web-Based Screening Tool does not include any sensitivity layers relating to socio-economic information; therefore, a Site Sensitivity Verification is technically not possible. Scoping level inputs provided by the Socio-Economic Specialist are included as Appendix G.9 to this Scoping 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;
- 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 REIPPPP program, 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;
- 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 renewable energy projects and other applicable (and relevant) projects within 50 km of the proposed projects (refer to Table 7.3 above).
    - 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 EIA Report.

The Specialist is also required to:

- Incorporate and address all 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.

7.8.8 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.

As at May 2022, the National Web-Based Screening Tool does not include any sensitivity layers relating to traffic information; therefore, a Site Sensitivity Verification is technically not possible. Scoping level inputs provided by the Traffic Specialist are included as Appendix G.10 to this Scoping Report.

The Traffic Impact Assessment must include the following tasks:

- 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;
- Specification of development setbacks or buffers required, and clear motivations for these recommendations;
- 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 renewable energy projects and other applicable (and relevant) projects within 30 km of the proposed projects (refer to Table 7.3 above).
    - 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.
- Determine the National and Local haulage routes between port of entry/manufacturer and site;
- Determine the Trip generation for the proposed development during construction and operation;
- Assessment of proposed internal roads and site access points;
- Assessment of freight requirements and permitting needed for abnormal loads;
- 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 EMPr, which will be appended to the Draft and Final EIA Reports.

The Specialist is also required to:

- Incorporate and address all 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.

7.8.9 Visual Impact Assessment

The Visual Specialist is required to undertake a Specialist Assessment in adherence to the gazetted Environmental Assessment Protocols, specifically 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 Specialist conducted a site visit from 25 – 26 January 2022 to identify the level of sensitivity assigned to the project area, and to verify and confirm this sensitivity and land use as per the National Web-Based Screening Tool.

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, modelled 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. Specification of development setbacks or buffers required, and provide clear motivations for these recommendations;
- 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 renewable energy projects and other applicable (and relevant) projects within 50 km of the proposed projects (refer to Table 7.3 above).
    - 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.
- 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 National Web-Based 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 EIA Report.

The Specialist is also required to:

- Incorporate and address all 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.

7.8.10 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 Battery Energy Storage Systems (BESS) to be installed at the proposed Vhuvhili SEF. 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 Terms of Reference 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;
- Assessing (identifying and rating) 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.11 of this Scoping Report for the Scoping High Level Safety, Health, and Environment Risk Assessment, which describes the proposed methodology for the assessment during the EIA Phase.

7.8.11 Desktop Geotechnical study

A Desktop Geotechnical Assessment will be undertaken in the EIA phase and will be included in the 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 Vhuvhili SEF study site. The Geotechnical study serves as a **technical report**, and thus Appendix 6 of the 2014 NEMA EIA Regulations (as amended) will thus **not** be applicable.

The Terms of Reference for the desktop assessment that will be completed during the EIA Phase of the project include:

- Determine whether problem soils and/or geohazards are present across the site.
- Evaluate the geological and geotechnical conditions and their influence on the founding conditions.
- Assess potential uses for materials present on-site and possible incorporation of such materials in construction activities.
- Delineate geological features of interest, e.g., steep slopes, outcrops, faults, lineaments, and/or steep slopes, that may have an impact on the development.
- Assess the influence of the groundwater on construction and development.

7.8.12 Defence

Defence Assessments are required to comply with the gazetted Environmental Assessment Protocols, specifically 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 and Chapter 4 of this Scoping Report, the entire area of interest for the proposed Vhuvhili SEF Project site is classified as 'low' sensitivity on the National Web-Based Screening Tool. Therefore, in line with GN R320, only a site sensitivity verification is necessary to confirm the site as a low sensitivity. However, this low sensitivity still needs to be verified and confirmed by means of a site visit during the EIA Phase. If the verified sensitivity appears to be medium, high or very high sensitivity, then a Compliance Statement will be required. If the verified sensitivity appears to be low, then no further requirements are necessary, except for the site sensitivity verification confirming the low sensitivity.

If a Compliance Statement is required, it will be applicable to the preferred site and proposed development footprint, and will include the following main aspects (where possible):

- Contact details of the EAP or the specialist, their relevant qualifications and expertise in preparing the statement, and a curriculum vitae;
- A signed statement of independence by the EAP or specialist compiling the statement;
- A map showing the proposed development footprint (including supporting infrastructure) overlaid on the defence sensitivity map generated by the Screening Tool;
- Where possible, a comment, from the Department of Defence confirming no unacceptable impact on military areas of interest; or requesting for further studies to be undertaken, which if required, will be appended to the Compliance Statement. The further studies, if required, must be in accordance with the requirements stipulated by the Department of Defence;
- Description of the nature of the applicable defence installations;
- Confirm the sensitivity rating for the site i.e., a section indicating how the National Web-Based Screening Tool was interrogated and whether classification of the site is accurate or not, with reasons;
- A statement indicating whether or not the proposed development will have an unacceptable impact on defence installations;
- A description of assumptions and limitations; and
- Identification of any additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof.

7.8.13 Civil Aviation

Civil Aviation Assessments are required to comply with the gazetted Environmental Assessment Protocols, specifically 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). However, as indicated in Chapter 3 and Chapter 4 of this Scoping Report, the findings from the National Web-Based Screening Tool have indicated that the proposed Vhuvhili SEF site has a medium sensitivity with the classification of "within 8 km of another civil aviation aerodrome" for some areas of the project site, with the rest of the project site being of low sensitivity. However, this sensitivity still needs to be verified and

confirmed by means of a site visit during the EIA Phase. If the verified sensitivity appears to be medium, high or very high sensitivity, then a Compliance Statement will be required. If the verified sensitivity appears to be low, then no further requirements are necessary, except for the site sensitivity verification confirming the low sensitivity.

If a Compliance Statement is required, it will be applicable to the preferred site and proposed development footprint, and will include the following main aspects (where possible):

- Contact details of the EAP or the specialist, their relevant qualifications and expertise in preparing the statement, and a Curriculum Vitae;
- A signed statement of independence by the EAP or specialist compiling the statement;
- A map showing the proposed development footprint (including supporting infrastructure) overlaid on the civil aviation sensitivity map generated by the Screening Tool);
- Where possible, a comment, from the South African Civil Aviation Authority (SACAA), which may include inputs from the Obstacle Evaluation Committee (OEC), if appropriate, confirming that there will be no unacceptable impact on civil aviation installations; or requesting for further studies to be undertaken, which if required, will be appended to the Compliance Statement;
- Description of the nature of the civil aviation installations applicable to the proposed project;
- A statement indicating whether the proposed project will have an unacceptable impact on the relevant civil aviation installation;
- A description of assumptions and limitations;
- Confirm the sensitivity rating for the site i.e., a section indicating how the National Web-Based Screening Tool was interrogated and whether classification of the site is accurate or not, with reasons; and
- Identification of any additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof.