SOLIS ENVIRONMENTAL

DRAFT SCOPING REPORT

Proposed Copper Solar Power Plant near Northam, Limpopo Province.

28 June 2023

PROJECT DETAIL

DFFE Reference No.	:	2023-06-0023
Project Title	:	Proposed Copper Solar Power Plant near Northam, Limpopo Province
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Reviewed	:	Mrs. Carli van Niekerk
Client	:	Copper Solar Power Plant (RF) (Pty) Ltd
Report Status	:	Draft Scoping Report
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GLOSSARY OF TERMS AND ACRONYMS

BA	Basic Assessment
BAR	Basic Assessment Report
CEA	Cumulative Effects Assessment
DFFE	Department of Forestry, Fisheries and the Environment
DM	District Municipality
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EP	Equator Principles
EPFI	Equator Principles Financial Institutions
Environmental impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.
GNR	Government Notice Regulation
I&AP	Interested and affected party
IAP	Invasive Alien Plant
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
kV	Kilo Volt
LM	Local Municipality
Mitigate	Activities designed to compensate for unavoidable environmental damage.
MW	Megawatt
NEMA	National Environmental Management Act No. 107 of 1998
NERSA	National Energy Regulator of South Africa
NWA	National Water Act No. 36 of 1998
PAOI	Project area of influence

POSA	Plants of South Africa
PPP	Public Participation Process
PV	Photovoltaic
REIPPP	Renewable Energy IPP Procurement Process
SAHRA	South African Heritage Resources Agency
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SPP	Solar Power Plant
SSV	Site Sensitivity Verification
VU	Vegetation Unit

CONTEXT FOR THE DEVELOPMENT

According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand, fueled by increasing economic growth and social development, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmentally responsible development, the impacts of climate change and the need for sustainable development. The use of renewable energy technologies, as one of a mix of technologies needed to meet future energy consumption requirements is being investigated as part of the national Department of Mineral Resources and Energy's (DMRE) (previously referred to as the Department of Energy) long-term strategic planning and research process.

The primary rationale for the proposed solar photovoltaic (PV) facility is to add new generation capacity from renewable energy to the national electricity mix and to aid in achieving the goal of 42% share of all new installed generating capacity being derived from renewable energy forms, as targeted by DMRE (Integrated Resource Plan Update 2010-2030). The IRP also identifies the preferred generation technologies required to meet the expected demand growth up to 2030 and incorporates government objectives including affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources and localisation and regional development. In terms of the Integrated Resource Plan Update (2019 IRP Update, 2010-2030), over the short term (of the next two or three years), clear guidelines arose; namely to continue with the current renewable bid programme with additional annual rounds of 1000 MW PV, with approximately 8.4 GW of the renewable energy capacity planned to be installed from PV technologies over the next twenty years.

The proposed project is intended to form part of the Department of Mineral Resources and Energy's (DMREs) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or any other programmes/opportunities to generate power in South Africa. The REIPPP Programme aims to secure 14 725 Megawatts (MW) of new generation capacity from renewable energy sources, while simultaneously diversifying South Africa's electricity mix. According to the 2021 State of the Nation Address, Government will soon be initiating the procurement of an additional 11 800 MW of power from renewable energy, natural gas, battery storage and coal in line with the Integrated Resource Plan 2019 and fulfilling their commitments under the United Nations Framework Convention on Climate Change and its Paris Agreement which include the reduction of greenhouse gas emissions. Eskom, our largest greenhouse gas emitter, has committed in principle to net zero emission by 2050 and to increase its renewable capacity.

In response to the above, Copper Solar Power Plant (RF) (Pty) Ltd is proposing the development of a photovoltaic solar facility and associated infrastructure for the purpose of commercial electricity generation on the Remaining Extent of Portion 1 and Portion 5 of the Farm Zwartdoorns no. 421, situated within the Thabazimbi Local Municipality area of jurisdiction (refer to Figure A for the locality map). The project entails the generation of up to 250 MW electrical power through photovoltaic (PV) technology. The total development footprint of the project will be approximately 715 hectares (including supporting infrastructure) within the 739 hectares assessed as part of the Environmental Impact Assessment (EIA) process. From a regional site selection perspective, this region is preferred for solar energy development due to its global horizontal irradiation value of around 2118 kWh/m^2.

EXECUTIVE SUMMARY

Like many other small and developing municipalities in the country, the Thabazimbi Local Municipality faces a number of challenges in addressing the needs of sustainable growth and improved quality of life. The Thabazimbi Local Municipality Integrated Development Plan (2022) states that it's the mission of the local municipality to ensure effective and efficient services delivery; stakeholders driven economic development and growth; sustainable job creation opportunities of communities; and a safe, healthy and prosperous environment.

Copper Solar Power Plant (RF) (Pty) Ltd intends to develop a 250 MW photovoltaic solar facility and associated infrastructure on the Remaining Extent of Portion 1 and Portion 5 of the Farm Zwartdoorns no. 421, situated within the Thabazimbi Local Municipality area of jurisdiction. The town of Northam is located approximately 2 km north of the proposed development (refer to Figure A and B for the locality and regional map). The total footprint of the project will approximately be 715 hectares (including supporting infrastructure on site). The site was identified as being highly desirable due to its suitable climatic conditions, topography (i.e. in terms of slope), environmental conditions (i.e. agricultural potential, ecological sensitivity and archaeology), proximity to the D1235road (i.e. to facilitate the movement of machinery, equipment, infrastructure and people during the construction phase).

In terms of the National Environmental Management Act (Act 107 of 1998), with specific reference to Sections 24 and 24D, as read with GNR 324-327, as amended (2017), Environmental Authorisation is required for the Copper Solar Power Plant (SPP). The following listed activities have been identified with special reference to the proposed development and are listed in the EIA Regulations (as amended):

- Activity 9(i) (GN.R 327): "The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water—(i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more."

- Activity 11 (i) (GN.R. 327): "The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."

- Activity 12(ii)(a)(b) (GN.R. 327): "The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more (a) within a watercourse or (b) within 32 meters of a watercourse, measured from the edge of a watercourse."

- Activity 19 (GN.R. 327): "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."

- Activity 24 (ii) (GN.R 327): "The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters."

- Activity 28 (ii) (GN.R. 327): "Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on

or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."

- Activity 56 (ii) (GN.R 327): "The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres…"

- Activity 1 (GN.R. 325): "The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more…"

- Activity 15 (GN.R. 325): "The clearance of an area of 20 hectares or more of indigenous vegetation…"

- Activity 4 (e)(i)(gg) (GNR. 324): "The development of a road wider than 4 metres with a reserve less than 13,5 metres within (e) the Limpopo province, (i) outside urban areas, (gg) areas within… 5 kilometres from any other protected area identified in terms of NEMPAA…."

- Activity 10 (e)(i) (GNR. 324): "The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres, (e) in the Limpopo province, (i) all areas."

- Activity 14(ii)(a)(c)(e)(i)(ff)(hh) (GNR. 324): "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; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; in the (e) Limpopo Province, (i) outside urban areas, within (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans and (hh) Areas within 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve."

- Activity 18 (e)(i)(gg) (GNR. 324): "The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (e) in the Limpopo province, (i) outside urban areas, (gg) areas within… 5 kilometres from any other protected area identified in terms of NEMPAA…."

Activities required for the development of the solar facility which are listed under Listing Notice 1, 2 and 3 (GNR 327, 325 and 324) implies that the development could potentially have a significant impact on the environment that will require mitigation. Subsequently a thorough assessment process is required as described in Regulations 21-24 of the EIA Regulations in order to obtain Environmental Authorisation (EA). Solis Environmental has been appointed as the independent consultant to undertake the EIA on behalf of Copper Solar Power Plant (RF) (Pty) Ltd.

Regulation 21 of the EIA Regulations requires that a scoping report must contain the information set out in Appendix 2 of the Regulations or comply with a protocol or minimum information requirements relevant to the application as identified and gazetted by the Minister in a government notice. Appendix 2 of GNR326 requires that information which 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 undertaken be set out in the scoping report.

The potentially sensitive areas which have been identified through the environmental scoping study are detailed in the chapters to follow. The scoping phase provides a high-level overview of the sensitivity on the Copper SPP project site. The detail is based on the desktop review of available baseline information for the project site, as well as the sensitivity data received from specialist studies undertaken during the scoping phase. During the scoping phase, the affected area was investigated in sufficient detail in order to provide reliable insight into the potential for constraining factors on the site. The sensitivity map(s) must be used as a tool by the developer to avoid any areas flagged to be of higher risk or sensitivity which must in turn inform the development layout which can then be further investigated during the EIA Phase in order to develop an environmentally suitable, reasonable and practical facility layout for the Copper SPP.

Based on the high-level assessments undertaken to inform this scoping process, it has been determined that the proposed development will have a net positive impact for the area and will subsequently ensure the optimal utilisation of resources and land. All negative environmental impacts can be effectively mitigated through the recommended mitigation measures and no residual negative impacts are foreseen. The potentially most significant environmental impacts associated with the development, as identified in this scoping phase, are briefly summarised below. It must be noted that the Environmental Impact Assessment (EIA) phase of the project will consider the impacts on a more detailed level and provide feedback on the facility layout for the proposed project.

Predicted impacts during the construction phase:

During the construction phase minor negative impacts are foreseen over the short term. The latter refers to a period of 12-18 months. The potentially most significant impacts relate to impacts on fauna and flora, direct disturbance / degradation / loss to wetland soils or vegetation, increased erosion and sedimentation, visual impacts, impact on palaeontology, and socio-economic impacts such as the creation of direct and indirect employment opportunities, economic multiplier effects from the use of local goods and services, potential loss in productive farmland, influx of jobseekers and change in population in the study area, temporary increase in safety and security concerns associated with the influx of people, temporary increase in traffic disruptions and movement patterns, nuisance impact (noise and dust), increased risk of potential veld fires, and impacts on the sense of place.

Impacts during the operational phase:

During the operational phase the site will serve as a Solar Power Plant energy facility and the potential impacts will take place over a period of 20 – 25 years. The negative impacts are generally associated with impacts on fauna and flora, potential for increased stormwater runoff leading to Increased erosion and sedimentation, potential for increased contaminants entering the wetland systems, visual impacts, loss of Land Capability, and soil erosion and compaction effects. The operational phase will have a direct positive impact through the creation of

employment opportunities and skills development, development of non-polluting, renewable energy infrastructure and contribution to economic development and social upliftment.

Impacts during the decommissioning phase:

The negative impacts generally associated with the decommissioning phase include: habitat destruction caused by clearance of vegetation and the loss of permanent employment. However, skilled staff will be eminently employable and a number of temporary jobs will also be created in the process. It is not expected that the facility will be decommissioned, but rather that the technology used will be upgraded.

Cumulative impacts:

Cumulative impacts could arise as other similar projects are constructed in the area. The potential for cumulative impacts is therefore limited but may still exist. The draft scoping report includes an assessment of the potential cumulative impacts associated with the proposed development. Potential cumulative impacts with a significance rating of negative medium during the construction phase relate to habitat destruction and fragmentation, displacement of priority avian species from important habitats, loss of important avian habitats, impacts of employment opportunities, business opportunities and skills development and impact associated with large-scale in-migration of people. Cumulative impacts during the operational phase relate to habitat destruction and fragmentation and visual intrusion. The cumulative effect of the generation of waste was identified as being potentially significant during the decommissioning phase.

Regulation 23 of the EIA Regulations determine that an EIA report be prepared and submitted for the proposed activity after the competent authority approves the final scoping report. The EIA report will evaluate and rate each identified impact and identify mitigation measures that may be required. The EIA report will contain information that is necessary for the competent authority to consider the application for Environmental Authorisation and to reach a decision contemplated in Regulation 24 of the EIA Regulations.

1 INTRODUCTION

This section aims to introduce the scoping report and specifically to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (…) must include- (a) details of:

(i) the EAP who prepared the report; and

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

1.1 LEGAL MANDATE AND PURPOSE OF THE REPORT

The National Environmental Management Act identifies listed activities (in terms of Section 24) which are likely to have an impact on the environment. These activities cannot commence without obtaining an EA from the relevant competent authority. Sufficient information is required by the competent authority to make an informed decision and the project is therefore subject to an Environmental Assessment Process, which can be either a Basic Assessment Process or a Scoping and Environmental Impact Assessment Process.

The Listing Notices 1 and 2 (GNR 327 and 325) outline the activities that may be triggered and therefore require EA. This implies that the development is considered as potentially having a significant impact on the environment. Subsequently a 'thorough S&EIR assessment process' is required as described in Regulations 21-24. A detailed description of the listed activities that are triggered are included in chapter 2 to follow. According to Appendix 2 of Regulation 326 the objective of the scoping process is to, through a consultative process:

- Identify the relevant policies and legislation relevant to the 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;
- 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;
- Identify the key issues to be addressed in the assessment phase;
- Agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and

- 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.

This draft scoping report will be submitted to the DFFE for review and comment. According to Regulation 326 all registered I&APs and relevant state departments (including Organs of State) must be allowed the opportunity to review and provide comment on the Draft Scoping Report. The Draft Scoping Report will be made available to I&APs and all relevant State Departments for a 30-day review and commenting period between **28 June – 28 July 2023**. They will be requested to provide written comments on the report within 30 days of receiving it. All issues to be identified and comments received during the review period will be documented and compiled into a Comments and Response Report to be included as part of this Final Scoping Report. Where comments have been received prior to the release of the Draft Scoping Report for the 30-day review and comment period, these comments have been included in Appendix C5 and C6 and has also been included and responded to in the Comments and Responses Report (Appendix C7).

1.2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Solis Environmental (previously Environamics Environmental Consultants) was appointed by the applicant as the independent EAP to conduct the EIA and prepare all required reports. All correspondence to the EAP can be directed to:

Contact person:	Herman Alberts
EAPASA Registration:	2019/1328
Postal Address:	14 Kingfisher Street, Tuscany Ridge Estate, Potchefstroom, 2531
Telephone:	063 685 2093 (Cell)
Electronic Mail:	herman@solis-environmental.co.za
And/or	
Contact person:	Christia van Dyk
Postal Address:	14 Kingfisher Street, Tuscany Ridge Estate, Potchefstroom, 2531
Telephone:	078 470 5252 (Cell)
Electronic Mail:	christia@solis-environmental.co.za

Regulation 13(1)(a) and (b) determines that an independent and suitably qualified and experienced EAP should conduct the S&EIR process. In terms of the independent status of the EAP, a declaration is attached as Appendix A to this report. The expertise of the EAP responsible for conducting the S&EIR is also summarised in the curriculum vitae included as part of Appendix A.

1.3 DETAILS OF SPECIALISTS

Table 1.1 provides information on the specialists that have been appointed as part of the EIA process. Regulation 13(1)(a) and (b) determines that an independent and suitably qualified, experienced, and independent specialist should conduct the specialist study, in the event where the specialist is not independent, a specialist should be appointed to externally review the work

of the specialist as contemplated in sub regulation (2), must comply with sub regulation 1. In terms of the independent status of the specialists, their declarations are attached as Appendix E to this report. The expertise of the specialists is also summarised in their respective reports.

Table 1.1: Details of Specialists

Study	Prepared by	Contact Person	Contact Number	E-mail Address
Terrestrial Ecology Baseline and Impact Assessment	The Biodiversity Company	Andrew Husted	Cell: 081 319 1225	info@thebiodiversitycompany.com
Avifaunal Scoping Assessment				
Wetland Baseline and Risk Assessment				
Soil and Agricultural Potential Assessment				
Heritage Impact Assessment	APAC	A.J. Pelser	Cell: 0834593091	apac.heritage@gmail.com
Paleontological Study	Banzai Envronmental	Elize Butler	Cell: 0844478759	info@banzai-group.com
Social Impact Assessment	Donaway Environmental	Johan Botha	Cell: 082 493 5166 Tel: 082 316 7749	johan@donaway.com
Visual Impact Assessment				
Traffic Assessment Study	iWink Consulting	Iris Wink	Cell: 060 557 7467	iris@iwink.co.za

1.4 STATUS OF THE EIA PROCESS

The Scoping and Environmental Impact Reporting (S&EIR) process is conducted strictly in accordance with the stipulations set out in Regulations 21-24 of Regulation No. 326. Table 1.2 provides a summary of the EIA process and future steps to be taken. It can be confirmed that to date:

- A newspaper advertisement was placed in the Platinum Bushvelder on 19 May 2023, informing the public of the EIA process and for the public to register as I&APs.
- A site visit was conducted by the EAP on 15 May 2023.
- Site notices were erected on site on 15 May 2023 informing the public of the commencement of the EIA process.
- The Background Information Document (BID) was circulated to all I&APs and surrounding landowners on 19 May 2023.
- A pre-application meeting request was submitted to DFFE on 27 June 2023 and it was indicated that a pre-application meeting is not required. Feedback was received from the DFFE on 28 June 2023, confirming that no pre-application meeting was required.
- An application form and the draft Scoping Report was submitted to DFFE on 28 June 2023.
- The draft Scoping Report has been made available for a 30-day review and comment period from 28 June 2023 to 28 July 2023.

It is envisaged that the Final Scoping Report will be submitted to the Department in August 2023 and that the Final Scoping Report will be accepted by the Department in September 2023. The EIA process should be completed within approximately nine months of submission of the Draft Scoping Report, i.e. by March 2024 (see Table 1.2).

Table 1.2: Estimated timeframe for completion of the 'scoping and EIA process'

Activity	Prescribed timeframe	Timeframe
Site visits	-	15 May 2023
Public participation (BID)	30 Days	19 May – 19 June 2023
Conduct specialist studies	2 Months	Feb. – May. 2023
Submit application form and DSR	-	28 June 2023
Public participation (DSR)	30	28 June – 28 July 2023
Submit FSR	44	August 2023
Approval of Final Scoping Report	43 Days	September 2023
Submit Draft EIR & EMPr	106 Days	September 2023

Public participation (DEIR)	30 Days	Sept. – Oct. 2023
Submission of FEIR & EMPr	-	October 2023
Decision	107 Days	March 2024
Public participation (decision) & submission of appeals	20 Days	May 2024

1.5 SPECIALIST STUDIES IDENTIFIED IN THE DFFE SCREENING TOOL REPORT

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16(1)(b)(v) of the 2014 EIA Regulations (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of applications in terms of Regulations and 21 – 24 of the EIA Regulations. The requirement for the submission of a Screening Report for the Copper SPP is applicable as it triggers Regulation 21 of the EIA Regulations, 2014 (as amended). The Screening Report has been appended to the Application for EA was submitted to the DFFE on 28 June 2023.

The table included below provides an indication of the specialist studies identified by the DFFE Screening Tool Report (Appendix B), an indication of whether the studies were undertaken or not and a motivation or confirmation of the studies being included or not.

Table 1.3: Specialist studies identified by the DFFE Screening Tool Report (Appendix B)

Study identified in the DFFE Screening Tool and sensitivity	Study included?	Appendix
Agricultural Impact Assessment Sensitivity: Very High	Yes	A Soil and Agriculture Impact Assessment is included in Appendix E4.
Landscape / Visual Impact Assessment Sensitivity: Very High	Yes	A Visual Impact Assessment is included in Appendix E3.
Archaeological and Cultural Heritage Impact Assessment Sensitivity: Low	Yes	A Heritage Impact Assessment is included in Appendix E5.
Palaeontological Impact Assessment Sensitivity: High	Yes	A Palaeontological Impact Assessment is included in Appendix E6.
Terrestrial Biodiversity Impact Assessment Sensitivity: Very High	Yes	A Terrestrial Biodiversity Assessment Report is included in Appendix E1. This assessment has been undertaken in terms of the

		Protocols of GNR320 – refer to the content of the report.
Aquatic Biodiversity Impact Assessment Sensitivity: Low	Yes	A Wetland Assessment Report is included in Appendix E. This assessment has been undertaken in terms of the Protocols of GNR320 – refer to the content of the report.
Avian Impact Assessment Sensitivity: Low	Yes	Avifauna Impact Assessment Report is included as Appendix E9. This assessment has been undertaken in terms of the Protocols of GNR320 – refer to the content of the report.
Civil Aviation Assessment Sensitivity: Medium	No	Study not included. Refer to section 2 of this report for site verification.
Defence Theme Sensitivity: Low	No	Study not included. Refer to section 2 of this report for site verification.
RFI Assessment Sensitivity: Low	No	Study not included. Refer to section 2 of this report for site verification.
Geotechnical Assessment Sensitivity: Not indicated	No	The Geotechnical Assessment will be conducted before construction begins as part of the micro-siting of the facility layout. The consideration of geotechnical aspects is considered to be of a technical concern rather than an environmental concern.
Plant species Assessment Sensitivity: Low	Yes	Refer to Appendix E1. The Terrestrial Biodiversity Impact Assessment also includes the relevant Plant Species Assessment. This assessment has been undertaken in terms of the

		Protocols of GNR320 – refer to the content of the report.
Animal Species Assessment Sensitivity: Medium	Yes	Refer to Appendix E1. The Terrestrial Biodiversity Impact Assessment also includes the relevant Animal Species Assessment. This assessment has been undertaken in terms of the Protocols of GNR320 – refer to the content of the report.

1.6 STRUCTURE OF THE REPORT

This report is structured in accordance with the prescribed contents stipulated in Appendix 2 of Regulation No.326. It consists of eight sections demonstrating compliance to the specifications of the regulations as illustrated in Table 1.4.

Table 1.4: Structure of the report

Requirements for the contents of a scoping report as specified in the Regulations		Section in report
(a)	details of -	1
	(i) the EAP who prepared the report; and	
	(ii) the expertise of the EAP, including a curriculum vitae.	
(b)	the location of the activity, including-	2
	(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;	
(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;	
(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.	
(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;	3
(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;	4
(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 –	5
	(i) details of all the alternatives considered;	
	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	
	(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	
	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	
	(ix) the outcome of the site selection matrix;	
	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and	
	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	
(g)	(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;	6
	(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;	
(i)	a plan of study for undertaking the environmental impact assessment process to be undertaken, including-	8
	(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 EIA process;	
	(iii) aspects to be assessed by specialists;	
	(iv) a description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists;	
	(v) a description of the proposed method of assessing duration and significance;	
	(vi) an indication of the stages at which the competent authority will be consulted;	
	(vii) particulars of the public participation process that will be conducted during the EIA process; and	
	(viii) a description of the tasks that will be undertaken as part of the EIA process;	
	(ix) identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	
(j)	an undertaking under oath or affirmation by the EAP in relation to-	Appendix A to the report
	(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 I&APs and any responses by the EAP to comments or inputs made by I&APs;	
(k)	an undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and I&APs on the plan of study for undertaking the EIA;	
(l)	where applicable, any specific information required by the CA; and	N/A
(m)	any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A

2 ACTIVITY DESCRIPTION

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include-

(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;

(c) a plan which locates the proposed activity 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;

(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.

2.1 THE LOCATION OF THE ACTIVITY AND PROPERTY DESCRIPTION

The activities entail the development of a photovoltaic solar facility and associated infrastructure on the Remaining Extent of Portion and Portion 5 of the Farm Zwartdoorns no. 421, situated within the Thabazimbi Local Municipality area of jurisdiction. The proposed development is located in the Limpopo Province in the most western part of South-Africa (refer to Figure B for the regional map). The town of Northam is located approximately 2 km north of the proposed development (refer to Figure A for the locality map).

The project entails the generation of up to 250 MW electrical power through the installation and operation of photovoltaic (PV) panels. An area of 739 ha has been assessed as part of this Scoping Report (hereafter referred to as the "development area"). The full extent of the development area has been considered during scoping with the aim of confirming the suitability from an environmental and social perspective. A development footprint will be defined based on the outcomes of the scoping phase and will be further assessed in the EIA phase. It is envisioned that the development footprint for Copper SPP will be ~715 ha in extent. The property on which the facility is to be constructed will be leased by Copper Solar Power Plant (RF) (Pty) Ltd from the property owner for the life span of the project (minimum of 20 years).

Generation from the facility will tie in with a newly proposed collector substation to be connected to the national grid via one of the existing Eskom 275kV or 400kV lines from Spitskop 400/275/88/kV MTS Substation or directly to the Spitskop 400/275/88/kV MTS Substation. The

connection power line will be constructed within the limits of the grid connection corridor (refer to Table 2.1 for the general site information).

Table 2.1: General site information

Description of affected farm portion	Solar Power Plant: Portion 5 of the Farm Zwartdoorns no. 421 Remaining Extent of Portion 1 of the Farm Zwartdoorns no. 421 Grid Connection: Remaining Extent of the Farm Nooitgedacht No. 11 Portion 1 of the Farm Nooitgedacht No. 11 Portion 32 of the Farm De Put No. 412 Portion 19 of the Farm De Put No. 412 Portion 18 of the Farm De Put No. 412 Portion 41 of the Farm De Put No. 412 Portion 21 of the Farm De Put No. 412 Remaining Extent of the Farm Tusschenkomst No. 15 Portion 1 of the Farm Tusschenkomst No. 15 Portion 2 of the Farm Tusschenkomst No. 15 Portion 3 of the Farm Tusschenkomst No. 15 Portion 1 of the Farm Spitskop No. 410 Portion 2 of the Farm Spitskop No. 410 Portion 1 of the Farm Makayskraal No. 18 Remaining Extent of Portion 1 of the Farm Zwartdoorns No. 421 Portion 2 of the Farm Zwartdoorns No. 421 Portion 3 of the Farm Zwartdoorns No. 421 Portion 5 of the Farm Grootkuil No. 409 R/E of Portion 10 of the Farm Wildebeestlaagte No. 411 Portion 12 of the Farm Wildebeestlaagte No. 411 Portion 15 of the Farm Wildebeestlaagte No. 411 Portion 17 of the Farm Wildebeestlaagte No. 411 Portion 18 of the Farm Wildebeestlaagte No. 411 Portion 19 of the Farm Wildebeestlaagte No. 411 Portion 29 of the Farm Wildebeestlaagte No. 411 Portion 30 of the Farm Wildebeestlaagte No. 411 Portion 31 of the Farm Wildebeestlaagte No. 411 Portion 32 of the Farm Wildebeestlaagte No. 411

	Portion 33 of the Farm Wildebeestlaagte No. 411 Portion 48 of the Farm Wildebeestlaagte No. 411 Portion 49 of the Farm Wildebeestlaagte No. 411 Portion 69 of the Farm Wildebeestlaagte No. 411 Portion 70 of the Farm Wildebeestlaagte No. 411 Portion 112 of the Farm Wildebeestlaagte No. 411 Portion 113 of the Farm Wildebeestlaagte No. 411 Portion 173 of the Farm Wildebeestlaagte No. 411
Province	Limpopo
District Municipality	Waterberg District Municipality
Local Municipality	Thabazimbi Local Municipality
Ward numbers	7
Closest towns	Northam is located approximately 2km north of the proposed development.
21 Digit Surveyor General codes	<u>Solar Power Plant:</u> Portion 5 of the Farm Zwartdoorns no. 421 T0KQ00000000042100005 Remaining Extent of Portion 1 of the Farm Zwartdoorns no. 421 T0KQ00000000042100000 <u>Grid Connection:</u> Remaining Extent of the Farm Nooitgedacht No. 11 T0JQ00000000001100000 Portion 1 of the Farm Nooitgedacht No. 11 T0JQ00000000001100001 Portion 18 of the Farm De Put No. 412 T0KQ00000000041200018 Portion 19 of the Farm De Put No. 412 T0KQ00000000041200019 Portion 21 of the Farm De Put No. 412 T0KQ00000000041200021 Portion 32 of the Farm De Put No. 412 T0KQ00000000041200032 Portion 41 of the Farm De Put No. 412 T0KQ00000000041200041 Remaining Extent of the Farm Tusschenkomst No. 15

	T0JQ00000000001500000 Portion 1 of the Farm Tusschenkomst No. 15 T0JQ00000000001500001 Portion 2 of the Farm Tusschenkomst No. 15 T0JQ00000000001500002 Portion 3 of the Farm Tusschenkomst No. 15 T0JQ00000000001500003 Portion 1 of the Farm Spitskop No. 410 T0KQ00000000041000001 Portion 2 of the Farm Spitskop No. 410 T0KQ00000000041000002 Portion 1 of the Farm Makayskraal No. 18 T0JQ00000000001800001 Remaining Extent of Portion 1 of the Farm Zwartdoorns No. 421 T0KQ00000000042100000 Portion 2 of the Farm Zwartdoorns No. 421 T0KQ00000000042100002 Portion 3 of the Farm Zwartdoorns No. 421 T0KQ00000000042100003 Portion 5 of the Farm Grootkuil No. 409 T0KQ00000000040900005 R/E of Portion 10 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100010 Portion 12 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100012 Portion 15 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100015 Portion 17 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100017 Portion 18 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100018 Portion 19 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100019 Portion 29 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100029 Portion 30 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100030

	Portion 31 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100031 Portion 32 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100032 Portion 33 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100033 Portion 48 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100048 Portion 49 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100049 Portion 69 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100069 Portion 70 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100070 Portion 112 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100112 Portion 113 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100113 Portion 173 of the Farm Wildebeestlaagte No. 411 T0KQ00000000041100173
Type of technology	Photovoltaic solar facility
Structure Height	Panels ~ 6m; Buildings ~ 6m; Power line ~ 32m; and Battery storage facility ~ 8m.
Battery storage	Within a 4-hectare area
Surface area to be covered (Development footprint)	715 ha
EIA Footprint	Assessed 739 ha
Structure orientation	The panels will either be fixed to a single-axis horizontal tracking structure where the orientation of the panel varies according to the time of the day, as the sun moves from east to west or tilted at a fixed angle equivalent to the latitude at which the site is in order to capture the most sun.
Generation capacity	Up to 250MW

The project area exclusively consists of land used for agricultural and mining activities.

2.2 ACTIVITY DESCRIPTION

The proposed development will trigger the following activities:

Table 2.2: Listed activities

Relevant notice:	Activity No (s)	Description of each listed activity as per project description:
GNR. 327 (as amended in 2017)	Activity 9(i)	• The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water—(i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more". • Activity 9 (i) is triggered since the proposed photovoltaic solar facility will require a new water connection line to the facility. The water connection line will exceed 1000 metres in length with an internal diameter of at least 0.36 metres.
GNR. 327 (as amended in 2017)	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". • Activity 11(i) is triggered since the proposed photovoltaic solar facility includes an on-site HV/MV substation and switching station with a capacity of up to 132kV. Generation from the facility will tie in with the existing Eskom Spitskop 400/275/88/kV MTS Substation. The connection power line will be constructed within the limits of the grid connection corridor.
GNR. 327 (as amended in 2017)	Activity 12(ii)(a)(b)	• "The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more (a) within a watercourse or (b) within 32 meters of a watercourse, measured from the edge of a watercourse." • Activity 12(ii)(a)(b) is triggered as the proposed water connection line and grid connection corridor crosses a channelled valleybottom wetland. The power line pylons associated with the line will be located either within 32 meters or within the feature itself and will have a footprint of more than 100 square meters. The service road associated with the power line will also need to cross the watercourse.

GNR. 327 (as amended in 2017)	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." • Activity 19 is triggered as the proposed water connection line and grid connection corridor crosses a channelled valleybottom wetland. The power line pylons associated with the line will be located within the feature itself and will require the removal of more than 10 cubic meters of rock from the watercourse. The service road associated with the power line will also need to cross the watercourse.
GNR. 327 (as amended in 2017)	Activity 24(ii)	• "The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters". • Activity 24(ii) is triggered as the proposed main access road to Copper SPP will be 10 meters wide, and with the inclusion of side drains and gavel embankments, will exceed the threshold of this activity.
GNR. 327 (as amended in 2017)	Activity 28(ii)	• "Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare". • Activity 28(ii) is triggered as the total area to be developed for the PV facility and associated infrastructure is greater than 1 ha and occurs outside an urban area in an area currently zoned for agriculture. The property will be re-zoned to "special" use.
GNR. 327 (as amended in 2017)	Activity 56 (ii):	• "The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres…" • Activity 56(ii) is triggered as the existing access to the affected property does not have a reserve and will need to be widened by more than 6 metres, to reach the desired width of 10 meters. And with the inclusion of side drains and gavel embankments, will exceed the threshold of this activity.

GNR. 325 (as amended in 2017)	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". • Activity 1 is triggered since the proposed photovoltaic solar facility will generate up to 250 megawatts electricity through the use of a renewable resource.
GNR. 325 (as amended in 2017)	Activity 15	• "The clearance of an area of 20 hectares or more of indigenous vegetation." • The project area overlaps with the Dwaalboom Thronveld, Western Sandy Bushveld and Central Sandy Bushveld. According to Mucina and Rutherford (2006), is classified as 'Least threatened' and Vulnerable' respectively. Activity 15 is triggered since portions of the site has not been lawfully disturbed during the preceding ten years; therefore, more than 20 hectares of indigenous vegetation will be removed. The development footprint of the Copper SPP will be approximately 715ha in extent.
GNR. 324 (as amended in 2017)	Activity 4 (e)(i)(gg)	• "The development of a road wider than 4 metres with a reserve less than 13,5 metres within (e) the Limpopo province, (i) outside urban areas, (gg) areas within… 5 kilometres from any other protected area identified in terms of NEMPAA…." • Activity 4 (e)(i)(gg) is triggered as the access road will have a width of up to 10 meters. The internal and perimeter roads with a width of between 6 and 10 meters will be constructed. The project is located within 5 kilometres of the Sporting Chance Private Nature Reserve, Tortoiseshell Private Nature Reserve, Hou Moed Private Nature Reserve, Deon Private Nature Reserve and Hillhoff Private Nature Reserve as per the South Africa Protected Areas Database.
GNR. 324 (as amended in 2017)	Activity 10 (e)(i)	• "The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres (e) in the Limpopo province in (i) all areas outside urban areas. • Activity 10 (e)(i) is triggered since the proposed development will need to develop infrastructure for

		the storage and handling of dangerous goods (diesel and oils) in containers with a capacity exceeding 30 but not exceeding 80 cubic metres. The project is located within the Limpopo province and outside urban areas.
GNR. 324 (as amended in 2017)	Activity 14(ii)(a)(c)(e)(i)(ff)(hh)	• "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; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; in the (e) Limpopo Province, (i) outside urban areas, within (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans and (hh) Areas within 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve." • Activity 14(ii)(a)(c)(e)(i)(ff)(hh) is triggered as the proposed water connection line and grid connection corridor crosses a channelled valleybottom wetland. The power line pylons associated with the line will be located either within 32 meters or within the feature itself and will have a footprint of more than 10 square meters. The service road associated with the power line will also need to cross the watercourse. The grid connection corridor is located within a CBA 1, ESA 1, no natural resources (NNR) and other natural areas (ONA) area. The project is located within 5 kilometres of the Sporting Chance Private Nature Reserve, Tortoiseshell Private Nature Reserve, Hou Moed Private Nature Reserve, Deon Private Nature Reserve and Hillhoff Private Nature Reserve as per the South Africa Protected Areas Database.
GNR. 324 (as amended in 2017)	Activity 18 (e)(i)(gg)	• "The widening of a road by more than 4 metres, or the lengthening of a road by more than 1-kilometre (e) in the Limpopo province, (i) outside urban areas, (gg) areas within… 5 kilometres from any other protected area identified in terms of NEMPAA…." • Activity 18 (e)(i)(gg) is triggered since the existing access road to the site will need to be widened by more than 4 metres. The project is located within the Limpopo Province and outside urban areas. The project is located within 5 kilometres of the Sporting Chance Private Nature Reserve, Tortoiseshell Private Nature Reserve, Hou Moed Private Nature Reserve,

		Deon Private Nature Reserve and Hillhoff Private Nature Reserve as per the South Africa Protected Areas Database.

The potentially most significant impacts will occur during the construction phase of the development, which will include the following activities:

- Site clearing and preparation: Certain areas of the site and access road will need to be cleared of vegetation and some areas may need to be levelled.
- Civil works to be conducted:

- Terrain levelling if necessary – Levelling will be minimal as the potential site chosen is relatively flat.
- Laying foundation - The structures will be connected to the ground through cement pillars, cement slabs or metal screws. The exact method will depend on the detailed geotechnical analysis.
- Construction of access and inside roads/paths – The majority of the access road will follow existing, gravel farm roads that may require widening up to 10 meters (inclusive of storm water infrastructure). Where new sections of road need to be constructed (lengthened), this will be gravel/hard surfaced access road and only tarred if necessary. A network of gravel internal access roads (~13km in length) and a perimeter road (~25km in length), each with a width between 4 and 6 meters, will be constructed to provide access to the various components of the PV development.
- Trenching – all Direct Current (DC) and Alternating Current (AC) wiring within the PV plant will be buried underground. Trenches will have a river sand base, space for pipes, backfill of sifted soil and soft sand and concrete layers where vehicles will pass.

2.3 PHOTOVOLTAIC TECHNOLOGY

The term photovoltaic describes a solid-state electronic cell that produces direct current electrical energy from the radiant energy of the sun through a process known as the Photovoltaic Effect. This refers to light energy placing electrons into a higher state of energy to create electricity. Each PV cell is made of silicon (i.e. semiconductors), which is positively and negatively charged on either side, with electrical conductors attached to both sides to form a circuit. This circuit captures the released electrons in the form of an electric current (direct current). The key components of the proposed project are described below:

- PV Panel Array - To produce up to 250 MW, the proposed facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple panels will be required to form the Solar Power Plant arrays which will comprise the PV facility. The PV panels will be tilted at a northern angle in order to capture the most sun or using one-axis tracker structures to follow the sun to increase the yield.

Figure 2.1: Typical example of Solar Power Plant array

- Wiring to Inverters - Sections of the PV array will be wired to inverters. The inverter is a pulse width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency.
- Connection to the grid - Connecting the array to the electrical grid requires transformation of the voltage from 480V to 33kV to 132kV. The normal components and dimensions of a distribution rated electrical substation will be required. Output voltage from the inverter is 480V and this is fed into step up transformers to 132kV. An onsite substation will be required on the site to step the voltage up to 132kV, after which the power will be evacuated into the national grid via the proposed power line. Generation from the facility will tie in with a newly proposed collector substation to be connected to the national grid via one of the existing Eskom 275kV or 400kV lines from Spitskop 400/275/88/kV MTS Substation or directly to the Spitskop 400/275/88/kV MTS Substation. The connection power line will be constructed within the limits of the grid connection corridor. (refer to the figure 2.1 below).

  The project will entail the following facility grid connection infrastructure:

  - 33kV cabling between the project components and the facility substation.
  - A 132kV facility substation.
  - 33kV or 132kV cabling or powerline between the facility substation, Copper Solar Power Plant and the Eskom collector switching station.

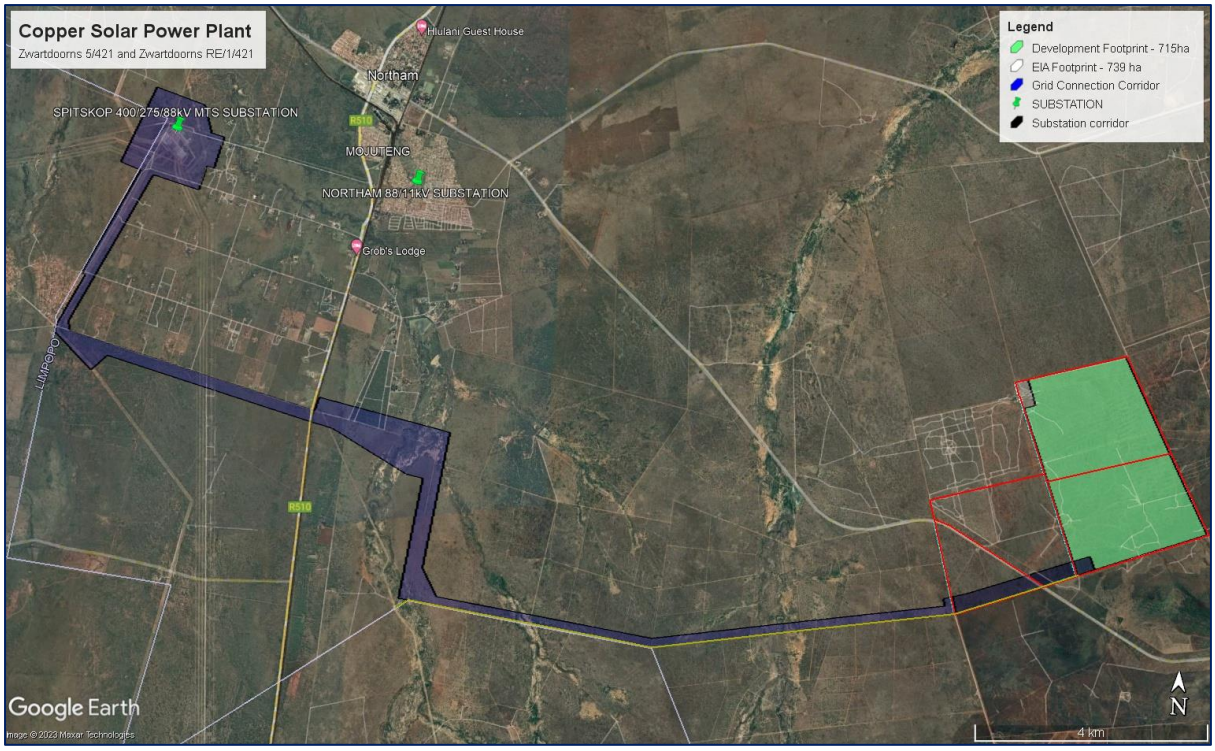


Figure 2.2: Grid connection corridor for the Copper Solar Power Plant

- Electrical reticulation network – An internal electrical reticulation network will be required and will be lain ~2-4m underground as far as practically possible.
- Supporting Infrastructure – All associated infrastructure will be constructed within the limits of the infrastructure and ancillary complex which will include an on-site substation, Battery Energy Storage System, Operations and Maintenance buildings etc.
- Battery storage – A Battery Storage Facility with a maximum height of 8 m and a maximum volume of 1,740 m^3 of batteries and associated operational, safety and control infrastructure.
- Roads – Access will be obtained via D1235 road. An internal site road network will also be required to provide access to the solar field and associated infrastructure.
- Fencing - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm. Fencing with a height of 2.5 meters will be used.

2.4 LAYOUT DESCRIPTION

The layout plan will consider and adhere to the limitations of the site and aspects such as environmentally sensitive areas, roads, fencing and servitudes on site – refer to Figures A to J. The total surface area proposed for the layout includes the PV panel arrays (spaced to avoid shadowing), access and maintenance roads and associated infrastructure (buildings, power inverters, power line, battery energy storage system, on-site substation and switching station and perimeter fences). Limited features of environmental significance exist on site, however the sensitivities that do exist have to be avoided in the layout of the solar facility. Table 2.3 below

provides detailed information regarding the layout for the proposed facility which will be further assessed during the EIA phase.

Table 2.3: Technical details for the proposed facility

Component	Description / dimensions
Height of PV panels	6 meters
Area of PV Array	715 Hectares (Development footprint)
Number of inverters required	Minimum 50
Area occupied by inverter / transformer stations / substations / BESS	Central inverters+ LV/MV trafo: 750 m^2 HV/MV substation with switching station: 1,5 ha BESS: 4 ha (within the Infrastructure & Ancillary Complex)
Capacity of on-site substation	132kV
Capacity of the power line	132kV
Area occupied by both permanent and construction laydown areas	Permanent Laydown Area: 715 Hectares Construction Laydown Area: ~5 ha
Area occupied by buildings	Infrastructure & Ancillary Complex: ~20 ha
Battery storage facility	Maximum height: 8m Maximum volume: 1740 m^3 Capacity ~up to 150MWh
Length of access roads	TBC
Width of access roads	8 m - 10 m
Length of internal roads	TBC
Width of internal roads	4 m – 6 m
Length of perimeter roads	TBC
Width of perimeter roads	4 m – 6 m
Grid connection corridor width	417 m up to 1.5 km
Grid connection corridor length	~ 25 km
Power line servitude width	32 m
Height of fencing	Approximately 2.5 meters

Table 2.4 below provides the coordinates for the solar power plant and associated infrastructure.

Table 2.4: Coordinates for the solar power plant and associated infrastructure

Coordinates			
Project Site	A	24°59'54.44"S	27°22'25.04"E
	B	24°59'36.78"S	27°23'33.51"E
	C	25° 1'13.75"S	27°24'26.42"E
	D	25° 1'40.10"S	27°23'6.93"E
	E	25° 0'1.81"S	27°22'27.94"E
	F	25° 0'1.86"S	27°22'27.52"E
	Service Road 1		
	1	25° 1'46.75"S	27°22'46.97"E
	2	25° 1'39.87"S	27°23'7.08"E

Proposed Access Roads (Service Roads)	3	25° 0'5.89"S	27°22'29.83"E
	Service Road 2		
	1	25° 1'47.12"S	27°22'45.83"E
	2	25° 1'56.36"S	27°22'17.82"E
	3	25° 2'4.44"S	27°21'53.27"E
	Service Road 3		
	1	25° 1'13.60"S	27°21'38.19"E
	2	25° 2'4.48"S	27°21'53.10"E
	3	25° 2'31.16"S	27°18'48.87"E
	4	25° 2'11.98"S	27°16'19.13"E
	5	25° 2'16.76"S	27°16'11.57"E
Grid Connection Corridor	A.	25° 1'29.01"S	27°23'15.02"E
	B.	25° 1'39.91"S	27°22'41.31"E
	C.	25° 1'9.52"S	27°21'42.49"E
	D.	25° 1'32.09"S	27°20'12.95"E
	E.	25° 1'9.43"S	27°18'58.32"E
	F.	25° 1'20.33"S	27°18'57.03"E
	G.	25° 1'11.38"S	27°17'57.33"E
	H.	25° 0'51.93"S	27°16'47.14"E
	I.	25° 0'38.35"S	27°16'39.57"E
	J.	25° 0'22.23"S	27°15'17.31"E
	K.	25° 0'29.78"S	27°15'14.99"E
	L.	24°59'52.17"S	27°12'41.42"E
	M.	24°59'46.77"S	27°12'40.15"E
	N.	24°58'22.26"S	27°13'26.73"E
	O.	24°58'29.48"S	27°13'55.42"E
	P.	24°58'15.91"S	27°13'59.48"E
	Q.	24°58'17.03"S	27°14'3.94"E
	R.	24°57'59.01"S	27°14'9.28"E
	S.	24°57'57.08"S	27°14'1.33"E
	T.	24°57'41.44"S	27°13'56.05"E
	U.	24°57'32.62"S	27°13'25.76"E
	V.	24°58'16.03"S	27°13'6.07"E
	W.	24°58'19.89"S	27°13'18.74"E
	X.	24°59'17.92"S	27°12'46.94"E
	Y.	24°59'20.89"S	27°12'48.19"E
	Z.	24°59'49.30"S	27°12'32.65"E
	AA.	24°59'53.07"S	27°12'32.04"E
	AB.	25° 0'13.36"S	27°12'56.04"E
	AC.	25° 0'4.72"S	27°13'5.28"E
	AD.	25° 0'39.53"S	27°15'26.48"E
	AE.	25° 1'3.04"S	27°16'13.37"E
	AF.	25° 1'37.28"S	27°20'13.00"E
	AG.	25° 1'18.18"S	27°21'28.46"E
	AH.	25° 1'18.09"S	27°21'34.84"E
	AI.	25° 1'51.01"S	27°21'53.46"E
	AJ.	25° 2'5.37"S	27°21'48.75"E

	AK.	25° 2'4.75"S	27°21'53.23"E
	AL.	25° 1'52.88"S	27°22'1.05"E
	AM.	25° 1'43.75"S	27°22'29.12"E
	AN.	25° 1'21.10"S	27°21'44.77"E
	AO.	25° 1'36.52"S	27°23'18.07"E

2.5 SERVICES PROVISION

The following sections provide information on services required on the site e.g. water, sewage, refuse removal, and electricity.

2.5.1 Water

Adequate provision of water will be a prerequisite for the development. Four options will be considered, in order of priority by the Developer:

1. Supply from the Local Municipality (LM). The Developer will approach the Local Municipality to enquire whether they can provide all or part of the total water requirements of the Project. Specific arrangements will be agreed with the Local Municipality in a Service Level Agreement (SLA), following the appointment of preferred bidder during the financial close period.
2. Supply from a Private Contractor, which may include extraction from any bulk water supply lines nearby to the site.
3. Any existing borehole on site, subject to NWA requirements.
4. A new borehole on site, subject to NWA requirements.

The estimated maximum amount of water required during construction is 1200m³ per month during the 12 - 18 months of construction. The estimated maximum amount of water required during the facility's 20 years of production is 4200m³ per annum. The majority of this usage is for the cleaning of the solar panels. Since each panel requires approximately 2 litres of water for cleaning, the total amount of ~500 000 panels will require 1 000 000 litres per wash. It is estimated that the panels may only need to be washed twice per annum, but provision is made for quaternary cleaning (March, May, July, and September). This totals approximately 4,000,000 litres per annum for washing, and allows 200,000 litres per annum (or 548 litres per day) for toilet use, drinking water, etc.

2.5.2 Stormwater

To avoid soil erosion, it is recommended that the clearing of vegetation be limited. Stormwater management and mitigation measures will be included in the Environmental Management Programme (EMPr) to be submitted as part of the EIR.

2.5.3 Sanitation

During construction phase, portable chemical toilets will be utilised, that will be serviced privately or by the local municipality. Wastewater will be disposed of at a licensed landfill site. Should the contractor decide to install a conservancy tanks/s, this will be done in accordance with the NWA.

No effluent will be produced during operation of the facility, except for normal sewage from site and operations staff. This will be collected and treated as per normal standards using a septic or conservancy tank. In cases where the Local Municipality does not permit the use of sceptic tanks, sewage will be stored in conservancy tank and collected by means of a honey-sucker and treated at an approved facility off site.

2.5.4 Solid Waste

During the construction phase, solid waste will mainly be in the form of construction material, excavated substrate and domestic solid waste. All waste will be disposed of in scavenger proof bins and temporarily placed in a central location for removal by an appointed contractor. Any other waste and excess material will be removed once construction is complete and disposed of at a registered waste facility. During the EIA, the applicant will request confirmation from the municipality that they have sufficient capacity at their registered landfills for the solid waste.

During the operational phase household waste will be removed to a licensed landfill site by a private contractor or by the local municipality.

2.5.5 Electricity

During the construction phase of the development, electricity will either be generated on site through a small solar system or through the use of generators or the existing Eskom supply on the farm will be utilised. This will depend on the Engineering, Procurement, and Construction (EPC) contractor appointed. During operation electricity use will be limited and will primarily be related to the lighting of the facility and domestic use. Design measures such as the use of energy saving light bulbs will be considered by the developer. During the day, electricity will be sourced from the photovoltaic plant, and from the electricity connection at night.

2.6 Decommissioning of the facility

The operating period will be 20 years from the commencement date of the operation phase. Thereafter two rights of renewal periods of 40 years and 20 years will be relevant. It is anticipated that new PV technologies and equipment will be implemented, within the scope of the Environmental Authorisation, when influencing the profitability of the solar facility.

A likely extension of the plant's lifetime would involve putting new, more efficient, solar panels on the existing structures to improve the efficiency of the facility as the technology improves. The specifications of these new panels will be the same as the current panels under consideration, but the conversion efficiency of sunlight to energy will be greater (comparable to new computer chips, that is the same, but faster and more efficient). If, for whatever reason the plant halts operations, the Environmental Authorisation and contract with the landowner will be respected during the decommissioning phase.

The decommissioning process will consist of the following steps:

- The PV facility would be disconnected from the Eskom grid.
- The BESS, inverters and PV modules would be disconnected and disassembled.
- Concrete foundations (if used) would be removed and the structures would be dismantled.

- Wastewater storage conservancy tank would be responsibly removed and area would be rehabilitated.
- The underground cables would be unearthed and removed and buildings would be demolished and removed.
- The fencing would be dismantled and removed.
- The roads can be retained should the landowner choose to retain them, alternatively the roads will be removed and the compaction will be reversed.
- Most of the wires, steel and PV modules are recyclable and would be recycled to a reasonable extent. The Silicon and Aluminium in PV modules can be removed and reused in the production of new modules.
- Any rubble and non-recyclable materials will be disposed of at a registered landfill facility.

The rehabilitation of the site would form part of the decommissioning phase. The aim would be to restore the land to its original form (or as close as possible). The rehabilitation activities would include the following:

- Removal of all structures and rubble;
- Breaking up compaction where required, loosening of the soil and the redistribution of topsoil; and
- Restoration of the surface to the original contours and application of hydro seeding.

3 LEGISLATIVE AND POLICY CONTEXT

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include-

(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;

3.1 INTRODUCTION

Environmental decision making with regards to Solar Power Plant plants is based on numerous policy and legislative documents. These documents inform decisions on project level environmental authorisations issued by the National Department of Forestry, Fisheries and the Environment (DFFE) as well as comments from local and district authorities. Moreover, it is significant to note that they also inform strategic decision making reflected in the IDPs and SDFs. Therefore, to ensure streamlining of environmental authorisations it is imperative for the proposed activity to align with the principles and objectives of key national, provincial and local development policies and legislation. The following acts and policies and their applicability to the proposed development are briefly summarised:

- The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)
- National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA]
- The National Energy Act, 2008 (Act 34 of 2008)
- National Water Act, 1998 (Act No. 36 of 1998)
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
- The National Heritage Resources Act, 1999 (Act No. 25 of 1999)
- Conservation of Agricultural Resources Act, 1983 (Act No. 85 of 1983)
- The National Forests Act, 1998 (Act 84 of 1998)
- The White Paper on the Energy Policy of the Republic of South Africa (1998)
- The White Paper on Renewable Energy (2003)
- Integrated Resource Plan (IRP) for South Africa (2010-2030)
- National Development Plan of 2030

- National Infrastructure Plan of South Africa (2012)
- New Growth Path Framework (2010)
- Climate Change Bill (2018)
- Climate Change Bill (2021) – for public comment
- Strategic Integrated Projects (SIPs) (2010 – 2030)
- Strategic Environmental Assessment (SEA) for wind and Solar Power Plant Energy in South Africa (2014)
- Limpopo Provincial Spatial Development Framework (PSDF) (2016)
- Waterberg District Municipality Final Integrated Development Plan (IDP) 2020 – 2021 (2020)
- Thabazimbi Local Municipality Draft Integrated Development Plan 2020-2021 (2020)
- Thabazimbi Local Municipality Local Municipality Spatial Development Framework (2018)

The key principles and objectives of each of the legislative and policy documents are briefly summarised in Tables 3.1 and 3.2 to provide a reference framework for the implications for the proposed activity.

3.2 LEGISLATIVE CONTEXT

Table 3.1: Legislative context for the construction of photovoltaic solar plants

LEGISLATION	ADMINISTERING AUTHORITY	DATE	SUMMARY / IMPLICATIONS FOR PROPOSED DEVELOPMENT
The Constitution of South Africa (Act No. 108 of 1996)	National Government	1996	The Constitution is the supreme law of the Republic and all law and conduct must be consistent with the Constitution. The Chapter on the Bill of Rights contains a number of provisions, which are relevant to securing the protection of the environment. Section 24 states that "everyone has the right to (a) an environment that is not harmful to their health or well-being and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that – (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. The Constitution therefore, compels government to give effect to the people's environmental right and places government under a legal duty to act as a responsible custodian of the country's environment. It compels government to pass legislation and use other measures to protect the environment, to prevent pollution and ecological degradation, promote conservation and secure sustainable development. The development of the Copper SPP and the aspects related thereto considers the creation of an environment which is not harmful or degraded through the implementation of appropriate mitigation measures.
The National Environmental Management Act (Act No. 107 of 1998)	National Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the Environment) and	1998	NEMA provides for co-operative governance by establishing principles and procedures for decision-makers on matters affecting the environment. An important function of the Act is to serve as an enabling Act for the promulgation of legislation to effectively address integrated environmental management. Some of the principles in the Act are accountability; affordability; cradle to grave management; equity; integration; open information; polluter pays; subsidiary; waste avoidance and minimisation; co-operative governance; sustainable development; and environmental protection and justice.

	the Limpopo Province Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA)		The mandate for EIA lays with the National Environmental Management Act (107 of 1998) and the EIA Regulations No. 324, 325, 326, and 327 promulgated in terms of Section 24 of NEMA. The EIA Regulations determine that an Environmental Authorisation is required for certain listed activities, which might have a detrimental effect on the environment. The EIA process undertaken for the Copper SPP is in-line with the requirements of NEMA for the Application for Environmental Authorisation.
The National Energy Act (Act No. 34 of 2008)	Department of Mineral Resources and Energy	2008	One of the objectives of the National Energy Act was to promote diversity of supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources, including solar: "To ensure that diverse energy resources are available, in sustainable quantities, and at affordable prices, to the South African economy, in support of economic growth and poverty alleviation, taking into account environmental management requirements (...); to provide for (...) increased generation and consumption of renewable energies..." (Preamble). Considering that the Copper SPP is proposed to make use of PV technology and the solar resource for the generation of electricity, the proposed project is in-line with the Act.
The National Water Act (Act No. 36 of 1998)	Department of Water Affairs (now known as Department of Water and Sanitation)	1998	Sustainability and equity are identified as central guiding principles in the protection, use, development, conservation, management and control of water resources. The intention of the Act is to promote the equitable access to water and the sustainable use of water, redress past racial and gender discrimination, and facilitate economic and social development. The Act provides the rights of access to basic water supply and sanitation, and environmentally, it provides for the protection of aquatic and associated ecosystems, the reduction and prevention of pollution and degradation of water resources. As this Act is founded on the principle that National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, a person can only be entitled to use water if

			the use is permissible under the Act. Chapter 4 of the Act lays the basis for regulating water use. Should a water use license be required for the project, the National Water Act will be applicable in terms of obtaining the relevant license.
National Environmental Management: Waste Act (Act No. 59 of 2008)	National Department Environmental Affairs (DEA) (now known as the Department of Forestry, Fisheries and the Environment)	2008	NEMWA has been developed as part of the law reform process enacted through the White Paper on Integrated Pollution and Waste Management and the National Waste Management Strategy (NWMS). The objectives of the Act relate to the provision of measures to protect health, well-being and the environment, to ensure that people are aware of the impact of waste on their health, well-being and the environment, to provide for compliance with the measures, and to give effect to section 24 of the Constitution in order to secure an environment that is not harmful to health and well-being. Regulations No. R921 (of 2013) promulgated in terms of Section 19(1) of the National Environmental Management: Waste Act (59 of 2008) determines that no person may commence, undertake or conduct a waste management activity listed in this schedule unless a license is issued in respect of that activity. It is not envisaged that a waste permit will be required for the proposed development as no listed activities in terms of waste management are expected to be triggered.
National Environment Management: Air Quality Act (Act No. 39 of 2004)	National Department Environmental Affairs (DEA) (now known as the Department of Forestry, Fisheries and the Environment)	2004	The object of this Act is to protect the environment by providing reasonable measures for the protection and enhancement of the quality of air in the Republic; the prevention of air pollution and ecological degradation; and securing ecologically sustainable development while promoting justifiable economic and social development. Regulations No. R248 (of 31 March 2010) promulgated in terms of Section 21(1)(a) of the National Environmental Management Act: Air Quality Act (39 of 2004) determine that an Atmospheric Emission License (AEL) is required for certain listed activities, which result in atmospheric emissions which have or may have a detrimental effect on the environment. The Regulation also sets out the minimum emission standards for the listed activities. It is not envisaged that an Atmospheric Emission License will be required for the proposed development.

The National Heritage Resources Act (Act No. 25 of 1999)	South African Heritage Resources Agency (SAHRA)	1999	The Act aims to introduce an integrated and interactive system for the management of heritage resources, to promote good governance at all levels, and empower civil society to nurture and conserve heritage resources so that they may be bequeathed to future generations and to lay down principles for governing heritage resources management throughout the Republic. It also aims to establish the South African Heritage Resources Agency together with its Council to co-ordinate and promote the management of heritage resources, to set norms and maintain essential national standards and to protect heritage resources, to provide for the protection and management of conservation-worthy places and areas by local authorities, and to provide for matters connected therewith. The Act protects and manages certain categories of heritage resources in South Africa. For the purposes of the Heritage Resources Act, a "heritage resource" includes any place or object of cultural significance. In this regard the Act makes provision for a person undertaking an activity listed in Section 28 of the Act to notify the resources authority. The resources authority may request that a heritage impact assessment be conducted if there is reason to believe that heritage resources will be affected. A case file has been opened on SAHRIS for the Copper SPP and all relevant documents were submitted for their comments and approval. The Heritage Impact Assessment undertaken for the SPP is included as Appendix E4.
Conservation of Agricultural Resources Act (Act No. 85 of 1983)	National and Provincial Government	1983	The objective of the Act is to provide control over the utilisation of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith. Consent will be required from the Department of Agriculture, Forestry and Fisheries (now known as the DFFE) in order to confirm that the proposed development is not located on high potential agricultural land and to approve the long-term lease agreement. A Soils and Agricultural Potential Assessment has been undertaken for the Copper SPP and the scoping report is included as Appendix E1. The full report will be provided during the EIA phase.

The National Forests Act, 1998 (Act 84 of 1998)	Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the Environment)	1998	The purposes of this Act are to: (a) promote the sustainable management and development of forests for the benefit of all; (b) create the conditions necessary to restructure forestry in State forests; (c) provide special measures for the protection of certain forests and trees: (d) promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes. (e) promote community forestry; (f) promote greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination. Section 12(1) read with s15(1) of the NFA stated that the Minister may declare a particular tree, group of trees, woodland; or trees belonging to a particular species, to be a protected tree, group of trees, woodland or species. A list of protected tree species was gazetted in GN 635 of 6 December 2019. The effect of the declaration is that no person may (a) cut, disturb, damage or destroy; or (b) possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, or any forest product derived from a protected tree, except under a license granted by the Minister; or in terms of an exemption published by the Minister in the Gazette. A Terrestrial Ecology Baseline and Impact Assessment has been undertaken for the Copper SPP and the scoping report is included in Appendix E1. The full report will be made available during the EIA phase.

3.3 POLICY CONTEXT

Table 3.2: Policy context for the construction of photovoltaic solar plants

POLICY	ADMINISTERING AUTHORITY	DATE	SUMMARY / IMPLICATIONS FOR PROPOSED DEVELOPMENT
The White Paper on the Energy Policy of the Republic of South Africa	Department of Mineral Resources and Energy	1998	The White Paper on the Energy Policy of the Republic of South Africa establishes the international and national policy context for the energy sector, and identifies the following energy policy objectives: • Increasing access to affordable energy services • Improving energy governance • Stimulating economic development • Managing energy-related environmental and health impacts • Securing supply through diversity • Energy policy priorities The White Paper sets out the advantages of renewable energy and states that Government believes that renewables can in many cases provide the least cost energy service, particularly when social and environmental costs are included. The White Paper acknowledges that South Africa has neglected the development and implementation of renewable energy applications, despite the fact that the country's renewable energy resource base is extensive, and many appropriate applications exist. The White Paper notes that renewable energy applications have specific characteristics that need to be considered. Advantages include: • Minimal environmental impacts in operation in comparison with traditional supply technologies; and • Generally lower running costs, and high labour intensities. Disadvantages include: • Higher capital costs in some cases;

			• Lower energy densities; and • Lower levels of availability, depending on specific conditions, especially with sun and wind-based systems. Copper SPP is in line with this policy as it proposes the generation of renewable energy from the solar resource.
The White Paper on Renewable Energy	Department of Mineral Resources and Energy	2003	This White Paper on Renewable Energy supplements the *White Paper on Energy Policy*, which recognises that the medium and long-term potential of renewable energy is significant. This Paper sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa. The White Paper notes that while South Africa is well-endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have thus far remained largely untapped. Government's long-term goal is the establishment of a renewable energy industry producing modern energy carriers that will offer in future years a sustainable, fully non-subsidised alternative to fossil fuels. The medium-term (10-year) target set in the White Paper is: *10 000 GWh (0.8 Mtoe) renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro. The renewable energy is to be utilised for power generation and non-electric technologies such as solar water heating and bio-fuels. This is approximately 4% (1667 MW) of the projected electricity demand for 2013 (41539 MW) (Executive Summary, ix).* The Copper SPP is in line with this paper as it proposes the generation of renewable energy from the solar resource.
Integrated Resource Plan (IRP) for South Africa	Department of Mineral Resources and Energy	2010-2030	The Integrated Resource Plan for Electricity for South Africa of 2010–2030 (further referred to as the IRP) is a "living plan" which is expected to be revised and updated continuously as necessary due to changing circumstances. According to the Summary of the plan the current IRP for South Africa, which was originally initiated by the Department of Energy (DoE) in June 2010 (the Department is now known as Department of Mineral Resources and Energy), led to the Revised Balanced Scenarios (RBS) for the period 2010–2030.

	"This scenario was derived based on the cost-optimal solution for new build options (considering the direct costs of new build power plants), which was then "balanced" in accordance with qualitative measures such as local job creation". In addition to all existing and committed power plants, the RBS included 11,4 GW of renewables, which relates to the proposed Copper Solar Power Plant. In 2010 several changes were made to the IRP model. The main changes in the IRP were the disaggregation of renewable energy technologies to explicitly display solar photovoltaic (PV), concentrated solar power (CSP), and wind options (RSA, 2011a). The summary of the IRP further explains that traditional cost-optimal scenarios were developed based on the previously mentioned changes in the IRP. This resulted in the Policy-Adjusted IRP, which stated that: "The installation of renewables (Solar Power Plant, CSP and wind) have been brought forward in order to accelerate a local industry; To account for the uncertainties associated with the costs of renewables and fuels, a nuclear fleet of 9,6 GW is included in the IRP; The emission constraint of the RBS (275 million tons of carbon dioxide per year after 2024) is maintained; and Energy efficiency demand-side management (EEDSM) measures are maintained at the level of the RBS" (RSA, 2011a:6). "The Policy-Adjusted IRP includes the same amount of coal and nuclear new builds as the RBS, while reflecting recent developments with respect to prices for renewables. In addition to all existing and committed power plants (including 10 GW committed coal), the plan includes 9,6 GW of nuclear; 6,3 GW of coal; 17,8 GW of renewables; and 8,9 GW of other generation sources" (RSA, 2011a:6). The IRP highlights the commitments before the next IRP. The commitments pertaining to the purpose of the proposed project in renewable energy is: "*Solar Power Plant programme 2012-2015: In order to facilitate the connection of the first Solar Power Plant units to the grid in 2012 a firm commitment to this capacity is necessary. Furthermore, to provide the security of investment to ramp up a sustainable local industry cluster, the first four years from 2012 to 2015 require firm commitment.*" "Solar Power Plant 2016 to 2019: As with wind, grid upgrades might become necessary for the second round of Solar Power Plant installations from 2016 to 2019, depending on their location. To trigger the associated tasks in a timely manner, a firm commitment to these capacities is necessary

in the next round of the IRP at the latest. By then, the assumed cost decreases for Solar Power Plant will be confirmed" (IRP, 2011a:17).

In conclusion the IRP recommends that an accelerated roll-out in renewable energy options should be allowed with regards to the benefits of the localization in renewable energy technologies (RSA, 2011a). It is however important to take note that since the release of the IRP in 2011 there has been a number of developments in the energy sector of South Africa. Therefore, the IRP was updated and was open for comments until March of 2017. The new IRP of 2019 was formally published in October 2019. For the revision scenario, analysis was conducted. The results revealed that for the period ending 2030 that: *"The committed Renewable Energy Independent Power Producers Programme, including the 27 signed projects and Eskom capacity rollout ending with the last unit of Kusile in 2022, will provide more than sufficient capacity to cover the projected demand and decommissioning of plants up to approximately 2025"; "Imposing annual build limits on renewable energy will not affect the total cumulative capacity and the energy mix for the period up to 2030*"; and *"the scenario without renewable energy annual build limits provides the least-cost option by 2030*" (RSA, 2018:34).

Lastly, the draft IRP of 2018 also included the scenario analysis for the period post 2030. Here it was observed that: "Imposing annual build limits on renewable energy will restrict the cumulative renewable installed capacity and the energy mix for this period; adopting no annual build limits on renewables or imposing a more stringent strategy to reduce greenhouse gas emissions implies that no new coal power plants will be built in the future unless affordable cleaner forms of coal-to-power are available; and the scenario without renewable energy annual build limits provides the least-cost option by 2050" (RSA, 2018:34–35).

In the final IRP of 2019 key considerations were taken into account together with required actions to be taken for the IRP of 2019 to be credible. In terms of renewable energy technologies like solar and wind, the IRP stated that *"The application of renewable build limits 'smoothes out' the capacity allocations for wind and Solar Power Plant which provides a constant pipeline of projects to investment; this addresses investor confidence*". The decision stated against this key consideration is to *"retain the current annual build limits on renewables (wind and PV) pending the finalization of a just transition plan"* (RSA, 2019:46). Hereby the IRP also recognises renewable technologies' potential

			to diversify the electricity mix, create new industries and job opportunities and localize across the value chain (RSA, 2019:13). The Copper SPP is in line with this plan as it proposes the generation of renewable energy from the solar resource and will contribute to the energy mix of the country as set out in this plan.
National Development Plan of 2030	The Presidency: National Planning Commission	-	The National Development Plan aims to "*eliminate poverty and reduce inequality by 2030*" (RSA, undated). In order to eliminate or reduce inequality, the economy of South Africa needs to grow faster in order to benefit all South Africans. In May 2010 a Draft National Development Plan was drafted, which highlighted the nine (9) key challenges for South Africa. The highest priority areas according to the plan are considered to be the creation of employment opportunities and to improve the quality of national education. In this regard, the plan sets out three (3) priority areas, namely, to raise employment by a faster growing economy, improve the quality of education, and to build the capability of the state in order to play a more developmental and transformative role. One of the key challenges identified was that the economy is unsustainably resource intensive and the acceleration and expansion of renewable energy was identified as a key intervention strategy to address this challenge. Copper SPP will contribute to the intervention strategy as identified within the plan.
National Infrastructure Plan of South Africa	Presidential Infrastructure Coordinating Commission	2012	In the year 2012 the South African Government adopted a National Infrastructure Plan (hereafter referred to as the Plan). The aim of this Plan is to transform the economic landscape, while strengthening the delivery of basic services and creating new employment opportunities. This Plan also supports the integration of African communities, and also sets out the challenges and enablers that our country needs in order to respond to the planning and development of infrastructure with regards to fostering economic growth (RSA, 2012). The Plan has developed eighteen (18) strategic integrated projects (further referred to as SIPs). These SIPs stretch over all nine (9) provinces, covering social and economic infrastructure, and projects that enhances development and growth. Of the eighteen (18), five (5) are geographically focused, three (3) spatial, three (3) energy, three (3) social infrastructure, two (2) knowledge, one (1) regional integration, and one (1) water and sanitation focussed. The three (3) SIPs according to the Plan, which are energy focused and correlate to the proposed project are as follow:

		• SIP 8: Green energy in support of the South African economy; • SIP 9: Electricity generation to support socio-economic development; and • SIP 10: Electricity transmission and distribution for all. SIP 8 according to the Plan "support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the IRP 2010 and support bio-fuel production facilities". The purpose of SIP 9 according to the Plan is to "accelerate the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances". SIP 9 should also monitor the implementation of major projects such as new power stations like Medupi, Kusile and Ingula. Lastly, SIP 10 aims to "expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development" (RSA, 2012:20). The Copper SPP is in line with this plan as it proposes the generation of renewable energy from the solar resource which supports socio-economic development and will contribute to meeting the electricity demand of the country as set out in this plan.
New Growth Path Framework	Department of - Economic Development	The New Growth Path was developed after 16 years of South Africa's democracy, to respond to emerging opportunities and risks while building on policies. This framework provides a dynamic vision on how to collectively achieve a more developed, equitable and democratic society and economy. This framework mainly reflects the commitment of the South African Government to create employment opportunities for its people in all economic policies (RSA, 2011b). This framework sets out the markers for job creation and growth and identify where there are viable changes in the character and structure of production, in order to create a more inclusive, greener economy in the long-term. It is stated in the framework that in order for this framework to reach its objectives, the Government is committed to: • Identify the possible areas of employment creation; and • Develop a policy to facilitate employment creation especially with regards to social equity, sustainable employment and growth in the creation of employment activities (RSA, 2011b).

			This framework also identifies investments in five key areas, one of which is energy. This framework also states that the green economy is a priority area, which includes the construction of and investment in renewable energy technologies like solar (RSA, 2011b). In this regard it will also assist creating employment opportunities over the medium- and long-term. Considering that the construction of and investment in renewable energy is a key area identified within the framework, the Copper SPP is considered to be in-line with the framework.
Climate Change Bill	National Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the Environment)	2018	On 08 June 2018 the Minister of Environmental Affairs published the Climate Change Bill ("the Bill") for public comment. The Bill provides a framework for climate change regulation in South Africa aimed at governing South Africa's sustainable transition to a climate resilient, low carbon economy and society. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. The following objectives are set within the Bill: • Provide for the coordinated and integrated response to climate change and its impacts by all spheres of government in accordance with the principles of cooperative governance; • Provide for the effective management of inevitable climate change impacts through enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to building social, economic, and environmental resilience and an adequate national adaptation response in the context of the global climate change response; • Make a fair contribution to the global effort to stabilise greenhouse gas concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe and in a manner that enables economic, employment, social and environmental development to proceed in a sustainable manner. The Copper SPP comprises a renewable energy generation facility and would not result in the generation or release of emissions during its operation.

Climate Change Bill	National Department of Forestry, Fisheries and the Environment	2021	The Department of Forestry, Fisheries and the Environment has published a new Climate Change Bill for public comment. The bill notes that climate change represents an urgent threat to human societies and the planet, and requires an effective, progressive and incremental response from both government and citizens. It recognises that South Africa has a global responsibility to reduce greenhouse gasses and that the anticipated impacts arising as a result of climate change have the potential to undermine achieving of the country's developmental goals. The main objective of the bill is to enable the development of an effective climate change response and the long-term, just transition to a climate-resilient and lower-carbon economy and society, and to provide for matters connected therewith. The Copper SPP comprises a renewable energy generation facility and would not result in the generation or release of emissions during its operation.
Strategic Integrated Projects (SIPs)	The Presidential Infrastructure Coordinating Committee	2010 - 2030	The Presidential Infrastructure Coordinating Committee (PICC) is integrating and phasing investment plans across 18 Strategic Infrastructure Projects (SIPs) which have five core functions: to unlock opportunity, transform the economic landscape, create new jobs, strengthen the delivery of basic services and support the integration of African economies. A balanced approach is being fostered through greening of the economy, boosting energy security, promoting integrated municipal infrastructure investment, facilitating integrated urban development, accelerating skills development, investing in rural development and enabling regional integration. SIP 8 and 9 of the energy SIPs supports the development of the solar energy facility: • SIP 8: Green energy in support of the South African economy: Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010 – 2030) and supports bio-fuel production facilities. • SIP 9: Electricity generation to support socio-economic development: The proposed Copper SPPis a potential SIP 9 Project as electricity will be generated and social and economic upliftment, development and growth will take place within the surrounding communities. It would become a SIP 9 project if selected as a Preferred Bidder project by the Department of

			Mineral Resources and Energy. SIP 9 supports the acceleration of the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances. The Copper SPP could be registered as a SIP project once selected as a preferred bidder under the REIPPP Programme. The project would then contribute to the above-mentioned SIPs.
Strategic Environmental Assessment (SEA) for wind and Solar Power Plant Energy in South Africa	National Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the Environment)	2014	The Department of Forestry, Fisheries and the Environment (DFFE) has committed to contribute to the implementation of the National Development Plan and National Infrastructure Plan by undertaking Strategic Environmental Assessments (SEAs) to identify adaptive processes that integrate the regulatory environmental requirements for Strategic Integrated Projects (SIPs) while safeguarding the environment. The wind and solar photovoltaic (PV) SEA was accordingly commissioned by DEA in support of SIP 8, which aims to facilitate the implementation of sustainable green energy initiatives. This SEA identifies areas where large scale wind and Solar Power Plant energy facilities can be developed in terms of SIP 8 and in a manner that limits significant negative impacts on the environment, while yielding the highest possible socio-economic benefits to the country. These areas are referred to as Renewable Energy Development Zones (REDZs). The REDZs also provide priority areas for investment into the electricity grid. Currently one of the greatest challenges to renewable energy development in South Africa is the saturation of existing grid infrastructure and the difficulties in expanding the grid. Proactive investment in grid infrastructure is the likely to be the most important factor determining the success of REDZs. Although it is intended for the SEA to facilitate proactive grid investment in REDZs, such investment should not be limited to these areas. Suitable wind and Solar Power Plant development should still be promoted across the country and any proposed development must be evaluated on its own merit. The Copper SPP is not located within a REDZ, but the development will contribute to the expansion of renewable energy facilities and infrastructure within the country, and provide the positive opportunities associated with it.
Limpopo Provincial Spatial	Limpopo Provincial Government	2014	The formulation of a Spatial Development Framework, being a macro spatial plan for the Limpopo province and its municipalities requires some statement on the spatial development objectives which guided the formulation of the macro spatial plan and hierarchy of settlements.

Development Framework (PSDF)	The main objective with the provincial SDF was to formulate a spatial framework which would guide and encourage equitable distribution of investment in terms of a functional settlement hierarchy, to achieve spatially balanced development across the Limpopo Province and support investment in sustainable settlements. Other spatial development objectives which guided the formulation of the macro spatial plan as well as policy and strategy formulation for implementation are: ○ The review and confirmation of the hierarchy of settlements (both towns and villages) by establishing an optimal and functional spatial pattern for districts and thus the Limpopo Province over time. ○ Rationalize and promote the optimal use of land and protection of natural resources by considering high/moderate potential agricultural areas, high/moderate environmental sensitivity areas and mining/mineral deposit areas as well as other relevant factors. ○ The establishing of a functional spatial pattern with a hierarchy of settlements which provides a sound basis for long term sustainable economic growth to amongst others increase income and employment in both the formal and informal sectors in urban, as well as rural areas. ○ Provide guidelines for the development of transportation and utility networks to strengthen the functional linkages between settlements in terms of a hierarchy of settlements; and ○ The successful integration of planning on macro (national and provincial) level and micro (district and local municipality) level. Secondary objectives pertaining to the Environmental aspects and Agricultural potential of soils, namely: The objectives of adding an environmental perspective to the spatial framework are: • To ensure that resources in the province are used to their fullest potential in promoting, protecting, and managing a sustainable environment. To include information contained in available databases to assist with decision making at strategic and project level assist in decision-making. The development of the Copper Solar Power Plant is in-line with the framework based on the contributions and opportunities presented by a development of this nature.

Waterberg District Municipality Integrated Development Plan (IDP)	Waterberg District Municipality	2020-2021	The Integrated Develop Planning is a mandatory and over aching process run collectively by all role players within the municipality to achieve developmental objectives of local government. Developmental Local Government has an obligation to provide basic services through an interaction between numerous stakeholders within the municipal area. It is through this collective interaction commonly known as the "The Theatre of planning" that we intend to address service delivery challenges facing the municipality and our communities The vision of the Waterberg DM is to be "A developmental municipality dedicated to the social and economic upliftment of its communities." The Mission Statement is: "To ensure effective utilization of economic resources to address socio–economic imperatives through mining, agriculture and tourism". The above vision and mission statements are supported by certain values that drive the attitudes and behaviour of politicians and administration of the Waterberg District Municipality are confirmed as: • Honesty • Respect • Fairness • Integrity • Accountability • Accessibility • Effectiveness • Ubuntu The development of the Copper Solar Power Plant is in line with the plan, considering the relevant Key Performance Area stated in the IDP.

Thabazimbi Local Municipality Draft Integrated Development Plan (IDP)	Thabazimbi Local Municipality	2020-2021 (2020)	The IDP for the municipality is the instrument for the strategic management of the Municipality and decision-making by Council. The IDP ensures a cooperative approach by the National, Provincial and Local spheres of government to develop and implement projects and programmes on a Priority basis which will empower and benefit the community. The IDM highlights the vision and mission statements of the LM that they strive to achieve. The vision of the municipality is to be "a leading eco-tourism Municipality in the provision of sustainable and excellent services". The vision is supported by the mission statement the is "Promote, co-ordinate, implement the financial and environmental growth and development through a committed staff and partnership with communities and stakeholders". To further support the vision and mission statements, certain values was identified namely: • Accountable • Transparent • Community Centred • Honest Human Capital. • A safe, healthy and prosperous environment. The development of the Copper Solar Power Plant will contribute to the goals of the area, albeit to a limited extent.
Thabazimbi Local Municipality Municipal Spatial Development Framework (SDF)	Thabazimbi Local Municipality	2018	Spatial Rationale seeks to strengthen and create sustainable human settlements through application of spatial planning and land use systems and practices. The Municipality intends to embark on a process of reviewing its Spatial Development Framework 2015 (SDF) and Town Planning Scheme 2014 which must be aligned to Spatial Planning and Land Use Management Act, Act 16 of 2013 (SPLUMA) and its Regulations. The Municipal Systems Act, 2000 mandates the incorporation of the SDF into the IDP as a sector plan with the intension to provide spatial direction. it is therefore important that the SDF and the IDP are aligned. The Limpopo Spatial Development Framework and existing SDF identified the following nodal areas in the Thabazimbi Municipal Area, namely the (i.) Provincial Growth Point (PGP) being the Thabazimbi Town, and (ii.) Municipal Growth Point (MGP)

being the Northam Town. Both of these towns play a critical role in the sustenance of the municipality both spatially and economically.

The contents of the SDF for the municipality are as follows:

- include a written and spatial representation of a five-year spatial development plan for the spatial form of the municipality;
- include a longer-term spatial development vision statement for the municipal area which indicates a desired spatial growth and development pattern for the next 10 to 20 years; identify current and future significant structuring and restructuring elements of the spatial form of the municipality, including development corridors, activity spines and economic nodes where public and private
- include a strategic assessment of the environmental pressures and opportunities within the municipal area,
- including the spatial location of environmental sensitivities, high potential agricultural land and coastal access strips, where applicable;
- identify the designation of areas in which—more detailed local plans must be developed; and shortened land use development procedures may be applicable and land use schemes may be so amended; provide the spatial expression of the coordination, alignment and integration of sectoral policies of all municipal departments;
- determine the purpose, desired impact and structure of the land use management scheme to apply in that municipal area; and include an implementation plan comprising of sectoral requirements, including budgets and resources for implementation;
- necessary amendments to a land use scheme;
- specification of institutional arrangements necessary for implementation;
- specification of implementation targets, including dates and monitoring indicators; and specification, where necessary, of any arrangements for partnerships in the implementation process

Since the SDF is still under review, the solar power plant may in the future contribute to the accomplishment of some of the objectives listed above, albeit to a limited extent.

3.4 OTHER LEGISLATION

Other legislation mainly refers to the following:

- Planning legislation governing the rezoning process and approval of the layout plan.
- Design standards and legislation for services provision such as water, sewerage, electricity, etc.
- Municipal bylaws related to building plans, building regulations, etc.

3.5 RELEVANT GUIDANCE

The following guidance was considered in conducting the EIA:

- The Equator principles III (2020)
- World Bank Group Environmental, Health and Safety General Guidelines (EHS Guidelines) (2007)
- Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution (2007)
- International Finance Corporation's Policy on Environmental and Social Sustainability (2012)
- DEA. (2013). Draft National Renewable Energy Guideline. Department of Environmental Affairs, Pretoria, South Africa
- DEA, (2012), Guideline 5 – Final companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010
- DEA, (2012), Guideline 7 – Public participation in the Environmental Impact Assessment process
- DEA, (2012), Guideline 9 – Need and desirability
- DEA, (2006), Guideline 3 – General guide to the Environmental Impact Assessment Regulations
- DEAT, (2006), Guideline 4 – Public participation in support of the Environmental Impact Assessment Regulations
- DEAT, (2006), Guideline 5 – Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations
- BirdLife, (2017). Best Practise Guidelines Birds & Solar Energy: Guidelines for assessing and monitoring the impact of solar power generating facilities on bird in southern Africa.

3.6 CONCLUSION

The EIA was undertaken in accordance with the EIA Regulations (as amended) published in GNR 326, in terms of Section 24(5) and 44 of the NEMA as amended as well as all relevant National legislation, policy documents, national guidelines, the World Bank EHS Guidelines, the IFC Performance Standards, and the Equator Principles.

The legislative and policy context plays an important role in identifying and assessing the potential social impacts associated with the proposed development, as well as an indication of the need and desirability of the proposed development from a national, provincial and local level. For this reason, the proposed development project will be assessed in terms of its fit with the key legislative, policy and planning documents discussed above.

The main findings of the review of the policy documents on all spheres of Government indicated that strong support was given towards renewable energy, specifically PV solar energy and therefore it is concluded that there is support for the development of the Copper Solar Power Plant. The White Paper on the Energy Policy of the Republic of South Africa of 1998 stated that due to the fact that renewable energy resources operate from an unlimited resource base, i.e. the sun, renewable energy can increasingly contribute towards a long-term sustainable energy supply for future generations. This policy further highlights that due to the unlimited resources base of renewable energy in South Africa, renewable energy applications, like PV solar energy and associated infrastructure, are more sustainable in terms of social and environmental costs. The Integrated Resource Planning for Electricity for South Africa of 2010–2030, the National Infrastructure Plan of South Africa and the New Growth Path Framework all support the development of the renewable energy sector. In particular, the IRP also indicated that 43% of the energy generation in South Africa is allocated to renewable energy applications. On a District and Local level limited attention is given explicitly to renewable sources like PV solar energy, however the documents reviewed do make provision for such developments and efficiency in improving the quality of lives in terms of efficient physical infrastructure as well as socio-economic growth. At Provincial, District and Local level the policy documents support the applications of renewables.

The review of the relevant policies and documents related to the energy sector therefore indicate that renewables, like solar energy and the establishment of solar energy facilities and associated infrastructure, are supported on all spheres of Government. The proposed Copper SPP is therefore supported by the related policy and planning documents reviewed in this section of the report.

4 THE NEED AND DESIRABILITY

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (…) must include – (f) a motivation for the need and desirability of the activity in the context of the preferred location.

4.1 THE NEED FOR THE PROPOSED ACTIVITY

The proposed activity is a direct result of the growing demand for electricity and the need for renewable energy in South Africa. According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This growing demand, fuelled by increasing economic growth and social development, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmentally responsible development, the impacts of climate change and the need for sustainable development.

Over 90% of South Africa's electricity generation is coal based, the Word bank estimates that this results in an annual, per capita carbon emission of ~8.9 tons per person. Based on 2008 fossil-fuel CO2 emissions statistics released by the Carbon Dioxide Information Analysis Centre, South Africa is the 13th largest carbon dioxide emitting country in the world and the largest emitter in Africa (Boden, et al. 2011).

The proposed project is intended to form part of the Department of Mineral Resources and Energy's (DMREs) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or any other appropriate energy generation programmes/opportunities. The REIPPP Programme aims to secure 14 725 Megawatts (MW) of new generation capacity from renewable energy sources, while simultaneously diversifying South Africa's electricity mix. According to the 2021 State of the Nation Address, Government, the procurement of an additional 11 800 MW of power from renewable energy, natural gas, battery storage and coal in line with the Integrated Resource Plan 2019 and fulfilling their commitments under the United Nations Framework Convention on Climate Change and its Paris Agreement which include the reduction of greenhouse gas emissions. Eskom, the largest greenhouse gas emitter of South Africa, has committed in principle to net zero emission by 2050 and to increase its renewable capacity. During the 2022 State of the Nation Address it was indicated that during the past year the government had taken "firm steps" to bring additional generation capacity online as quickly as possible to close the shortfall in terms of electricity. As a result, it was confirmed that several new generation projects will be coming online over the next few years.

Besides capacity additions, several assumptions have changed since the promulgation of IRP 2010–2030. Key assumptions that changed include the electricity demand projection, Eskom's existing plant performance, as well as new technology costs. These changes necessitated the review and update of the IRP which resulted in the draft IRP 2018 that was made available for comment and updated to the draft IRP 2019 as per table 4.1 below:

Table 4.1: Published Draft IRP 2019 (Approved by Cabinet for Consultation)

	Coal	Coal (Decommissioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	Gas & Diesel	Other (Distributed Generation, CoGen, Biomass, Landfill)
Current Base	37 149		1 860	2 100	2 912	1 474	1 980	300	3 830	499
2019	2 155	-2373					244	300		Allocation to the extent of the short term capacity and energy gap.
2020	1 433	-557				114	300			
2021	1 433	-1403				300	818			
2022	711	-844			513	400 1000	1600			
2023	750	-555				1000	1600			500
2024			1860				1600		1000	500
2025						1000	1600			500
2026		-1219					1600			500
2027	750	-847					1 600		2000	500
2028		-475				1000	1 600			500
2029		-1694			1575	1000	1 600			500
2030		-1050		2 500		1 000	1 600			500
TOTAL INSTALLED CAPACITY by 2030 (MW)	33364		1860	4600	5000	8288	17742	600	6380	
% Total Installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52	22.53	0.76	8.1	
% Annual Energy Contribution (% of MWh)	58.8		4.5	8.4	1.2*	6.3	17.8	0.6	1.3	

Installed Capacity
Committed / Already Contracted Capacity
Capacity Decommissioned
New Additional Capacity
Extension of Koeberg Plant Design Life
Includes Distributed Generation Capacity for own use

According to the South African Energy Sector Overview (2021), there is currently 1 723MW of installed PV capacity, while an additional 2 600MW and 860MW from wind and solar has been rewarded as part of Bid window 5 and 6, respectively (latter announced in 2022).

4.2 THE DESIRABILITY OF THE PROPOSED ACTIVITY

The facility's contribution towards sustainable development and the associated benefits to society in general is discussed below:

- Lesser dependence on fossil fuel generated power - The deployment of the facility will have a positive macro-economic impact by reducing South Africa's dependence on fossil fuel generated power and assisting the country in meeting its growing electricity demand.
- Increased surety of supply - By diversifying the sources of power in the country, the surety of supply will increase. The power demands of South Africa are ever increasing and by adding solar power this demand can be met, even exceeded without increasing pollution in relation to the use of fossil fuels. The project has the potential of "securing" economic activity by assisting in removing supply constraints if Eskom generation activities result in a supply shortfall. When supply is constrained, it represents a limitation to economic growth. When a supply reserve is available, it represents an opportunity for economic growth.
- Local economic growth - The proposed project will contribute to local economic growth by supporting industry development in line with provincial and regional goals and ensuring advanced skills are drawn to the Limpopo Province. The project will likely

encounter widespread support from government, civil society and businesses, all of whom see potential opportunities for revenues, employment and business opportunities locally. The development of the photovoltaic solar facility will in turn lead to growth in tax revenues for local municipalities and sales of carbon credits, resulting in increased foreign direct investment. The location of the proposed development within the Thabazimbi Local Municipality is desirable since 14% of households within the Municipality have no income (Thabazimbi IDP, 2020/2021).

- Lower costs of alternative energy - An increase in the number of solar facilities commissioned will eventually reduce the cost of the power generated through solar facilities. This will contribute to the country's objective of utilising more renewable energy and less fossil fuel-based power sources. It will assist in achieving the goal to generate 14 725 MW of electricity from renewable energy as per the Renewable Energy Independent Power Producer Procurement (REIPPP) Programme of the Department of Mineral Resources and Energy. The Government will be initiating the procurement of an additional 11 800 MW of renewable energy as stated during the 2021 State of the Nation Address.
- Reduction in greenhouse gas emissions - The additional power supplied through solar energy will reduce the reliance on the combustion of fossil fuels to produce power. The South African electricity grid is predominantly coal-fired and therefore GHG emissions intensive (coal accounts for more than 92% of the fuel used in South Africa's electricity generation). The reduction of GHG emissions as a result of the project implementation will be achieved due to reduction of CO_2 emissions from combustion of fossil fuel at the existing grid-connected power plants and plants which would likely be built in the absence of the project activity.
- CDM Project - A solar energy facility also qualifies as a Clean Development Mechanism (CDM) project (i.e. a financial mechanism developed to encourage the development of renewable technologies).
- Climate change mitigation - On a global scale, the project makes a contribution to greenhouse gas emission reduction and therefore contributes toward climate change mitigation.
- Reduced environmental impacts - The reduction in non-renewable electricity consumed from the grid will not only result in a reduction in greenhouse gas emissions, but also the prevention of negative impacts associated with coal mining. For example, coal power requires high volumes of water, in areas of South Africa where water supply is already over-stretched and water availability is highly variable. Photovoltaic solar energy technology also does not produce the sulphur emissions, ash or coal mining concerns associated with conventional coal fired electricity generation technologies resulting in a relatively low level of environmental impacts. It is a clean technology which contributes toward a better-quality environment for employees and nearby communities.
- Social benefits - The project activity is likely to have significant long-term, indirect positive social impacts that may extend to a regional and even national scale. The larger scale impacts are to be derived in the utilization of solar power and the experience gained through the construction and operation of the power plant. In future, this experience can be employed at other similar solar installations in South Africa.

- Provision of job opportunities - The main benefit of the proposed development operating in the area is that local companies or contractors will be hired for the duration of the construction period. The operational phase will provide permanent job opportunities to the local communities from the surrounding area since security guards and general labourers will be required on a full-time basis. Approximately 500 employment opportunities will be created during the construction and operational phases.
- Indirect socio-economic benefits - The increase in the demand for services such as accommodation, transportation, security, general maintenance and catering will generate additional indirect socio-economic benefits for the local community members.
- Effective use of resources - Because of predominantly the climate and soil limitations, the site is totally unsuitable for cultivated crops, and the viable agricultural land use is limited to grazing only. The proposed development in this specific area will generate alternative land use income through rental for the proposed energy facility, which will have a positive impact on agriculture. It will provide the farming enterprise with increased cash flow and rural livelihood, and thereby improve the financial sustainability of agricultural activities.
- Increased access to electricity: Despite the abundant availability of coal, electricity generation and the development of related infrastructure has been inadequate in providing access to electricity for entire population of approximately 60 million people. South Africa has been described as a country with an energy-deprived population with more than 1.5 million households comprising approximately 5 million people that are without electricity. The national electricity crises of 2010 and the resultant effects on South African residents and the economy has highlighted how highly reliant we are on electricity as a source of energy. Government has committed to developing measures to promote energy saving, reduce energy costs to the economy, and reduce the negative impact of energy use on the environment.
- Cumulative impacts of low to medium significance – No cumulative impacts with a high residual risk have been identified. In terms of the desirability of the development of sources of renewable energy therefore, it may be preferable to incur a higher cumulative loss in such a region as this one, than to lose land with a higher environmental value elsewhere in the country.

5 DESCRIPTION OF ENVIRONMENTAL ISSUES

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include-

(h) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including –

(i) details of all the alternatives considered;

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

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

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

(ix) the outcome of the site selection matrix;

(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and

(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;

5.1 CONSIDERATION OF ALTERNATIVES

The DEAT 2006 guidelines on assessment of alternatives and impacts proposes the consideration of four types of alternatives namely, the no-go, location, activity, and design alternatives. It is, however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. It also recognises that the consideration of alternatives is an iterative process of feedback between the developer and EAP, which in some instances culminates in a single preferred project proposal.

An initial site assessment was conducted by the developer on the Remaining Extent of Portion and Portion 5 of the Farm Zwartdoorns no. 421, and the farm was found favourable due to its close proximity to grid connections, solar radiation, ecology and relative flat terrain. Where specific features of environmental sensitivity are identified by the independent specialists as part of the Scoping Phase, these areas and the associated required buffers will be considered by the developer to ensure that the facility layout is appropriate considering the sensitive features present. The site selection also took the site geology, land capability, water availability and land use into consideration before deciding on the specific site within the affected property.

The following sections explore different types of alternatives in relation to the proposed activity in more detail.

5.1.1 No-go alternative

This alternative considers the option of 'do nothing' and maintaining the status quo of the affected environment. The description provided in section 5.3 of this report could be considered the baseline conditions (*status quo*) to persist should the no-go alternative be preferred. The site is currently zoned for agricultural land uses. Should the proposed activity not proceed, the site will remain unchanged and will continue to be used for the current land uses present. The area associated with the development footprint has limited agricultural potential and is unsuitable for cultivation, with grazing considered to be the only agricultural option. The potential opportunity costs in terms of alternative land use income through rental for the energy facility and the supporting social and economic development in the area would be lost if the *status quo* persists.

5.1.2 Location alternatives

This alternative asks the question, if there is not, from an environmental perspective, a more suitable location for the proposed activity. No other properties have at this stage been secured by Copper Solar Power Plant (RF) (Pty) Ltd in the Northam area to potentially establish the Copper SPP. From a local perspective the Remaining Extent of Portion and Portion 5 of the Farm Zwartdoorns no. 421 are preferred due to its suitable climatic conditions, topography (i.e. in terms of slope), environmental conditions (i.e. agricultural potential and archaeology), proximity to a grid connection point (i.e. for the purpose of electricity evacuation), as well as site access (i.e. to facilitate the movement of machinery, equipment, infrastructure and people during the construction phase). Based on the above site-specific attributes, the study area is considered highly preferred in terms of the development of a Solar Power Plant facility. As such, no property / location alternatives will be considered (refer to Figure 5.1).

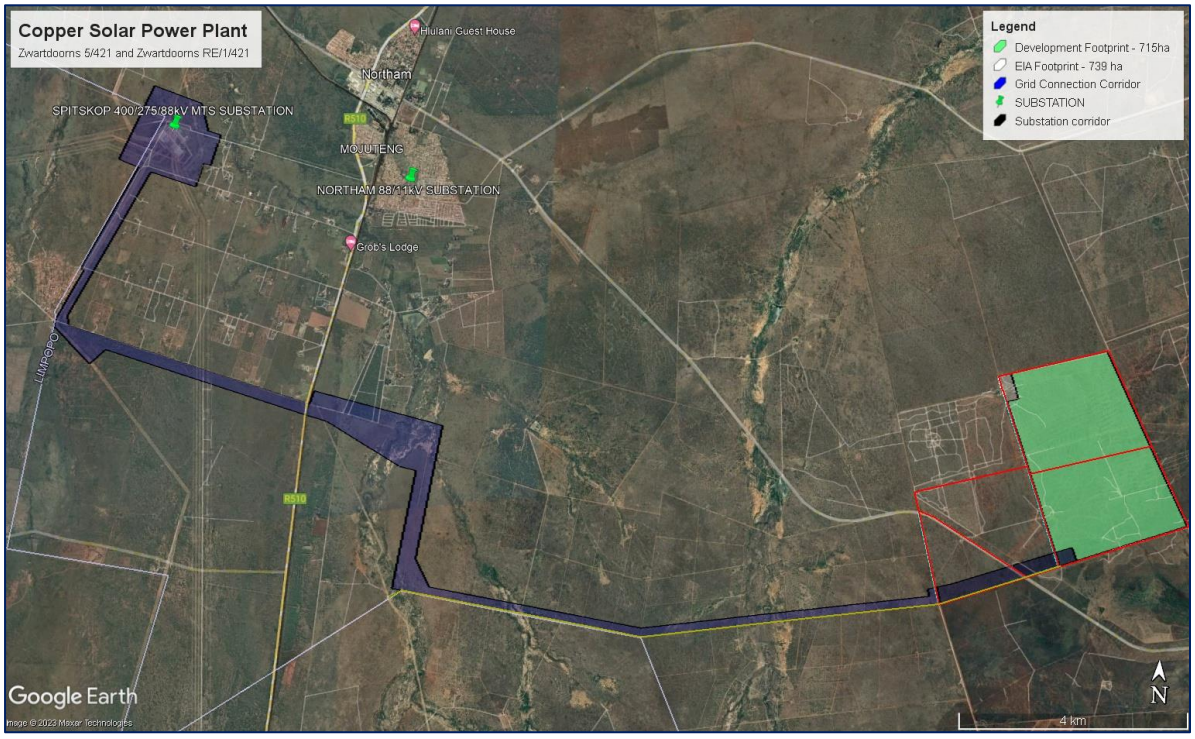


Figure 5.1: Location of the single preferred location alternative

5.1.3 Activity alternatives

The scoping process also needs to consider if the development of a Solar Power Plant facility would be the most appropriate land use for the particular site.

- Photovoltaic (PV) solar facility – Copper Solar Power Plant (RF) (Pty) Ltd is part of a portfolio of Solar Power Plant projects throughout South Africa. Copper Solar Power Plant (RF) (Pty) Ltd is of the opinion that solar PV technology is perfectly suited to the site, given the high irradiation values for of the Northam area–refer to Figure 5.2. The technology furthermore entails low visual impacts, have relatively low water requirements, is a simple and reliable type of technology and all the components can be recycled.
- Wind energy facility - Due to the local climatic conditions a wind energy facility is not considered suitable as the area does not have the required wind resource. Furthermore, the applicant has opted for the generation of electricity via solar power rather than the use of wind turbines based on the renewable energy resource available for the area. This alternative is therefore regarded as not feasible and will not be evaluated further in this report.
- Concentrated solar power (CSP) technology - CSP technology requires large volumes of water, and this is a major constraint for this type of technology considering the water challenges and limitation experienced not only in the country but also within the local area. While the irradiation values are high enough to generate sufficient solar power (refer to Figure 5.2), the water constraints render this alternative not feasible. It must also be noted that the IRP no longer includes the use of CSP as part of the energy mix of the county. Therefore, this alternative will not be considered further in this report.

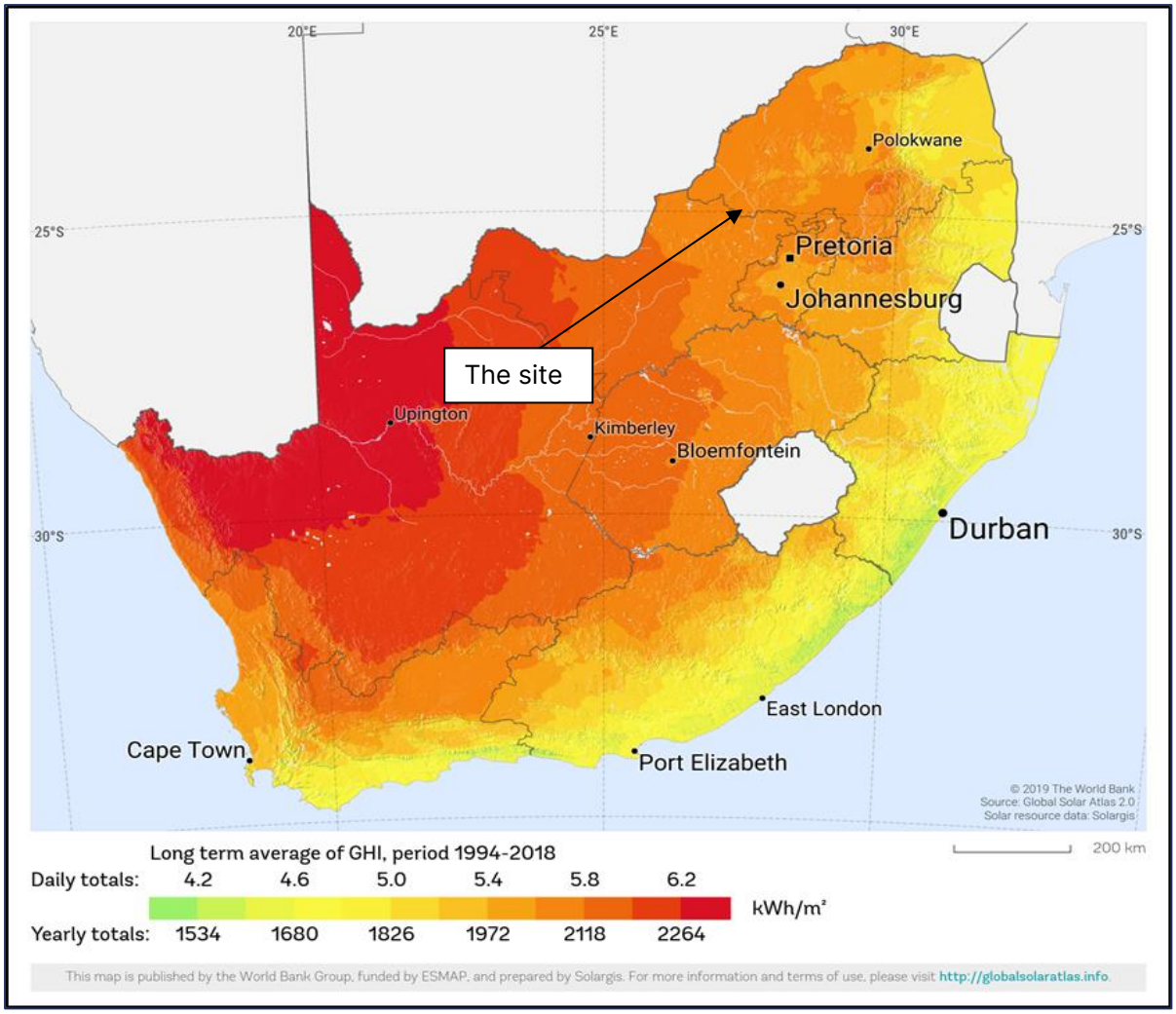


Figure 5.2: Global horizontal irradiation values for South Africa (Solar GIS, 2021) and the Copper SPP development footprint.

5.1.4 Design and layout alternatives

Design alternatives were considered throughout the planning and design phase (i.e., what would be the best design option for the development?). In this regard discussions on the design were held between the EAP and the developer, which also included the consideration of sensitive environmental areas and features present as identified by the independent specialists that needs to be avoided by the placement of infrastructure. The layout plan will be submitted as part of the EIA Report.

The layout will follow the limitations of the site and aspects such as environmental sensitive areas (heritage features) roads, fencing and servitudes are considered. The total surface area proposed for layout options include the PV panel arrays spaced to avoid shadowing, access and maintenance roads and associated infrastructure (buildings, power inverters, power lines, BESS and perimeter fences). With regards to the structure orientation, the panels will either be fixed to a single-axis horizontal tracking structure where the orientation of the panel varies according to the time of the day, as the sun moves from east to west or tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun.

Note: It is customary to develop the final/detailed construction layout of the Solar Power Plant facility only once an Independent Power Producer (IPP) is awarded a successful bid under the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) or an alternative programme, after which major contracts are negotiated and final equipment suppliers identified. For the purpose of the Environmental Impact Assessment (EIA), site layout alternatives will not be comparatively assessed, but rather a single layout will be refined as additional information becomes available throughout the EIA process (e.g., specialist input, additional site surveys, ongoing stakeholder engagement).

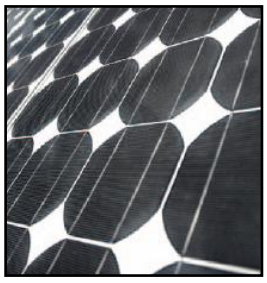
The development area presented in the Scoping Report has been selected as a practicable option for the facility, considering technical preference and constraints, as well as initial No-Go layers informed by specialist site surveys. Following further site screening by the specialists (scheduled to take place during the EIA phase), the development footprint will be finalised for impact assessment.

5.1.5 Technology alternatives

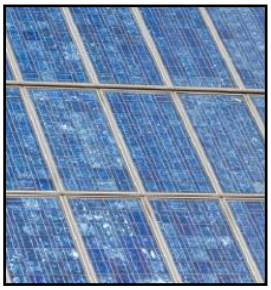
There are several types of semiconductor technologies currently available and in use for PV solar panels. Two, however, have become the most widely adopted, namely crystalline silicon and thin film. These technologies are discussed in more detail below:

- Crystalline (high efficiency technology at higher cost):

  Crystalline silicon panels are constructed by first putting a single slice of silicon through a series of processing steps, creating one solar cell. These cells are then assembled together in multiples to make a solar panel. Crystalline silicon, also called wafer silicon, is the oldest and the most widely used material in commercial solar panels. Crystalline silicon modules represent 85-90% of the global annual market today. There are two main types of crystalline silicon panels that can be considered for the solar facility:



  - Mono-crystalline Silicon - mono-crystalline (also called single crystal) panels use solar cells that are cut from a piece of silicon grown from a single, uniform crystal. Mono-crystalline panels are among the most efficient yet most expensive on the market. They require the highest purity silicon and have the most involved manufacturing process.



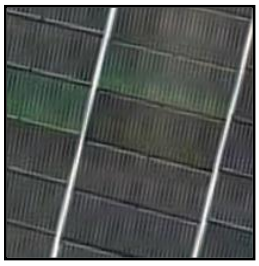
  - Poly-crystalline Silicon – poly-crystalline panels use solar cells that are cut from multifaceted silicon crystals. They are less uniform in appearance than mono-crystalline cells, resembling pieces of shattered glass. These are the most common solar panels on the market, being less expensive than mono-crystalline silicon. They are also less efficient, though the performance gap has begun to close in recent years (First Solar, 2011).

- Thin film (low-cost technology with lower efficiency):

  Thin film solar panels are made by placing thin layers of semiconductor material onto various surfaces, usually on glass. The term *thin film* refers to the amount of semiconductor material used. It is applied in a thin film to a surface structure, such as a sheet of glass. Contrary to popular belief, most thin film panels are not flexible. Overall, thin film solar panels offer the lowest manufacturing costs, and are becoming more prevalent in the industry. Thin films currently account for 10-15% of global PV module sales. There are three main types of thin film used:

  - Cadmium Telluride (CdTe) - CdTe is a semiconductor compound formed from cadmium and tellurium. CdTe solar panels are manufactured on glass. They are the most common type of thin film solar panel on the market and the most cost-effective to manufacture. CdTe panels perform significantly better in high temperatures and in low-light conditions.

  - Amorphous Silicon - Amorphous silicon is the non-crystalline form of silicon and was the first thin film material to yield a commercial product, first used in consumer items such as calculators. It can be deposited in thin layers onto a variety of surfaces and offers lower costs than traditional crystalline silicon, though it is less efficient at converting sunlight into electricity.



  - Copper, Indium, Gallium, Selenide (CIGS) - CIGS is a compound semiconductor that can be deposited onto many different materials. CIGS has only recently become available for small commercial applications and is considered a developing PV technology (First Solar, 2011).

- Bifacial panels:

  As the name suggests, bifacial solar panels have two faces, or rather, they can absorb light from both sides of the panel. A lot of potential energy transfer is lost in traditional solar cells when the light hits the back of a solar panel. Most bifacial solar panels use monocrystalline cells, whereas traditional cells use polycrystalline materials. The monocrystalline materials, alongside the clear light pathway on both sides of the panel, enable the light to be absorbed from either side of the cell, and it is thought that the overall efficiency of these cells can be up to 30% greater in commercial applications. Although, the exact amount is variable depending on the surface that they are installed on. The front side of the solar panel still absorbs most of the solar light, but the back side of the solar panel can absorb between 5-90% of the light absorbed by the front of the solar panel. Refer to Figure 5.3 for an illustration of Bifacial versus Monoficial Solar Panel absorption.

Traditional solar panels use an opaque back sheet. By comparison, bifacial solar panels either have a clear/reflective back sheet or have dual panes of glass. Most of these solar panels are frameless so any issues with potential-induced degradation (PID) are reduced. To efficiently convert light into electricity from both sides, bifacial solar cells have selective-area metallization schemes that enable light to pass between the metallized areas, rather than the conventional thick metal collectors as seen with monofacial solar panels.

The technology that (at this stage) proves to be most feasible and reasonable with respect to the proposed solar facility is crystalline silicon panels, due to it being non-reflective, more efficient, and with a higher durability. However, due to the rapid technological advances being made in the field of solar technology the exact type of technology to be used, such as bifacial panels, will only be confirmed at the onset of the project.

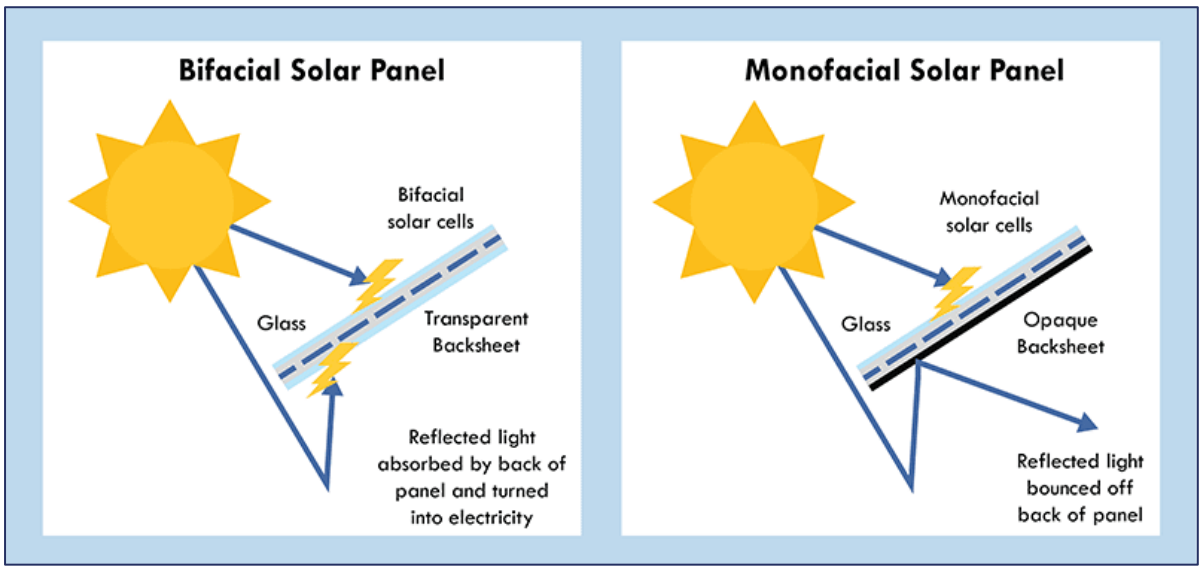


Figure 5.3: Bifacial vs Monoficial Solar Panel absorption.

5.2 PUBLIC PARTICIPATION PROCESS

The following sections provide detailed information on the public participation process conducted in terms of Regulations 39 to 44. The following three categories of variables were taken into account when deciding the required level of public participation:

- The scale of anticipated impacts;
- The sensitivity of the affected environment and the degree of controversy of the project;
- The characteristics of the potentially affected parties.

Since the scale of anticipated impacts is low, the general land use of the area is related to mining and agriculture, the limited environmental sensitivity of the site and the fact that no conflict was foreseen between potentially affected parties, no additional public participation mechanisms are considered at this stage of the process. The following actions have already been undertaken:

- Newspaper advertisement

  Since the proposed development is unlikely to result in any impacts that extend beyond the municipal area where it is located, it is deemed sufficient to advertise in a local newspaper. An advertisement will be placed in English in the local newspaper (Platinum

Bushvelder) on the 19 May 2023 (see Appendix C2) notifying the public of the EIA process and requesting Interested and Affected Parties (I&APs) to register with and submit their comments to Solis Environmental (Environamics Environmental Consultants). I&APs was given the opportunity to raise comments within 30 days of the advertisement (by 19 June 2023).

- Site notices

  Site notices was placed on site in Afrikaans and English on 15 May 2023 to inform surrounding communities and immediately adjacent landowners of the proposed development. I&APs were given the opportunity to raise comments by 14 June 2023. Photographic evidence of the site notices is included in Appendix C3.

- Direct notification of identified I&APs

  Identified I&APs, including key stakeholders representing various sectors, will be directly informed of the EIA process on 19 May 2023 via registered post, telephone calls, WhatsApps and emails (as relevant). The Background Information Document (BID) was distributed with the notification. For a complete list of I&APs with their contact details see Appendix C4 to this report. It was expected from I&APs to provide their inputs and comments by 19 June 2023.

- Direct notification of surrounding landowners and occupiers

  Written notices were also provided via registered post, WhatsApp or email (as relevant) to all surrounding landowners and occupiers on 19 May 2023. The surrounding landowners were given the opportunity to raise comments within 30 days. For a list of surrounding landowners see Appendix C4.

- Circulation of Draft Scoping Report

  Copies of the draft Scoping report has been provided to all I&APs via courier, Dropbox, company website and/or email (as relevant). Hard copies of the report will be made available on request and where an I&AP does not have the resources to view the report on an online platform. I&AP's and organs of state will be requested to provide their comments on the report until 24 July 2023. The comments will be documented and compiled into a Comments and Response Report to be included as part of the Final Scoping Report for decision-making.

5.2.1 Consultation process

Regulation 41 requires that the landowner, surrounding landowners, municipality, relevant ward councillor, any organ of state having jurisdiction in respect of any aspect of the activity should be given written notice of the activity. A complete list of all the consultees who received written notice as well as proof of correspondence is attached as Appendices C5 and C6. Refer to Figure 5.4 for the location of the surrounding land owners.

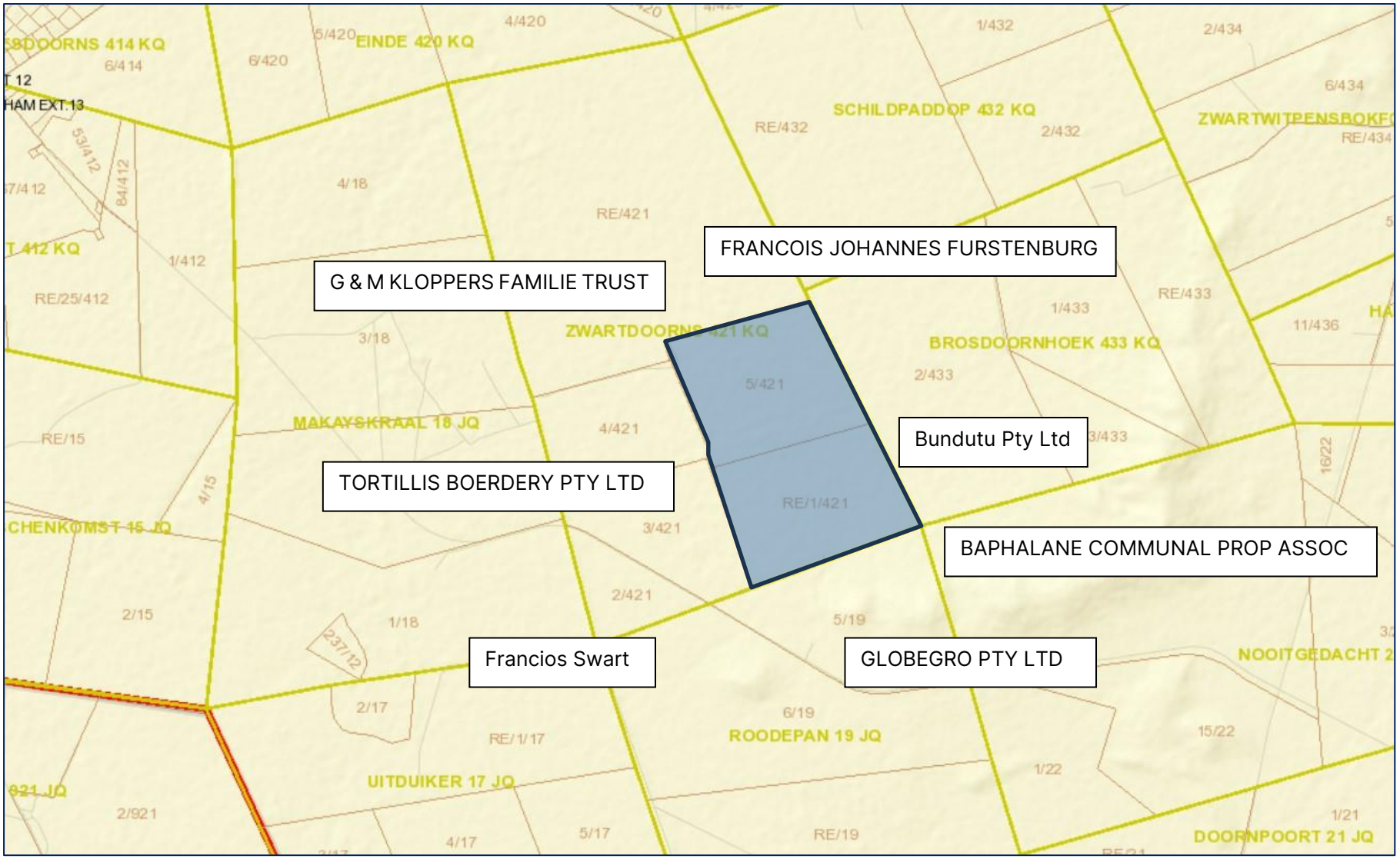


Figure 5.4: Location of the surrounding landowners (Chief Surveyor General database).

5.2.2 Registered I&APs

I&APs include all stakeholders who deem themselves affected by the proposed activity. According to Regulation 43(1) "A registered interested and affected party is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application."

This report is the Draft Scoping Report which will be made available to all potential and/or registered I&APs and State Departments. They will be provided with a copy of the Draft Scoping Report and will be requested to provide written comments on the report within 30 days. All issues identified during the review period will be documented and compiled into a Comments and Response Report to be included as part of the Final Scoping report.

All comments received prior to the release of the Draft Scoping Report for the 30-day review and comment period have been included in this report as Appendix C5, Appendix C6 and Appendix C7 to provide I&APs an opportunity to confirm that their comments raised during the initial public participation phase has been included and considered as part of the EIA process.

5.2.3 Issues raised by I&APs and consultation bodies

To date the interim comments from Eskom and is summarised in the Comments and Response Report included in Appendix C7. Any comments received during the circulation of the draft Scoping Report will be summarised in the final Scoping Report. The full wording and original correspondence are included in Appendix C5.

5.3 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PREFERRED ALTERNATIVE

The following sections provide general information on the biophysical and socio-economic attributed associated with the preferred alternative (i.e. the location of the development footprint within the affected property).

5.3.1 Biophysical environment

The biophysical environment is described with specific reference to geology, soils, agricultural potential, vegetation and landscape features, climate, biodiversity, heritage features (in terms of archaeology and palaeontology), the visual landscape and the social environment to be affected. A number of specialists were consulted to assist with the compilation of this chapter of the report – refer to the Table 1.2.

The surrounding land uses include farming activities. The area proposed for development (i.e. the development footprint) exclusively consists of land used for grazing, therefore limited sensitive areas from an ecological, heritage or conservation point have been identified. These features are described in more detail below.

5.3.1.1 Geology, soils and agricultural potential

According to the land type database (Land Type Survey Staff, 1972 - 2006), the project area is characterised by three different landtypes namely Ae 62, Ae 64, and Fa 4 land types. This Ae land type consists of red-yellow apedal soils which are freely drained. The soils tend to have a high base status and is deeper than 300 mm. The Fa land type is characterised by Glenrosa and/or Mispah soil forms which are common in this area, however, other soils may occur. Lime is rare or absent throughout the entire landscape.

According to the Soil and Agricultural SSV (Appendix E5), the following land potential level have been determined;

- Land potential level 5 (this land potential level is characterised by restricted potential. Regular and/or moderate to severe limitations due to soil, slope, temperatures or rainfall); and
- Land potential level 6 (this land potential level is characterised by very restricted potential. Regular and/or moderate to severe limitations due to soil, slope, temperatures, or rainfall). Non arable.

Fifteen land capabilities have been digitised by (DAFF, 2017) across South Africa, of which fifteen potential land capability classes are located within the proposed footprint area's assessment area, including;

- Land Capability 1 to 5 (Very low Sensitivity to Low Sensitivity);
- Land Capability 6 to 8 (Moderately low Sensitivity to Moderate Sensitivity);
- Land Capability 9 to 10 (Moderately High Sensitivity); and
- Land Capability 11 to 15 (High Sensitivity to Very High Sensitivity)

The land capability sensitivity (DAFF, 2017) indicates a "Very Low to Very High" sensitivity category. The most dominant soil forms, which was identified within the project area is the Carolina, Nkonkoni, Hutton, Vaalbos and Mispah soil forms. Other soils also associated to the project area includes the Ermelo, Clovelly, Oakleaf and Swartland soil forms. The dominant Carolina, Hutton, and Vaalbos soil forms are associated with "Moderate to Very High" land capability sensitivity. The other soil forms present in the project area namely Ermelo, Clovelly and Oakleaf soil forms also have land capability sensitivities of "Moderate to Very High" respectively following the DFFE, (2023) agricultural themes. The Mispah and Swartland soil forms identified in the project area are characterised with "Low" sensitivity land capability. The most sensitive of these soil forms is characterised by a land potential 5, due to the poor climate, with a "Moderate" sensitivity.

The baseline soil findings and the DFFE (2023) agricultural theme concur in most areas with soils with "Moderate to Very High" sensitivities. However, areas with the Mispah and Swartland soil forms which are characterised with "Moderate to Very High" sensitivity are associated with limited land capability potentials. Based on the site-verified soil findings these soils have a "Very Low" to "Low" sensitivity due to the shallow profile depths and high clay contents that significantly limit cropping practices. Overall, the project area sensitivity can be assigned as "Moderate High." Crop field areas categorised as "High" agricultural sensitivities were also identified within the 50 m regulated area. However, these areas are not actively cultivated fields or still considered as high potential. The stakeholders can also obtain consent for use of those

areas or engage with the landowners for appropriate compensation where necessary for use of these areas for the project.

5.3.1.2 Vegetation, topography and landscape features

The Wetland Baseline and Risk Assessment (Appendix E2) indicated that the PAOI is situated in the Savanna biome. The savanna vegetation of South Africa represents the southernmost extension of the most widespread biome in Africa (Mucina & Rutherford, 2006).

The savanna biome is the largest biome in South Africa, extending throughout the east and north-eastern areas of the country. Savannas are characterised by a dominant grass layer, over-topped by a discontinuous, but distinct woody plant layer. At a structural level, Africa's savannas can be broadly categorised as either fine-leaved (microphyllous) savannas or broad-leaved savannas. Fine-leaved savannas typically occur on nutrient rich soils and are dominated by microphyllous woody plants of the Mimosaceae family (Common genera include *Vachellia and Albizia*) and a generally dense herbaceous layer (Scholes & Walker, 1993). On a fine-scale vegetation type, the PAOI overlaps with the Dwaalboom Thornveld, the Central Sandy Bushveld and the Western Sandy Bushveld vegetation types.

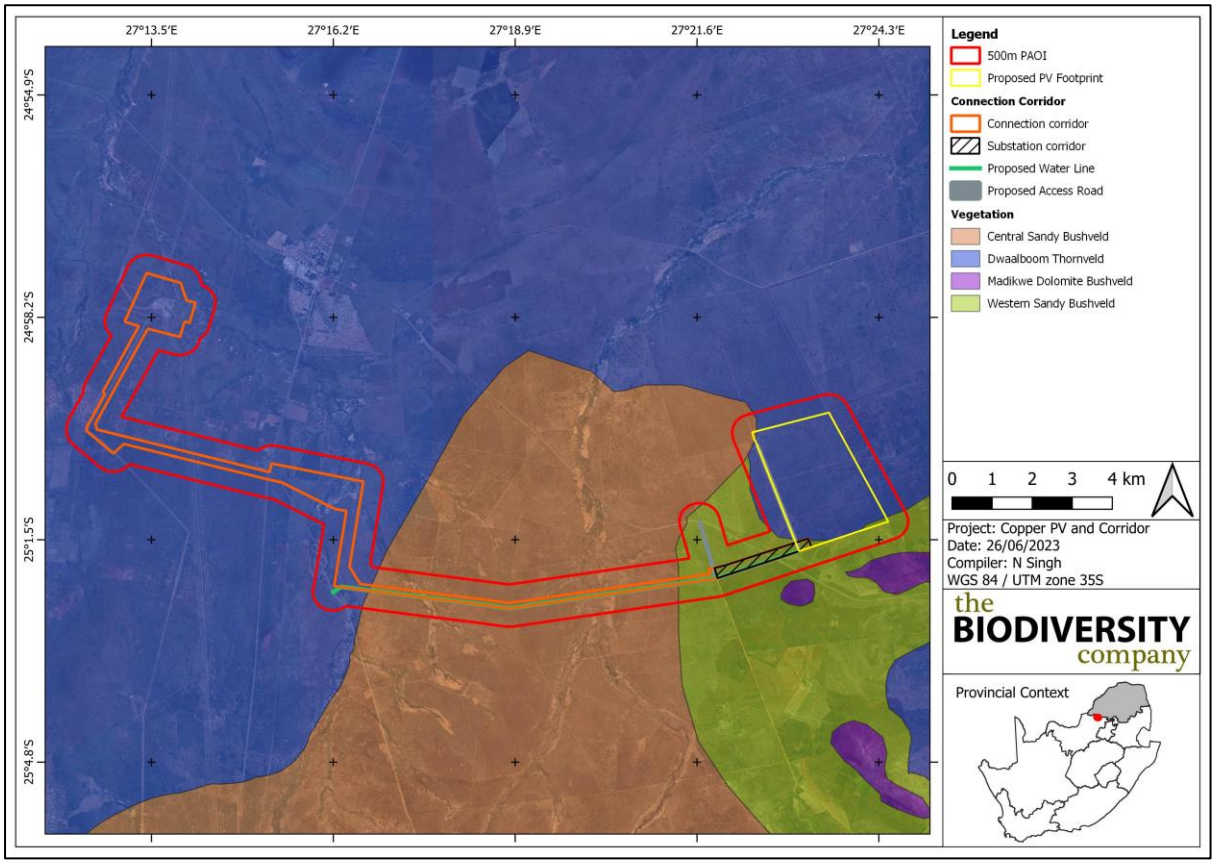


Figure 5.5: Map illustrating the vegetation types associated with the region.

Dwaalboom Thornveld is restricted to and is distributed in Limpopo and North-West Provinces, within flats north of the Dwarsberge and associated ridges mainly west of the Crocodile River in the Dwaalboom area but including a patch around Sentrum. South of the ridges it extends eastwards from the Nietverdiend area, north of the Pilanesberg to the Northam area at an altitude range of between 900 and 1,200m AMSL. Its main vegetation and landscape features

include plains with a layer of scattered, low to medium high, deciduous microphyllous trees and shrubs with a few broad-leaved tree species. There is almost a continuous herbaceous layer dominated by grass species. Dwaalboom Thornveld is classified as Least Threatened.

The Central Sandy Bushveld is characterised by low undulating areas, sometimes between mountains, and sandy plains and catenas supporting tall, deciduous Terminalia sericea and Burkea africana woodland on deep sandy soils (with the former often dominant on the lower slopes of sandy catenas) and low, broad-leaved Combretum woodland on shallow rocky or gravelly soils (Mucina & Rutherford, 2006). This vegetation is classified as Vulnerable. The Western Sandy Bushveld is characterised by undulating plains with tall open woodland and low woodland (Mucina & Rutherford, 2006). Broad leaved and microphyllous tree species are prominent. On flatter areas the dominant species include Acacia erubescens, whereas on shallow soils Combretum apiculatum is dominant, furthermore Terminalia sericea is dominant on deeper soils. The vegetation type is Least Threatened.

According to the Terrestrial Biodiversity SSV (attached as Appendix E1), the different habitat types within the PAOI were delineated and identified based on observations during the field assessment, and available satellite imagery. These habitat types were assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of species of conservation concern and their ecosystem processes. Six (6) different terrestrial habitat types were delineated within the PAOI, (Table 5.1). Based on the sensitivity criteria, all habitats within the PAOI were allocated a sensitivity category. The sensitivities of the habitat types delineated are illustrated in figure 5.6.

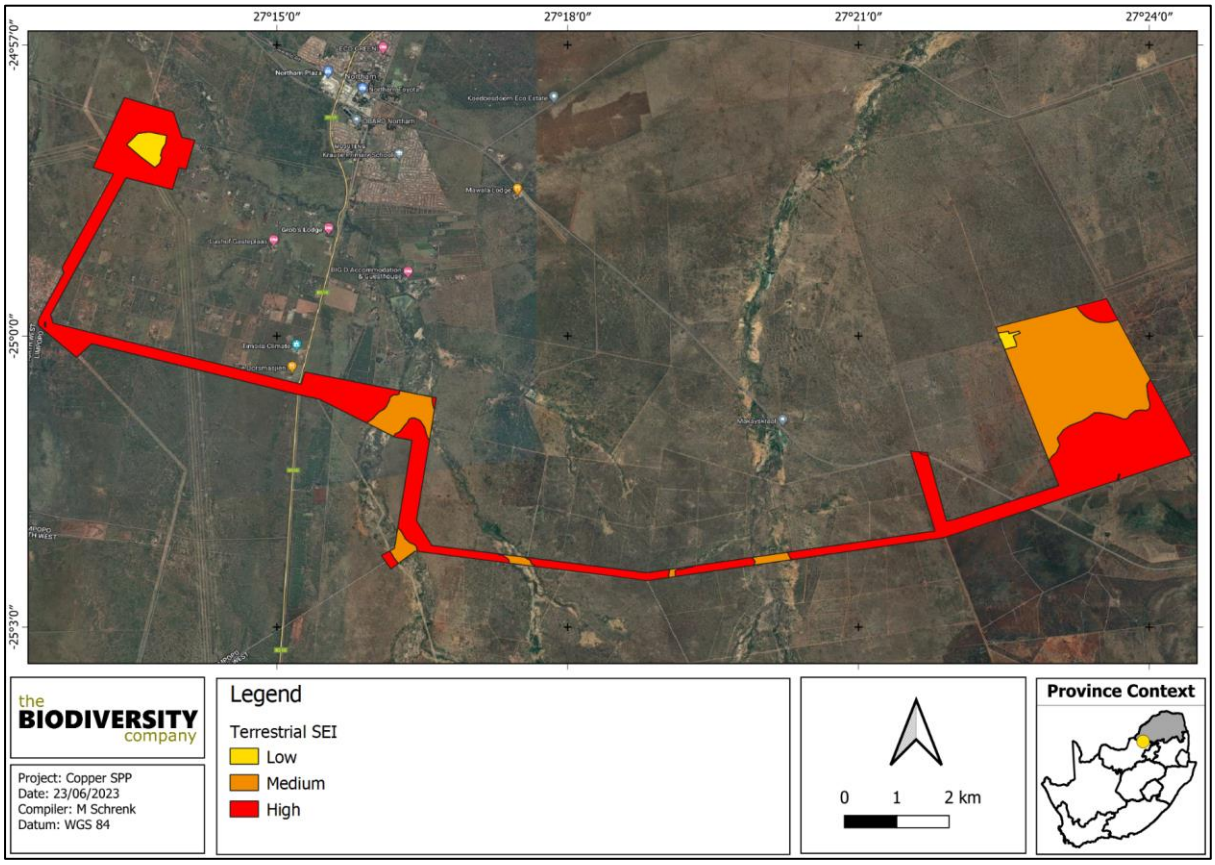


Figure 5.6: Map illustrating the Site Ecological Importance of the Project Area

The degraded bushveld habitat features were found to be in a state that may support specific flora SCC/protected species, and these areas serve as important foraging corridors and potential nesting habitat for a range of fauna species. Development footprints should be amended to avoid large and connected portions of this habitat feature, especially those overlapping with provincial CBA and ESA sites, in order to preserve the functional ecology.

Due to the likelihood of flora SCC occurring, as well as the recording of protected trees, a project area walkthrough and Search and Rescue must be conducted before development activities commence. It is noted that the application of permits may be required for any SCC or protected flora that need to be relocated or destroyed.

The allocated sensitivities for each of the relevant themes are either disputed or validated for the overall PAOI in table 5.2 below. A summative explanation for each result is provided as relevant. The specialist-assigned sensitivity ratings are based largely on the SEI process followed in the previous section, and consideration is given to any observed or likely presence of SCC or protected species.

Table 5.1: Summary of the screening tool vs specialist assigned sensitivities.

Screening Tool Theme	Screening Tool	Specialist	Tool Validated or Disputed by Specialist - Reasoning
Terrestrial Theme	**Very high**	**High**	Validated – Most habitat area sensitivities are regarded as high. Minimal significant habitat fragmentation was present and functional ESA vegetation was recorded.
Plant Theme	**Low**	**Medium**	Disputed – No SCC were recorded but there is potential for them to occur, numerous protected trees were recorded.
Animal Theme	**Medium**	**Medium**	Validated – Certain SCC species are known to regularly move through the area.

Table 5.2: Summary of habitat types delineated within the Project Area and assigned EI values.

Habitat Type	Description	Ecosystem Processes and Services	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance (SEI)
Cleared	Developed or cleared land. No longer ecologically functional in any meaningful sense.	Some connectivity and foraging for common fauna species.	**Medium** Confirmed or highly likely occurrence of populations of Near Threatened (NT) species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. Any area of natural habitat of threatened ecosystem type with status of VU. Presence of range-restricted species. > 50% of receptor contains natural habitat with potential to support SCC.	**Medium** Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types. Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential.	**Medium**	**High** Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.	**Low** Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.

Habitat Type	Description	Ecosystem Processes and Services	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance (SEI)
Heavily Degraded Bushveld	Semi – functional savannah habitat. Important for supporting some key ecosystem services and providing habitat connectivity. Portions of this unit have been subject to historical overgrazing, extensive herbicide applications, and some current indigenous weed invasion – however these areas of the habitat exist in a state of recovery.	Foraging habitat for fauna species. Erosion control and nutrient cycling. Grazing land. Carbon sequestration and nectar resources for pollinators. Important movement corridors for all types of fauna. Wood source for local community.	**High** Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining. Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type. Presence of Rare species. Globally significant populations of congregatory species (> 1% but < 10% of global population).	**Medium** Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types. Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential.	**Medium**	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Medium** Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Secondary Water Resource	Seasonally wet drainage features as delineated by a freshwater ecologist.	Important movement corridor for fauna species and unique habitat feature for specialist fauna and flora. Flood control and	**Medium** Confirmed or highly likely occurrence of populations of Near Threatened (NT) species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals.	**High** Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types.	**Medium**	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor	**Medium** Minimisation and restoration mitigation – development activities of medium impact acceptable followed by

Habitat Type	Description	Ecosystem Processes and Services	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance (SEI)
		natural water movement corridor.	Any area of natural habitat of threatened ecosystem type with status of VU. Presence of range-restricted species. > 50% of receptor contains natural habitat with potential to support SCC.	Good habitat connectivity, with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts, with no signs of major past disturbance and good rehabilitation potential.		functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	appropriate restoration activities.
Degraded Bushveld	Semi- to fully functional ESA habitat defined by a diversity of trees and shrubs, including numerous large mature trees.	Foraging habitat for fauna species, including SCC. Erosion control and nutrient cycling. Grazing land. Carbon sequestration and nectar resources for pollinators. Important movement corridors for all types of fauna.	**High** Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining. Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type. Presence of Rare species.	**High** Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types. Good habitat connectivity, with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts, with no signs of major past disturbance and good rehabilitation potential.	**High**	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site	**High**

Habitat Type	Description	Ecosystem Processes and Services	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance (SEI)
		Wood source for local community.	Globally significant populations of congregatory species (> 1% but < 10% of global population).			once the disturbance or impact has been removed.	
Protected Area Buffer	Habitat buffer imposed on formally protected areas adjacent to the PAOI.	Provides a noise and disturbance buffer between construction and operational activities and known protected areas supporting sensitive fauna and flora species.	**N/A**	**N/A**	**N/A**	**N/A**	**High**
Primary Water Resource	Permanent source of water that supports fauna foraging throughout the year.	Important permanent water source for regional fauna moving through the area.	**High** Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining. Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type. Presence of Rare species.	**Medium** Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types. Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential.	**Medium**	**Low** Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of: (i) remaining at a site even when a disturbance or impact is occurring,	**High**

Habitat Type	Description	Ecosystem Processes and Services	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance (SEI)
			Globally significant populations of congregatory species (> 1% but < 10% of global population).			or (ii) returning to a site once the disturbance or impact has been removed.	

5.3.1.3 Wetlands and Riparian Features

The Wetland Baseline and Risk Assessment (attached as Appendix E2) states that the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) which was released as part of the National Biodiversity Assessment (NBA 2018). National Wetland Map 5 includes inland wetlands and estuaries, associated with river line data and many other data sets within the South African Inventory of Inland Aquatic Ecosystems (SAIIAE, 2018). Three wetland types were identified by means of this data set. The wetlands are classified as being two depression wetlands, two hillslope seeps and a floodplain wetland. The depression and hillslope seep wetlands were classified as being a C (Moderately Modified) and the floodplain wetland was classified as a A/B (Largely Natural) (Figure 5.8).

NFEPA Wetlands

Three wetland types have been identified within the project area of influence, namely two channelled valley bottom wetlands, four unchannelled valley bottom and four hillslope seep wetlands (Figure 5.8).

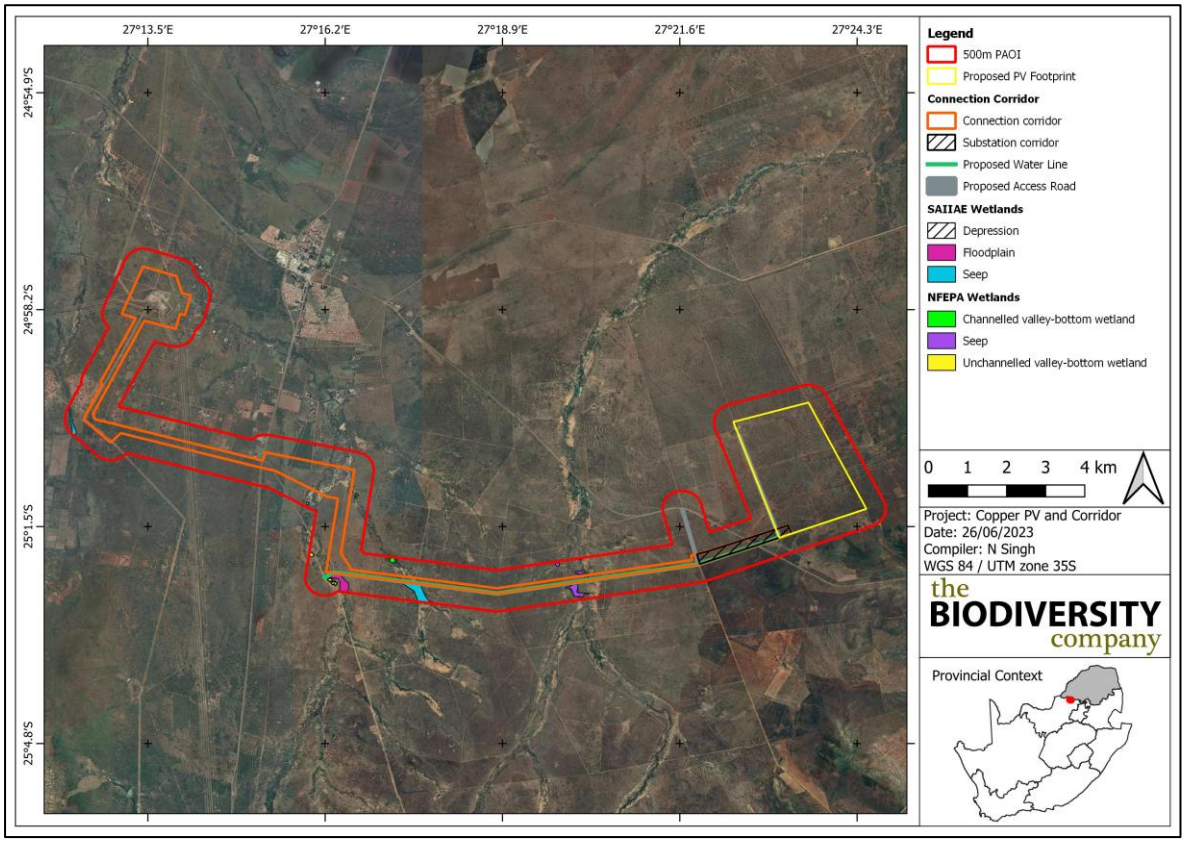


Figure 5.7: NFEPA and SAIIAE Wetlands located within the PAOI.

Wetland delineation and description

During the site visit, no natural wetlands were identified within the proposed SPP area. Two artificial wet areas were identified within the proposed SPP site and were classified as dams with artificial drainage channels aimed at directing stormwater runoff into the said dam areas (Figure 5.9). Other smaller artificial features included semi-permanent ponds and temporary reservoirs

used for watering animals. None of these features displayed wetland characteristics as they were lined, therefore are not further assessed as a wetland.

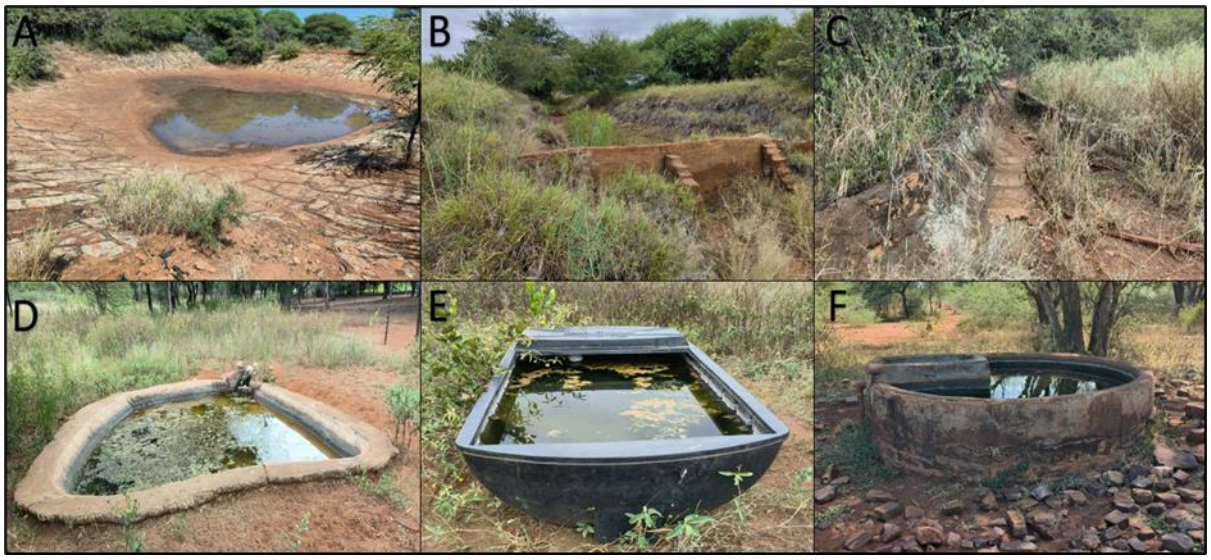


Figure 5.8: Photographical evidence of the different artificial features identified on site. A) Dam, B) Artificial drainage from dam, C) Artificial drainage leading into dam, D, E & F) Artificial ponds/reservoirs used for watering animals

Five hydrogeomorphic (HGM) units were identified within the PAOI of the proposed power line corridor (Figure 5.10). The wetland areas were delineated in accordance with the DWAF (2005) guidelines. Since a portion of the proposed corridor was assessed for the proposed Palladium SPP and corridor, the numbering and labelling of the HGM units were retained from those delineations and report. HGM units 1, 2, 4, 5 and 6 are relevant to this report. The HGM units have been classified as one channelled valley bottom, three unchanneled valley bottom wetlands and a depression wetland. Drainage features (or lines) were also identified within the PAOI. These features are referred to as 'A' Section channels that convey surface runoff immediately after a storm event and are not associated with a baseflow (DWAF, 2005).

Channelled valley bottom wetlands are typically found on valley floors with a clearly defined, finite stream channel and lacks floodplain features, referring specifically to meanders. Channelled valley bottom wetlands are known to undergo loss of sediment in cases where the wetlands' slope is steep and the deposition thereof in cases of low relief.

Unchannelled valley bottom wetlands are typically found on valley floors where the landscape does not allow high energy flows. Depression wetlands are located on the "slope" landscape unit. Depressions are inward draining basins with an enclosing topography which allows for water to accumulate within the system. Depressions, in some cases, are also fed by lateral sub-surface flows in cases where the dominant geology allows for these types of flows.

The functional assessment, Present Ecological Status (PES) and ecological Importance and Sensitivity (IS) assessment have been conducted for the identified HGM 1 – 6 as shown in Figure 5.10 below.

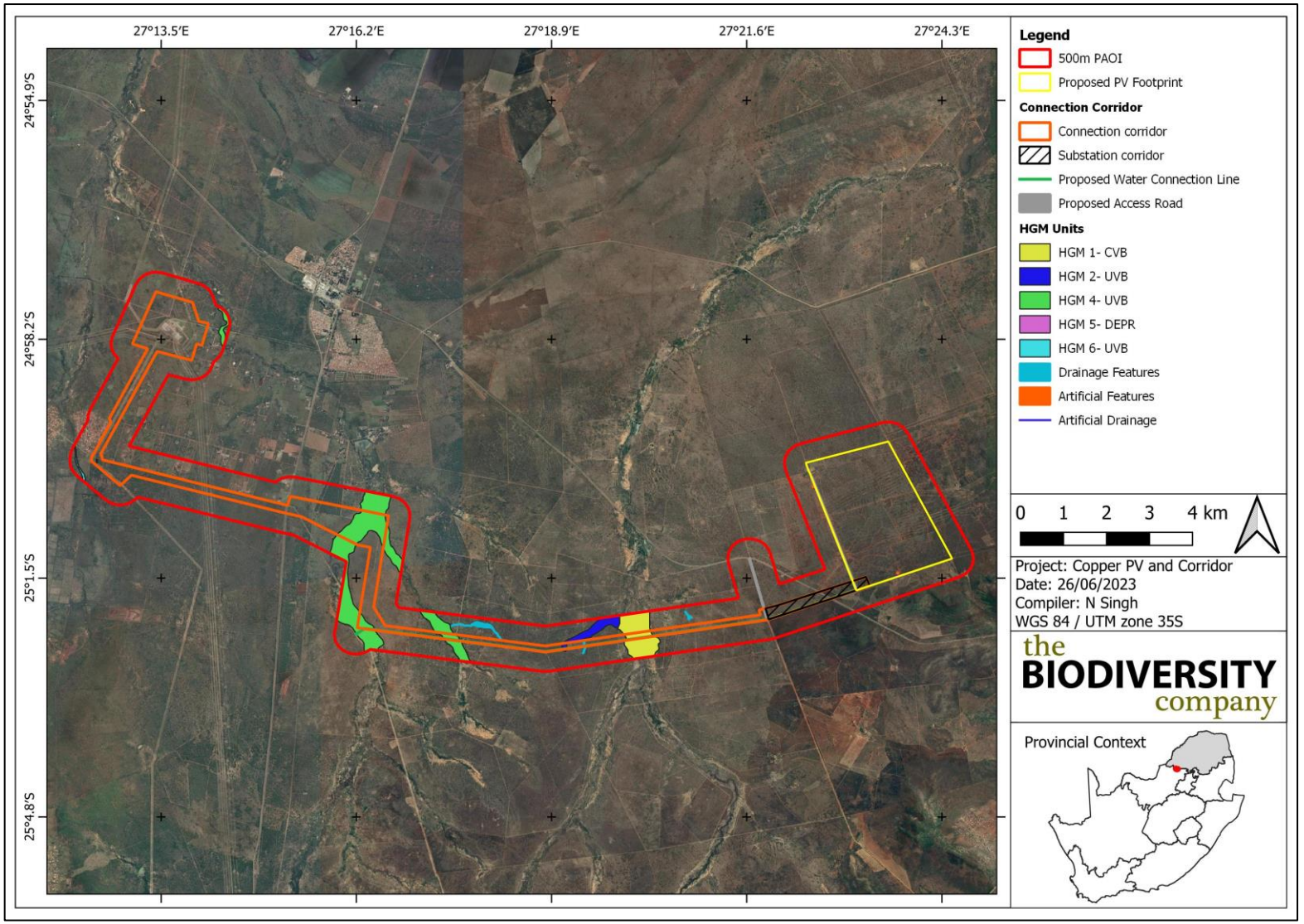


Figure 5.9: Delineation and location of the different HGM units identified within the PAOI.

Functional Assessment

The ecosystem services provided by the wetland units identified on site were assessed and rated using the WET-EcoServices method (Kotze *et al.,* 2008). The average ecosystem service scores for the delineated systems are illustrated in Table 5.3. The ecosystem services scores of the delineated wetlands ranges from low to high. Ecosystem services contributing to these scores include flood attenuation, streamflow regulation, sediment trapping, phosphate assimilation, nitrate assimilation, toxicant assimilation, erosion control, and provision of cultivated foods.

Table 5.3: Average ecosystem service scores for delineated wetlands

Moderately High	Intermediate	Moderately Low
HGM 4	HGM 1	HGM 2
	HGM 6	HGM 5

HGM 4 scored the highest ecological services scores due to its high volumes of hydrophyte vegetation. The wetland was classified as an unchannelled body that plays an important role in stream flow regulation and flood attenuation, this combined with the high hydrophyte vegetation gives this system good ecosystem services scores. The vegetation helps with the accumulation of toxicants from the environment and also provides resources.

HGM units 1 and 6 scored intermediate ecological services scores. These HGM units were classified as being valley bottom wetlands where water will runoff to after heavy rains and plays an important role in flood attenuation and streamflow regulation. Although these wetlands have the same ability to regulate streamflow as HGM 4 they do not have the same amounts of hydrophyte vegetation and will thus have lower ecosystem services scores.

HGM 2 and 5 scored the lowest ecological services scores due to the lack of hydrophyte vegetation. The wetlands will still help with flood attenuation but to a much lesser extent than the other HGM units.

Present Ecological Status

The PES for the assessed HGM units is presented in Table 5.4. The delineated wetland systems have been scored overall PES ratings ranging from largely modified (class D) to seriously modified (class E), depending on the level of modification.

Table 5.4: Summary of the scores for the wetland PES

Largely Modified (D)	Seriously Modified (E)
HGM 1	HGM 2
HGM 4	HGM 5
HGM 6	

Importance and Sensitivity

The results of the ecological IS assessment are shown in Table 5.5. Various components pertaining to the protection status of a wetland are considered for the IS, including Strategic Water Source Areas (SWSA), the NFEPA wetland vegetation (wet veg) threat status and the protection status of the wetland. The IS for all the wetlands have been calculated to be

"Moderate", which combines the relatively High threat status and the low protection levels of the wetland.

Table 5.5: The IS results for the delineated HGM units

HGM Type	NFEPA Wet Veg			NBA Wetlands			SWSA (Y/N)	Calculated IS
	Type	Ecosystem Threat Status	Ecosystem Protection Level	Wetland Condition	Ecosystem Threat Status 2018	Ecosystem Protection Level		
Channelled Valley Bottom	Central Bushveld Group 3	Critical	Not Protected	N/A	N/A	N/A	N	**Moderate**
Unchannelled Valley Bottoms	Central Bushveld Group 3	Endangered	Moderately Protected	N/A	N/A	N/A	N	**Moderate**
Depression	Central Bushveld Group 3	Least Threatened	Poorly Protected	C Moderately Modified	Least Concerned	Poorly Protected	N	**Moderate**

5.3.1.4 Climate

This area is characterised by a summer rainfall with dry winters. May to August tends to be dry and cool, August to October is hot and dry whereas November to April is hot and wet, Mucina & Rutherford (2006). The mean annual precipitations for this region are between 500mm and 700mm with frost frequently occurring. The mean monthly maximum temperature (November) is 35.3°C and 3.1°C for the average minimum temperatures during June.

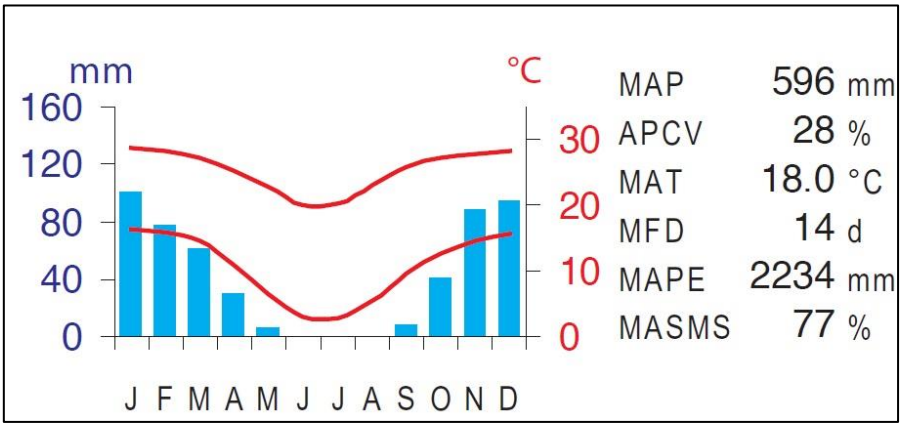


Figure 5.10: Climate diagram for the Central Sandy Bushveld (SVcb 12).

5.3.1.5 Avifaunal

According to the Avifaunal SSV (Appendix E3), the Species of Conservation Concern (SCC) SABAP2 data indicate that 278 avifauna species are expected for the PAOI and surrounding. Of these, 11 are considered SCC and include those listed in Table 5.3. The likelihood of occurrence within the POAI is included here.

Table 5.6: Threatened avifauna species that are expected to occur within the project area.

Common Name	Scientific Name	Regional	Global
Lanner Falcon	*Falco biarmicus*	VU	LC
Martial Eagle	*Polemaetus bellicosus*	EN	EN
European Roller	*Coracias garrulus*	NT	LC

Cape Vulture	*Gyps coprotheres*	EN	VU
White-backed Vulture	*Gyps africanus*	CR	CR
African Grass Owl	*Tyto capensis*	VU	LC
Greater Painted-snipe	*Rostratula benghalensis*	NT	LC
Black-winged Pratincole	*Glareola nordmanni*	NT	NT
Yellow-throated Sandgrouse	*Pterocles gutturalis*	NT	LC
Marabou Stork	*Leptoptilos crumenifer*	NT	LC
Yellow-billed Stork	*Mycteria ibis*	EN	LC

Site Ecological Importance (SEI)

The different habitat types within the PAOI were delineated and identified based on observations during the field assessment and available satellite imagery. These habitat types were assigned Site Ecological Importance (SEI) categories based on their ecological integrity, conservation value, the presence of species of conservation concern.

Three habitat types were delineated within the Project Area: Water Resource, Degraded Bushveld and Modified habitat. Their respective SEI and the corresponding mitigation guidelines are summarised in Table 3 3 and visually illustrated in Figure 5.12.

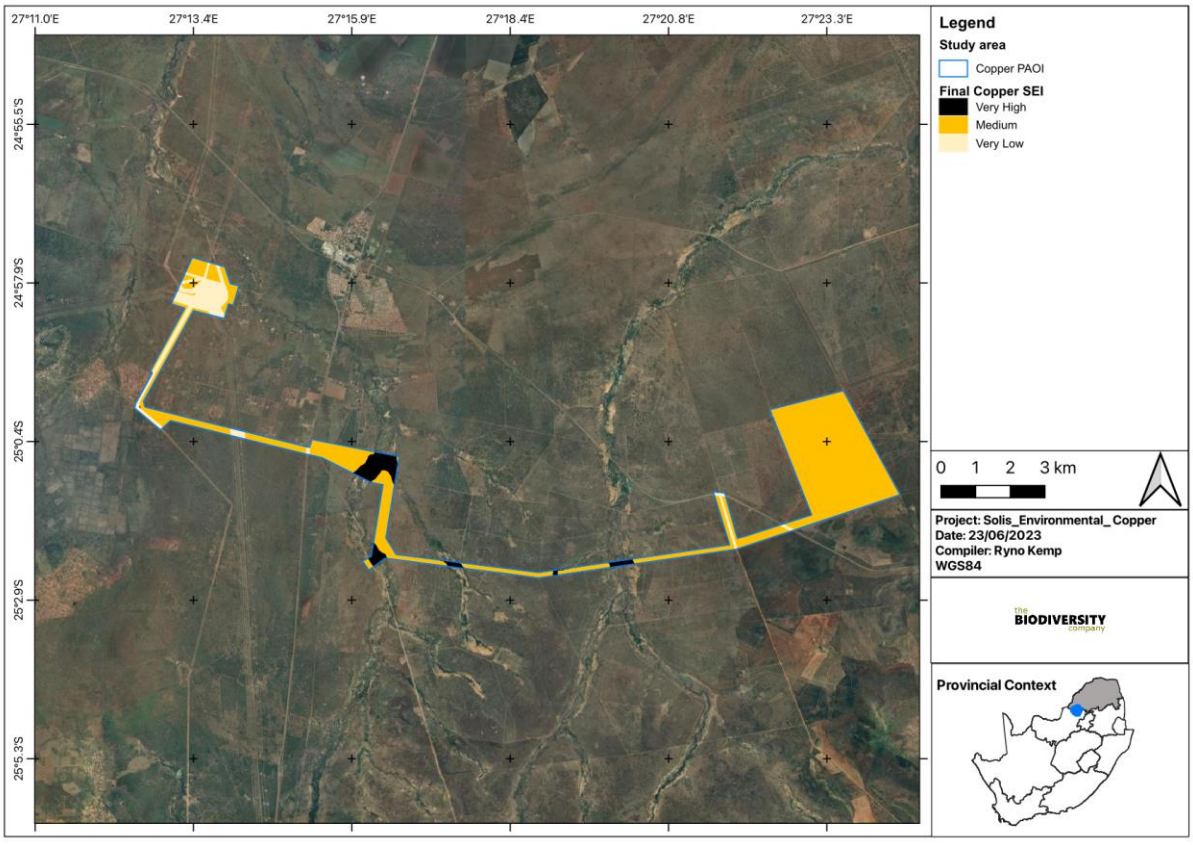


Figure 5.11: Map illustrating the Avifauna Site Ecological Importance (SEI) for the proposed Solar Power Plant (SPP) Project Area

Table 5.7: Summary of Avifauna Site Ecological Importance (SEI) for the Solar Power Plant (SPP) Project Area

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	SEI
Water Sources	High	High	**High**	Medium	**Very High**
	Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km^2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A.	Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN		Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality	
Degraded Bushveld	Medium	High	**Medium**	Medium	**Medium**
	Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals.	Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN		Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality.	
Modified Habitat	Very Low	Very Low	**Very Low**	Very High	**Very Low**
	No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining.	Several major current negative ecological impacts.		Habitat that can recover rapidly	

5.3.1.6 Fauna

Based on the desktop assessment it can be said that the PAOI is sensitive with medium to high sensitivity flora and fauna species occurring.

The expectant anthropogenic activities are likely to drive habitat destruction, causing displacement of fauna and flora, and possibly event direct mortality. Land clearing destroys local wildlife habitat and can lead to the loss of local breeding grounds, nesting sites and wildlife movement corridors such as rivers, streams and drainage lines, or other locally important features. The removal of natural vegetation may reduce the habitat available for fauna species and may reduce animal populations and species compositions within the area. The significance of these impacts will be determined after a field assessment has been conducted.

5.3.1.7 Visual landscape

The Visual Impact Assessment (attached as Appendix E4) state The study area is characterized by a variety of landscape features that possess a visual or scenic value. These natural elements along with potential sensitive visual receptors serve as a visual baseline for assessing the

surroundings. The following landscape features and potential sensitive visual receptors can be observed:

Table 5.8: Landscape Features

Scenic Resource	Landscape features within the 10km assessment radius (some beyond with influence).
Topographic Features	Some ridges, mountains and koppies to the east and south-east from the SPP at distances ranging from 370m to beyond the 10km assessment radius. Some ridges north-west from Northam. Mountains and ridges in the area possess splendid scenic beauty, captivating with their majestic contrasting presence and breath-taking views.
Water Features	Within the 10km radius, there are several non-perennial dry riverbeds and man-made earth dams serving as reservoirs, with the notable presence of the Bierspruit Dam, near the mining town of Swartklip. This prominent dam not only fulfils its purpose of water storage but also offers recreational opportunities, including a boat club for enthusiasts to engage in water-based activities.
Vegetation Features	The area surrounding the proposed development consist of lush, beautiful Bushveld vegetation.
Cultural Landscapes	The bushveld landscape links to the more prominent “Africa setting” which boasts a variety of traditional (and newer) African cultures seeing the Bushveld as a cultural source of tradition, sense of place, interaction and co-existence with nature. Furthermore, in many households, hunting is also seen as a tradition and part of culture, and the Bushveld is almost synonymous with the word “hunting” giving the hunter the tranquil setting and feel of Africa and a complete African hunting experience.

Table 5.9: Potential Sensitive Receptors

Sensitive Receptors	Potential sensitive receptors within the 10km assessment radius.
Nature reserves and national parks	Within the 10km radius, 18 private nature reserves exist, each proclaimed many years ago between 1955 and 1967 under the Game Ordinance of 1949 of the former Transvaal Province. These reserves encompass a diverse range of developments, including game farming, cattle farming, mining operations, and even residential developments associated with mining activities.
Human settlements and farmsteads	The town of Northam being the main urban development. Some informal settlements are also present within the 10km radius as well as residential developments as part of small “mining towns”. Some farmsteads are also present within the 10km radius.

Scenic routes and arterial roads	• R510 regional road. • D1235 district road. • Zwartklip-Dwaalboom road. All roads in the area can be seen as medium scenic significance due to the extensive mining operations and a more aesthetic Bushveld landscape.
Cultural and heritage sites	These form part of the heritage study, if any. A development might have a visual impact on cultural or heritage sites only if these sites are visited frequently by tourists or interested parties.
Tourism facilities / sites	Although game farms can also be seen as tourism, no specific game farms were identified, but the probability is very high that game farms exist within the 10km radius. Many farms in the region are cattle farms, but also provide hunting services and facilities to national and international hunters.

Refer to Figure 5.13 and Figure 5.14 for the Zone of Theoretical Visibility (ZTV). These maps indicate all areas that are in direct line of site of the proposed development up to a distance of 10km.

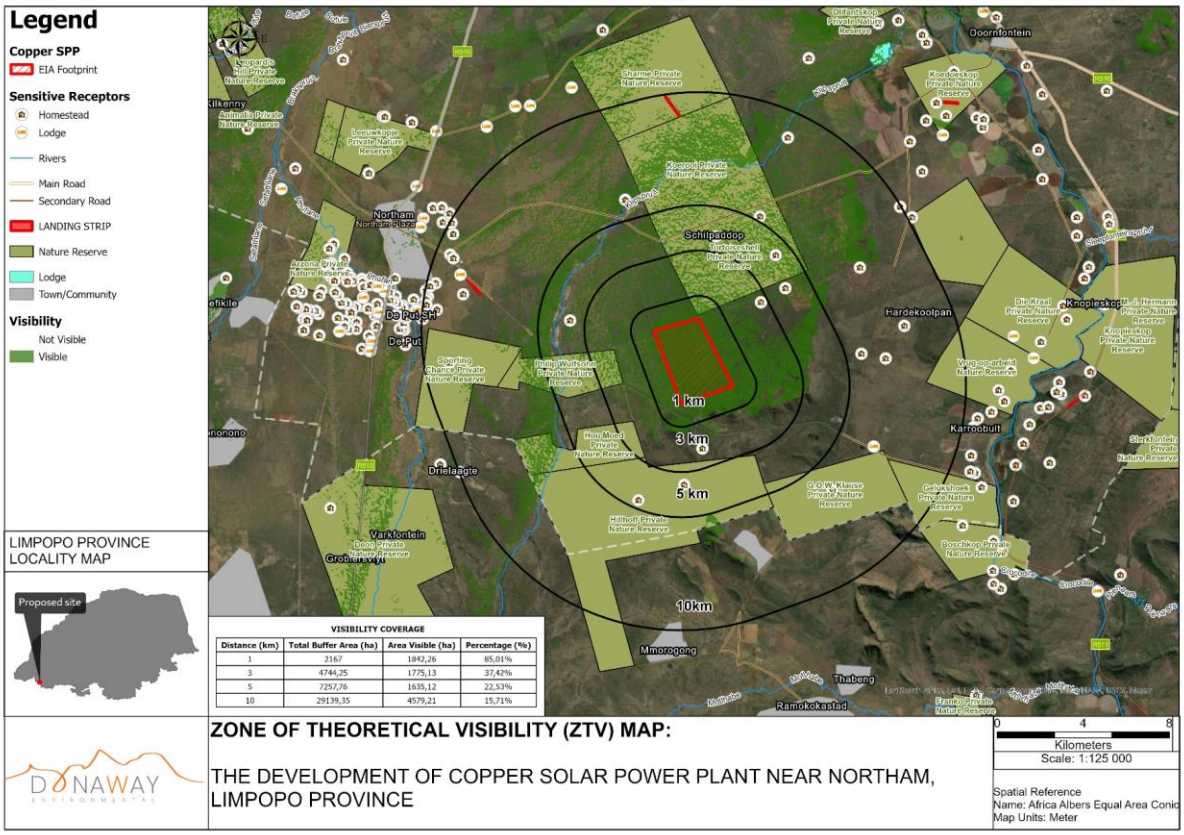


Figure 5.12: Zone of Theoretical Visibility (ZTV) for the SPP, Satellite View.

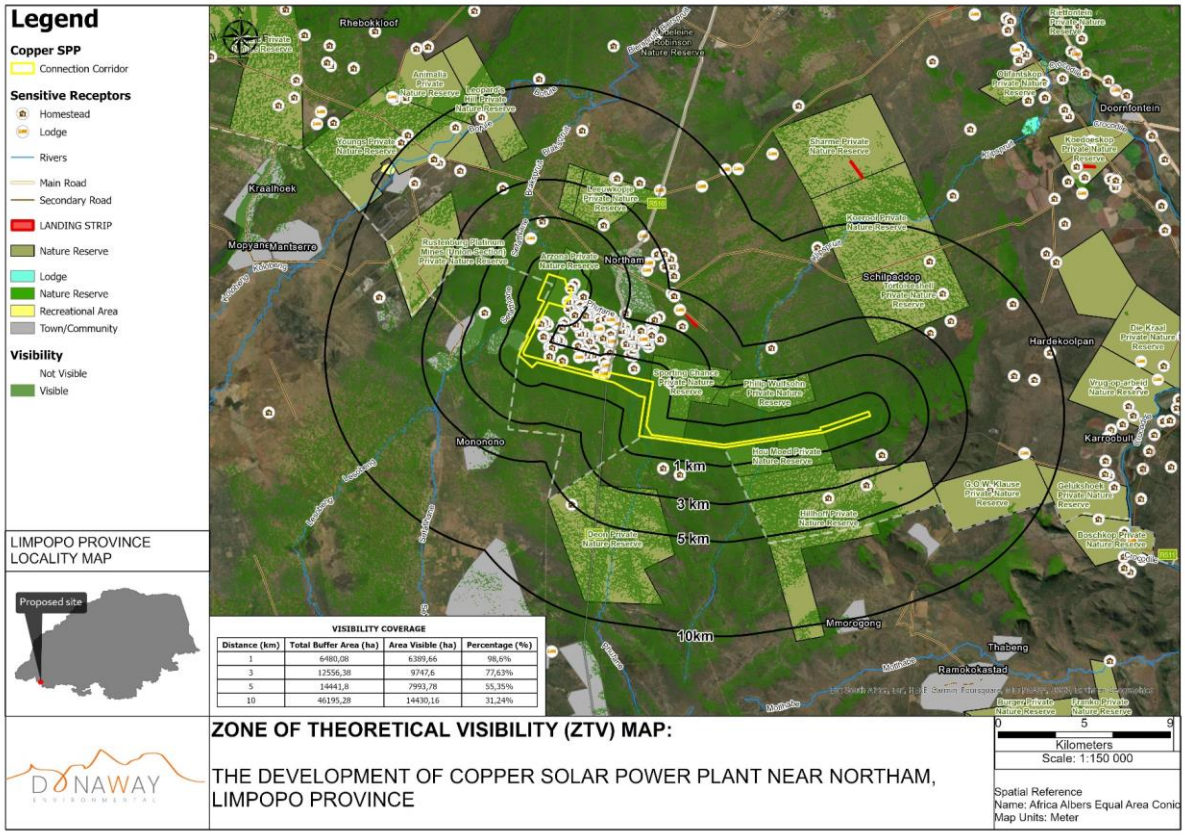


Figure 5.13: Zone of Theoretical Visibility (ZTV) for the grid connection corridor, Satellite View.

Table 5.8 below reflects the visibility rating in terms of proximity on sensitive receptors of the SPP.

Table 5.10: ZTV Visibility Rating in terms of Proximity to the SPP.

Radius	Sensitive Visual Receptors	Exposure rating in terms of proximity
0-1km	**SPP** - One private nature reserve - D1235 district road	**High Exposure**
	Grid Connection - Three private nature reserves - D1235 district road - R510 regional road - 38 farmsteads - Three lodging facilities - Sefikile	

1-3km	**SPP** - One farmstead - Two private nature reserves - D1235 district road	**Moderate-High Exposure**
	Grid Connection - Six lodging facilities - Approximately 50 farmsteads - R510 regional road - Zwartklip-Dwaalboom road - Northam - Five private nature reserves - Sefikile	
3-5km	**SPP** - Three private nature reserves - Four farmsteads - D1235 district road	**Moderate Exposure**
	Grid Connection - Six private nature reserves - 11 farmsteads - Four lodging facilities - Northam - One private airstrip - Sefikile - R510 regional road - Zwartklip-Dwaalboom road - D1235 district road - Mononono	
5-10km	**SPP** - Five private nature reserves - One private airstrip - Four farmsteads	**Low Exposure**

	Grid Connection - Eight private nature reserves - 12 farmsteads - Two lodging facilities - R510 regional road - Zwartklip-Dwaalboom road - D1235 district road - Mononono	

Please Note: The ZTV assessment did not consider existing screening such as buildings and vegetation cover but rather the terrain's above mean sea level (AMSL) which indicates line of sight.

Visual sensitivity

The assessment of visual sensitivity in the area reveals a moderate impact, primarily attributed to the presence of two distinct landscapes: the mining landscape and the Bushveld landscape. The proposed development is closely situated to existing mining activities, which set a president for development in the area. Some ridges, mountains and koppies are located to the north-west of Northam and east and south-east from the SPP which also contribute to the positive aesthetics of the landscape. Settlement patterns are mostly influenced by the mining developments and no settlement is of specific scenic quality. However, the project is located within a Bushveld landscape with good aesthetic qualities.

Receptor sensitivity

Please refer to the ZTV map below and Section 4 of this report for an indication of sensitive visual receptors in the area. Receptors encompass a wide spectrum of entities, ranging from private nature reserves to mining developments. This indicates that the term "receptors" includes a diverse array of recipients or entities that can be influenced or impacted by the project in different ways.

Visual Absorption Capacity

The area surrounding the proposed development boasts an excellent Visual Absorption Capacity (VAC) in terms of its lush vegetation. However, it's important to note that this VAC is predominantly limited to the western, eastern and south-eastern region in terms of topography. The area is characterized by dense vegetation, including a variety of trees, which provides effective screening and limits visibility of surrounding activities. During the site visit, it was evident that mining activities and mine heaps were difficult to discern from the road. This

underscores the robust visual absorption capacity of the area, with its dense vegetation serving as an effective barrier to visually intrusive elements.

If people are unaware of the project, they will likely only notice its existence and impact when they are physically near it. However, if individuals have prior knowledge and information about the project, they can extend their perception and understanding of it beyond a limited distance.

Visual intrusion

The visual landscape surrounding the proposed development is already spoiled by the presence of extensive mining activity, resulting in visual pollution. This ongoing mining activity has contributed to altering the natural aesthetics of the area, potentially leading to a desensitisation among local residents and frequent visitors who have become accustomed to the industrial development. The economy of the area is predominantly reliant on the mining sector, highlighting the significant role it plays in sustaining the local community. As a result, the visual impact of industrial development may be perceived differently by those familiar with the area's economic dependence on mining, as their perspective may be influenced by the understanding of its importance to the local economy. Conversely, it is important to acknowledge that the development itself may encroach upon the natural beauty of the Bushveld landscape.

5.3.1.8 Traffic consideration

According to the Transport Impact Assessment (Appendix E9), The access road leading from the recommended access point needs to be wide enough for heavy vehicles and large construction vehicles to navigate (minimum width of 8 m should be kept). Especially the current radius at the access point will need to be upgraded to ensure large haulage vehicles can make the turn towards the site arriving on the service road from a western direction. Generally, the radii at any bends along the access road need to be large enough to allow for all construction vehicles to turn safely. It is further recommended that the access point is security controlled during the construction phase with a minimum stacking distance between the road edge of the D1235 and the security control (i.e., the boom) of 25 m to ensure that at least one large construction vehicle can be accommodated in front of the access boom without impeding on vehicles travelling on the D1235.

The geometric design and layout for the internal roads from the recommended access points need to be established at detailed design stage. Existing structures and services, such as drainage structures, signage and pipelines will need to be evaluated if impacting on the roads. It needs to be ensured that the 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. is assumed that the materials, plant, and workers will be sourced from the surrounding towns as far as possible, such as the Northam area.

In terms of the National Land Transport Act (NLTA) (Act No.5 of 2009), the assessment of available public transport services is included in this report. The following comments are relevant in respect to the public transport availability for the proposed developments.

It is expected that minibus taxis and buses frequent the R510 and R511, which are located ~13 and ~15 km distance from the site and are therefore too far for workers to walk. However, the developer of a large-scale project, such as many renewable energy projects, will provide shuttle buses or similar for workers during the construction phase.

It is envisaged that the components to be imported to South Africa, will arrive either via the Port of Richards Bay or the Port of Durban, as these two ports are the closest to the site.

At present, solar panels are locally produced in South Africa by only a few select firms. The largest of them is located in Pinetown, Kwa-Zulu Natal. Owing to their limited annual production capacity of approximately 325MW, the bulk of solar modules being deployed on South African PV projects are imported, primarily from East Asia. Where panels are sourced locally, these are typically delivered to site via flatbed trucks.

For the purpose of the Transport study and calculation of trips, it is assumed that all panels will be imported, and that 250 MW get developed. Considering a loading capacity of around 600 solar panels per 40tf container, the total number of trips will result in approximately 834 trips for a 250 MW development. Spacing the transport of the panels over a one-month period (i.e., 22 workdays), the daily number of trips would result in approximately 38. Looking at an estimate of 30% of these trips occurring during the peak traffic periods, the number of trips for the delivery of the panels during peak traffic will be around 12 trips, which can be accommodated by the external road network.

From experience with similar project, an estimated 500 workers will be active on-site during construction and the resulting daily staff trips are then 33 The exact number of vehicle trips for the transportation of materials during the construction phase depends on the type of vehicles, planning of the construction, source/location of construction material, etc. However, for the purpose of this study, it was estimated that at the peak of construction, approximately 150 construction vehicle trips will access the site per day. The impact on the surrounding road network and the general traffic is deemed nominal, with mitigation, as the 221 trips will be distributed over a 9-hour workday. The majority of the trips will occur outside the peak hours.

It must also be noted that vehicle trips from material delivery vary depending on the construction task/program, fuel supply arrangements, as well as distance from the material source to the site. Project planning can be used to reduce material delivery during peak hours. The development traffic impact during the construction phase can be assessed as manageable, considering that the construction phase is temporary in nature.

5.3.2 Description of the socio-economic environment

The socio-economic environment is described with specific reference to social, economic, heritage and cultural aspects.

5.3.2.1 Socio-economic conditions

The social impact assessment (attached as Appendix E7) explains that the Limpopo Province is located in the northernmost part of South Africa bordering Mozambique, Zimbabwe and Botswana. It is flanked by three South African provinces: the North West Province to the south-west, and Gauteng and Mpumalanga to the south. The Limpopo Province in named after the Limpopo River, which flows along its northern border, separating South Africa from Zimbabwe and Mozambique.

Covering an expansive area of 125,754 km^2 and home to a population of 5 799 090 people, the Limpopo Province ranks as the fifth largest province in South Africa in terms of both size and population. Its capital and largest city is Polokwane (formerly known as Pietersburg), centrally located within the province. Other significant towns and cities, such as Bela-Bela (Warmbad), Lephalale (Ellisras), Makhado (Louis Trichardt), Musina (Messina), Thabazimbi, and Tzaneen, are scattered throughout the province.

Geographically, the Limpopo Province comprises Lowveld plains interspersed with several mountain ranges that emerge from the Highveld plateau in the southern and central regions. These ranges include the Soutpans Mountains stretching from east to west, as well as the Water Mountains in the southwest. The Lowveld spans the eastern, northern, and western parts of the province, adorned with iconic mopani and baobab trees that define its unique landscape.

Within the eastern region lies the untouched splendour of the majestic Kruger National Park. Established in 1926, it was South Africa's first national park and has since become one of the country's most popular tourist destinations. The region's abundant wildlife diversity also contributes to a thriving hunting industry, adding to the province's allure as a tourist hotspot.

The province's economic activity is primarily driven by its rich mineral deposits, which include platinum-group metals, iron ore, chromium, high and middle-grade coking coal, diamonds, antimony, phosphate, copper, gold, emeralds, scheelite, magnetite, vermiculite, silicon, and mica. Additionally, agricultural pursuits thrive in certain climatic regions, allowing for double harvesting seasons. As a result, the province boasts the largest production of various crops, including sunflowers, cotton, maize, peanuts in the Bela-Bela and Modimolle region, as well as bananas, litchis, pineapples, mangoes, pawpaw's, and various nuts in the Tzaneen and Makhado region. Coffee and tea plantations in the province also provide numerous employment opportunities for the local population.

The Limpopo Province serves as a vital cross-border transportation route from South Africa to other southern African countries. The N1 national route connects Cape Town to Mussina in the northern part of South Africa before crossing over to Zimbabwe at the Beit Bridge border over the Limpopo River. In Zimbabwe, the road continues as the A4 and connects South Africa to Harare, the capital of Zimbabwe.

Administratively, the Limpopo province is divided into five district municipalities, which are further subdivided into 22 local municipalities.

Waterberg District Municipality (DM)

The Waterberg District Municipality (DM) is a Category C municipality situated in the western part of the Limpopo Province, sharing borders with the Capricorn DM to the north and the Sekhukhune DM to the east. To the south-west, the Waterberg DM is adjacent to the North West Province, while the Gauteng Province lies to its south-east.

As the largest of the five district municipalities in the Limpopo Province, the Waterberg DM encompasses over a third of the province's total area. It plays a significant role as a border control region, with five border control points: Groblersbrug, Stockpoort, Derdepoort, Zanzibar, and Platjan, strategically located along the South African and Botswana border. The major towns within the district include Bela-Bela, Lephalale, Modimolle, Mookgophong, and Thabazimbi.

One notable feature of the region is the Waterberg Biosphere, a UNESCO-designated Biosphere Reserve. This expansive area, spanning approximately 654 033 hectares, showcases an intricate

rock formation shaped by millions of years of riverine erosion, resulting in stunning bluff and butte landforms.

The region's economy thrives on mining, tourism, and agricultural activities, with mining serving as the primary economic driver. The Waterberg DM is renowned as one of South Africa's premier ecotourism destinations, offering diverse wildlife, birdlife, and picturesque landscapes throughout the region. Key minerals extracted in the area include platinum, iron ore, coal, and diamonds, with the region contributing 40% of the national coal reserves. The Medupi power station, the fourth largest in the world, is also located in this district, playing a crucial role in power generation for South Africa.

Agriculture in the Waterberg DM is predominantly focused on game farming, although livestock and the cultivation of crops such as cotton, sunflowers, tobacco, and soybeans are also prevalent. The district's tourism industry thrives on the diverse Bushveld region, encompassing privately owned game reserves that provide opportunities for leisure activities and hunting.

The Waterberg District Municipality is further divided into five local municipalities: Bela-Bela LM, Lephalale LM, Modimolle-Mookgopong LM, Mogalakwena LM, and Thabazimbi LM.

Thabazimbi Local Municipality

The Thabazimbi Local Municipality (LM) is a Category B municipality situated within the Waterberg District Municipality, located in the south-western part of the Limpopo Province. It shares borders with the Lephalale LM to the north, and the Modimolle-Mookgophong LM and Bela-Bela LM to the east, all of which are part of the Waterberg DM. The northern boundary of the municipality is shared with Botswana, while its southern boundary adjoins the North West Province. The municipality encompasses the town of Thabazimbi and mining towns like Amandelbult Mine town.

The town of Thabazimbi and the entire municipality derive their name from the Tswana language, meaning "mountain of iron." This name originated from the discovery of abundant iron ore by J.H. Williams at Vliegpoort in 1919. Mining activities in the region began in the 1930s, primarily supporting the production of iron and steel. In addition to iron ore, the area is known for its platinum deposits and andalusite.

Agriculture plays a significant role in driving the local economy, with the production of commodities such as wheat, beans, and maize contributing to the region's prosperity. The Thabazimbi area also attracts tourism, with notable attractions including the Marakele National Park. The National Parks Board supports the park to the same high standards as the renowned Kruger National Park and Mapungubwe.The Waterberg District Municipality (DM) is a Category C municipality situated in the north-western part of the Limpopo Province. It shares borders with the Cape Winelands District to the south-east and the City of Cape Town Metropolitan Municipality to the south. The western border of the municipality is defined by the Atlantic Ocean, while its northern border adjoins the Namakwa District Municipality in the Northern Cape Province. Some of the main towns within the Waterberg District Municipality include Malmesbury, Piketberg, Northam, Clanwilliam, Vredenburg, and Moorreesburg.

5.3.2.2 Cultural and heritage environment

Stone Age

The Stone Age is the period in human history when lithic (stone) material was mainly used to produce tools. In South Africa the Stone Age can be divided into three periods as listed below. It is important to note that dates are relative and only provide a broad framework for interpretation. A basic sequence for the South African Stone Age (Lombard et.al 2012) is as follows:

- Earlier Stone Age (ESA) up to 2 million – more than 200 000 years ago
- Middle Stone Age (MSA) less than 300 000 – 20 000 years ago
- Later Stone Age (LSA) 40 000 years ago – 2000 years ago

It should also be noted that these dates are not a neat fit because of variability and overlapping ages between sites (Lombard et.al 2012: 125). No Stone Age sites (including rock art) are known to occur in the immediate study area. The closest known Stone Age sites (Early to Later Stone Age) are found close to Rooiberg and Thabazimbi at sites called Blaauwbank & Olieboomspoort (Bergh 1999: 5).

No Stone Age sites and scatters of Stone Age material (stone tools) were identified in the study area during the May 2023 field assessment. One site with a scatter of MSA/LSA stone tools were identified during a recent HIA on the farm Haakdoornfontein 12JQ (Pelser 2021: 26-27).

Iron age

The Iron Age is the name given to the period of human history when metal was mainly used to produce metal artifacts. In South Africa it can be divided in two separate phases (Bergh1999: 96-98), namely:

- Early Iron Age (EIA) 200 – 1000 A.D
- Late Iron Age (LIA) 1000 – 1850 A.D.

Huffman (2007: xiii) however indicates that a Middle Iron Age should be included. His dates, which now seem to be widely accepted in archaeological circles, are:Early Iron Age (EIA) 250 – 900 A.D.

- Middle Iron Age (MIA) 900 – 1300 A.D.
- Late Iron Age (LIA) 1300 – 1840 A.D.

There are no known Iron Age sites (EIA or LIA) in the immediate study area, although a large number of EIA to LIA sites are known to exist in the larger geographical landscape in which the study area falls. The closest and best-known Iron Age site is located at Rooiberg near Thabazimbi to the north of the study area (Bergh 1999: 7).

The closest Early Iron Age site is located at Broederstroom near Brits (Bergh 1999: 6). In a band stretching from Pretoria to Brits as many as 125 Late Iron Age sites have been identified and many more between Brits and Rustenburg (Bergh 1999: 7). Tswana chiefdoms flourished in the area during AD 1600 to 1840 (Pistorius 2009: 18). Late Iron Age sites are also known between Brits and Thabazimbi (Bergh 1999: 7).

At the beginning of the 19th century different Tswana groups settled in the larger area. It includes the Kwena, Po and Kgatla. During the so-called difaqane (period of war or stress) they fled to the north-west and the Ndebele of Mzilikazi settled in around the Brits area and further north between 1827 and 1832 (Bergh 1999: 10-11, 106-107, 111; Pistorius 2009: 18-19).

Tom Huffman's research work shows that Iron Age sites, features or material could possibly be found in the area (based on pottery analysis combined with radiocarbon dates from related sites). This could include the so-called Moor Park facies of the Urewe Tradition dating to between AD1350 and AD1750 (Huffman 2007: 159); Uitkomst facies of the same tradition dating to between AD1650 and AD1820 (p.171); Rooiberg facies of Urewe dating to between AD1650 and AD1750 (p.175); the Olifantspoort & Madikwe facies of the Urewe tradition both dating t between AD1500 and AD1700 (p.191 & 199); the Buispoort facies of Urewe dating to between AD1700 and AD1840 (p.203); the Diamant facies of the Kalundu Tradition dating to between AD750 & AD1000 (p.223) and finally the Eiland facies of the same tradition dating to between AD1000 and AD1300 (Huffman 2007: 227).

No Iron Age sites, features or material were identified in the area during the May 2023 assessment. With no rocky ridges or hills present in the area, and therefore little or no building material available for the construction of the typical Late Iron Age stone-walled settlements, it is unlikely that LIA sites would be present here. Areas like these could rather have been favored for livestock grazing & agricultural purposes as is the case in recent historical times. However, during earlier assessments in the larger area, and again on the farm Haakdoornfontein 12JQ, some Iron Age-related material (mostly pottery and grinding stones) were identified (Pelser 2021: 26-30). Some typical Late Iron Age pottery was found in the Copper SPP study area, on a dirt road section between the Copper SPP and neighbouring Palladium SPP development areas.

Historical age

The historical age started with the first recorded oral histories in the area. It includes the moving into the area of people that were able to read and write. The first European group to pass close by the area were that of Cowan & Donovan in 1808, followed by Scoon & McLuckie in 1829, Hume & Scoon in 1835 and by the famous Dr. David Livingstone in 1847 (Bergh 1999: 12-14).

The information below was obtained from a HIA Report by Dr. Julius Pistorius done in 2013 for Samancor's proposed Mining Right Application for Portions of the farm Varkensvlei 403KQ and Nooitgedacht 406KQ near Northam (p.22-23).

"It is highly unlikely that the Project Area was occupied by Early Iron Age (EIA) Bantu- Negroid people who lived elsewhere in the Limpopo, Mpumalanga, KwaZulu-Natal and North-West Provinces of South Africa during the 3rd to 9th centuries AD. The earliest Iron Age settlers who moved into the larger project area were Late Iron Age Sotho-speaking groups who belonged to the Moloko tradition. These Kgatla and Kwena communities are associated with stone walled settlements which date from AD1600 although earlier settlements, devoid of any stone walls, also probably occur in the region. Moloko sites have been recorded in Rooiberg, north of the

Project Area, at the Pilanesberg and in Madibeng and Rustenburg further to the south where these sites are associated with kopjes and randjes. Iron Age settlements occur in the Ben Alberts Nature Reserve and elsewhere in the Thabazimbi district.

The Rooiberg area is also renowned for early tin mining activities, possibly dating from the Late Iron Age. It seems as if large quantities of tin ore were mined from the Rooiberg and transported to an unknown destination. The abundance of iron ore in the area, particularly around Thabazimbi, also led to the smelting of these ores by local Late Iron Age people in order to manufacture products such as weapons (spears) and tools (hoes, axes, etc.).

The closest towns to the Project Area are Thabazimbi and Northam. Thabazimbi's name is derived from the Tswana words for 'mountain of iron'. This was due to the discovery of the exceptionally rich iron ore deposits at Vliegpoort ('defile of flies') by the geologists J.H. Williams in 1919. The South African government bought the ore body and production for the Iscor Iron Ore mine in 1928. The mine started with its operations in 1931 A branch railway line was built from Northam to Thabazimbi on the Pretoria-Middelwit line. The town of Thabazimbi was laid out on the farm Kwaggashoek and proclaimed 23 on 4 May 1953. Millions of tons of iron ore are annually mined and hauled by train to Vanderbijlpark and New Castle.

The town of Northam was laid out by E.H. Fulls on the farm Leeukoppie and formally proclaimed in 1946. This farm together with several others was owned by H. Herd who had purchased the properties from British soldiers to whom they have been allocated after the Anglo Boer War. Herd was allowed to choose the name for the new village which he called Northam after the village Northam in Devonshire, England".

The Chief Surveyor General's Database (www.csg.dla.gov.za) was scrutinized for old maps of the various farms. For Zwartdoorns 421KQ the oldest map that could be obtained dates to 1956 (CSG Document 10F2KM01). The farm was then numbered as No.1019 and was then located in the District of Rustenburg in the Province of Transvaal. The specific map shows that it was surveyed for an electrical servitude/line between July & August 1956. No historical sites or features are indicated on this map.

Site specific review

Dense vegetation cover at the time of the assessment limited visibility on the ground in some sections, while some parts were more open. The field assessment focused on these sections, and also on areas with clumps of trees that could possibly indicate the location of man-made structures and features. The fact that the study and development area is also mostly flat (with no real rocky outcrops, ridges or prominent hills present), as well as the mostly red sandy soils and some turf characterizing the topography and natural stratigraphy of the area would mean that Late Iron Age stone-walled settlement remains are unlikely to occur in the area. These settlements typically tend to concentrate on and around rocky ridges and prominent hills. Landscapes such as these would also have been utilized mainly for cattle/livestock grazing and limited crop raising and growing in pre-historical times.

Although no stone-walled Iron Age settlement features were identified in the study area (similar to the situation on neighbouring study areas), two scatters of undecorated ceramics (typical Iron Age pottery) were identified in close proximity to each other. The site is located on a dirt road on the western boundary of the Copper SPP area. One other feature – a recent historical one - was identified in the Copper SPP study area during the field assessment, although it is possible

that other sites, features and material (such as unmarked or low stone-packed graves), that are not visible due to dense grass cover and the fact that these are covered by soil, could be present.

5.3.2.3 Palaeontological Environment

According to the Palaeontological Impact Assessment (Appendix E7), the geology of the proposed Copper Solar Power Plant near Northam in Limpopo is depicted on the 1: 250 000 Thabazimbi 2426 (1974) and the Rustenburg 2526 (1981) Geological Map (Council for Geosciences, Pretoria) (Figure 5.15). These maps indicate that the north-western portion of the development is underlain by Nebo Granite (Mn, brick colour) (Lebowa Granite Suite) while the rest of the development footprint is underlain by undifferentiated Pretoria Group (Transvaal Supergroup) (Vro, green). The most western portion of the proposed water collection line and grid connection is furthermore, underlain by the Rustenburg layered Suite (Bushveld Complex). Updated geology (mapped by the Council of Geosciences, Pretoria) refines the geology and indicates that the development is underlain by Nebo Granite as well as the Timeball Hill Formation (Pretoria Group, Transvaal Supergroup). The Palaeotechnical Report of the Limpopo Province (Groenewald et al, 2014) as well as the South African Heritage Resources Information System (SAHRIS) (Almond et al, 2013; SAHRIS website) allocates a Zero Palaeontological Sensitivity to the Lebowa Granite Suite of the Bushveld Complex and a High Palaeontological Sensitivity to the Timeball Hill Formation. However, the igneous rocks of the Bushveld Complex probably compromised the original fossil content of the microbial stromatolites and microfossils by thermal metamorphosis.

The Bushveld Complex comprise of the largest mafic intrusion in the world and underlie an area of almost 65 000 km^2. The maximum thickness of these rocks is almost 8 km while individual layers can be followed for about 150 km. This intrusion is world renowned for the ore reserves of platinum-group elements namely chromium and Copper. The Bushveld Complex is divided in 4 groups namely the Lebowa Granite Suite, Rashoop Granophyre Suite, Rustenburg Layered Suite and Rooiberg Group. The latter Group of felsic and minor volcanic rocks may be genetically closer related to the Bushveld event as to the Transvaal Supergroup (Hutton and Schweitzer, 1995). The Rustenburg Layered Suite reveals a complete differentiation sequence of magma and is made up of various rock layers ranging from dunite, gabbro, norite, and pyroxenite, and anorthosite to magnetite and apatite- rich diorite.

The Timeball Hill Formation mantled by the superficial sediments comprises of conglomerates, diamictite, quartzite, minor lavas with lacustrine and fluvio-deltaic mudrocks, while the overlying Klapperkop Member of the Timeball Hill Formation consist of conglomerate, quartzite, shale and siltstone (Groenewald 2014). Catuneanu & Eriksson (2002) is of the opinion that the Timeball Hill Formation was deposited within a deep marine basin.

The Timeball Hill Formation is known to contain stromatolites and are associated with thin carbonate interbeds within turbidite sequences in the lower part of the formation (Catuneanu & Eriksson 2002). Stromatolites have not been recorded from the overlying fluvio-deltaic Klapperkop Quartzite Member. Other subunits in the Pretoria Group comprising stromatolites possibly also contain organic-walled microfossils.

Stromatolites are layered mounds, columns and sheet-like sedimentary rocks. These structures were originally formed by the growth of layer upon layer of cyanobacteria, a single-celled photosynthesizing microbe. Cyanobacteria are prokaryotic cells (simplest form of modern carbon-bases life). Stromatolites are first found in Precambrian rocks and are known as the

earliest known fossils. The oxygen atmosphere that we depend on was generated by numerous cyanobacteria photosynthesizing during the Archaean and Proterozoic Era.

Stromatolites and oolites from the Transvaal Supergroup have been described by various authors (Eriksson and Altermann, 1998). Detailed descriptions of South African Archaean stromatolites are available in the literature (Altermann, 1995; Altermann 2001; Buick, 2001; and Schopf, 2006).

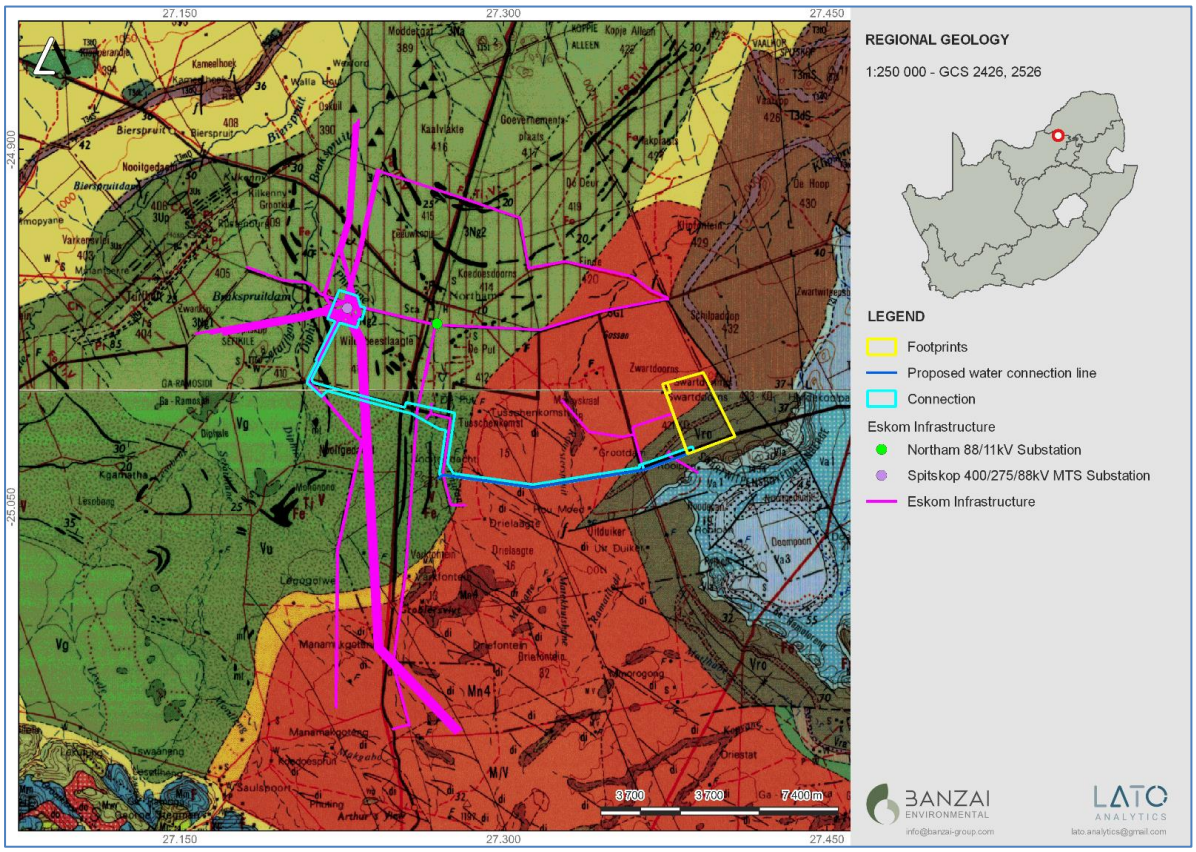


Figure 5.14: Extract of the 1: 250 000 Thabazimbi 2426 (1974) and the Rustenburg 2526 (1978) Geological Maps (Council for Geosciences, Pretoria)

5.4 SITE SELECTION MATRIX

Due to the nature of the proposed development, the location of the solar power plant is largely dependent on technical and environmental factors such as solar irradiation, climatic conditions, topography of the site, access to the grid and capacity of the grid. Studies of solar irradiation worldwide indicate that the Limpopo Province has a high potential for the generation of power from solar.

The receptiveness of the site to PV Development includes the presence of optimal conditions for the sitting of a solar energy facility due to high irradiation values and optimum grid connection opportunities (i.e. the grid connection points are located within the affected property which minimises the length of power line development and consolidates the overall impacts and disturbance of the project within the affected property). The Remaining Extent of Portion and Portion 5 of the Farm Zwartdoorns no. 421 where the project is proposed to be located is

considered favorable and suitable from a technical perspective due to the following characteristics:

- Climatic conditions: Climatic conditions determine if the project will be viable from an economic perspective as the SPP is directly dependent on the annual direct solar irradiation values of a particular area. The Limpopo province receives high averages of direct normal and global horizontal irradiation daily. This is an indication that the regional location of the project includes a low number of rainy days and a high number of daylight hours experienced in the region. The Global Horizontal Radiation value is around 2118 kWh/m^2 per annum is relevant in the area.
- Topographic conditions: The surface area on which the proposed facility will be located has a favourable level topography, which facilitates work involved with construction and maintenance of the facility and ensures that shadowing on the panels do not occur. The topographic conditions, which are favourable, minimises the significance of the impact that will occur during the clearing and levelling of the site for the construction activities.
- Extent of the site: A significant portion of land is required to evacuate up to 250MW and space is a constraining factor in PV facility installations. Provision was made to assess a larger area than is required for the facility to make provision for any other environmental or technical constraints that may arise and avoiding those areas. Larger farms are sought after to make provision for any constraints imposed by the Department of Agriculture on the extent of land that may be used for such facilities per farm, as well as the opportunities presented for the avoidance of sensitive environmental features present. The Remaining Extent of Portion 1 and Portion 5 of the Farm Zwartdoorns no. 421, and the development footprint assessed therein is considered to provide an opportunity for the successful construction and operation of a SPP with a capacity of up to 250MW, as well as opportunities for the avoidance and mitigation of impacts on the affected environment and sensitive environmental features.
- Site availability and access: The land is available for lease by the developer. Reluctant farm owners or farmers over capitalising hamper efforts to find suitable farms. Access to the site is readily available via the D1235 district road to the south of the site.
- Grid connection: In order for the PV facility to connect to the national grid the facility will have to construct an on-site substation, Eskom switching station and a power line from the project site to connect to the Eskom grid. Available grid connections are becoming scarce and play a huge role when selecting a viable site. Generation from the facility will tie in with a newly proposed collector substation to be connected to the national grid via one of the existing Eskom 275kV or 400kV lines from Spitskop 400/275/88/kV MTS Substation or directly to the Spitskop 400/275/88/kV MTS Substation. The connection power line will be constructed within the limits of the grid connection corridor.
- Environmental sensitivities: From an environmental perspective the proposed site is considered highly desirable due to limited environmental sensitivities in terms of geology, and soils, agricultural potential, vegetation and landscape features, climate, biodiversity and the visual landscape (refer to Section 5.3.1 of this report). The area proposed for development exclusively consists of land used for agriculture, but wetland features (depressions) are located on the development footprint, as well as a drainage line. These

environmental sensitive features will need to be considered by the developer for the placement of the facility infrastructure within the development footprint.

It is evident from the discussion above that the Remaining Extent of Portion 1 and Portion 5 of the Farm Zwartdoorns no. 421 may be considered favourable and suitable in terms of the site and environmental characteristics. As mentioned previously, no alternative areas on the property have been considered for the placement of the development footprint as the assessed development footprint avoids any sensitive features. The development footprint of this project will cover a significant portion of the farm; however, provision will be made to exclude any sensitive areas from the facility layout to be developed within the development footprint.

5.5 CONCLUDING STATEMENT ON ALTERNATIVES

When considering the information provided by the specialists with regards to the site selection criteria, the site is identified as preferred due to fact that the opportunities presented on the site to develop the project in such a way which avoids the areas and features (including the associated buffers) of high environmental sensitivity. Therefore, development of the up to 250 MW Copper SPP on the Remaining Extent of Portion 1and Portion 5 of the Farm Zwartdoorns no. 421 is the preferred option.

Considering the environmental sensitive features present within the development footprint, the Applicant has proposed a draft facility layout which considers these features, and thereby aim to avoid any direct impact on these features. The layout will be further assessed as part of the EIA Phase of the project.

6 DESCRIPTION OF THE IMPACTS AND RISKS

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (…) must include-

(v) the impacts and risks identified for each alternative, including the nature, significance,

consequence, extent, duration and probability of the impacts, including the degree to which these impacts-

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be avoided, managed or mitigated;

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

(vii) positive and negative impacts that the proposed activity and alternatives will have on

the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

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

6.1 SCOPING METHODOLOGY

The contents and methodology of the scoping report aims to provide, as far as possible, a user-friendly analysis of information to allow for easy interpretation.

- Checklist (see section 6.1.1): The checklist consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts.
- Matrix (see section 6.1.2): The matrix analysis provides a holistic indication of the relationship and interaction between the various activities, development phases and the impact thereof on the environment. The method aims at providing a first order cause and effect relationship between the environment and the proposed activity. The matrix is designed to indicate the relationship between the different stressors and receptors which leads to specific impacts. The matrix also indicates the specialist studies that have been conducted to address the potentially most significant impacts.

6.1.1 Checklist analysis

The independent consultant conducted a site visit on 15 May 2023. The site visit was conducted to ensure a proper analysis of the site-specific characteristics of the study area. Table 6.1 provides a checklist, which is designed to stimulate thought regarding possible consequences

of specific actions and so assist scoping of key issues. It consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts. The table highlights certain issues, which are further analysed in matrix format in section 6.2.

Table 6.1: Environmental checklist

QUESTION	YES	NO	Description
1. Are any of the following located on the site earmarked for the development?			
I. A river, stream, dam or wetland		×	None.
II. A conservation or open space area		×	None.
III. An area that is of cultural importance		×	None.
IV. Site of geological significance		×	None.
V. Areas of outstanding natural beauty		×	None.
VI. Highly productive agricultural land		×	None.
VII. Floodplain		×	None.
VIII. Indigenous Forest		×	None.
IX. Grass land		×	None.
X. Bird nesting sites		×	The Avifauna SSV (refer to Appendix E3) did not observe any nests of Species of Conservation Concern. The low number of species recorded nesting within the site should be interpreted with caution because the survey was undertaken using point surveys, and the full assessment area was not yet covered. It is postulated that more species are likely to be nesting if an assessment of the full site is done.
XI. Red data species		×	The Avifauna SSV refer to Appendix E3) did not record any Red Data Species on site but indicated that some species may occur on site that are considered SCC.
XII. Tourist resort		×	None.
2. Will the project potentially result in potential?			
I. Removal of people		×	None.

II. Visual Impacts	×		The VIA (refer to Appendix E4) confirmed that the significance of the visual impact will be a "Negative Medium Impact". The only receptors likely to be impacted by the proposed development are residents living and working on nearby farms, people travelling on the D1235 road.
III. Noise pollution		×	Construction activities will result in the generation of noise over a period of 12-18 months. The noise impact is unlikely to be significant.
IV. Construction of an access road	×		Access will be obtained via a gravel road off the D1235 district road.
V. Risk to human or valuable ecosystems due to explosion/fire/ discharge of waste into water or air.		×	None.
VI. Accumulation of large workforce (>50 manual workers) into the site.	×		Approximately 800 employment opportunities will be created during the construction phase and 50 employment opportunities during the operation phase of the SPP project.
VII. Utilisation of significant volumes of local raw materials such as water, wood etc.	×		The estimated maximum amount of water required during the facility's 20 years of production is approximately 4200m³ per annum.
VIII. Job creation	×		Approximately 800 employment opportunities will be created during the construction and 50 employment opportunities during the operational phases for the SPP project.
IX. Traffic generation	×		Traffic will be generated over the 12–18-month construction period for the SPP.

X. Soil erosion	×		The site will need to be cleared or graded to a limited extent, which may potentially result in a degree of dust being created, increased runoff and potentially soil erosion. The time that these areas are left bare will be limited to the construction phase, since vegetation will be allowed to grow back after construction.
XI. Installation of additional bulk telecommunication transmission lines or facilities		×	None.
3. Is the proposed project located near the following?			
I. A river, stream, dam or wetland		×	None.
II. A conservation or open space area		×	None.
III. An area that is of cultural		×	None.
IV. A site of geological significance		×	None.
V. An area of outstanding natural		×	None.
VI. Highly productive agricultural land		×	None.
VII. A tourist resort		×	None.
VIII. A formal or informal settlement	×		The closest town to the project is Northam, located approximately 2km north west of the proposed development.

6.1.2 Matrix analysis

The matrix describes the relevant listed activities, the aspects of the development that will apply to the specific listed activity, a description of the environmental issues and potential impacts, the significance and magnitude of the potential impacts and possible mitigation measures. The matrix also highlights areas of particular concern (see Table 6.2) for more in depth assessment during the EIA process. An indication is provided of the specialist studies being conducted and which informed the initial assessment. Each cell is evaluated individually in terms of the nature of the impact, duration and its significance – should no mitigation measures be applied. This is important since many impacts would not be considered insignificant if proper mitigation measures were implemented.

In order to conceptualise the different impacts, the matrix specify the following:

Stressor:	Indicates the aspect of the proposed activity, which initiates and cause impacts on elements of the environment.
Receptor:	Highlights the recipient and most important components of the environment affected by the stressor.
Impacts:	Indicates the net result of the cause-effect between the stressor and receptor.
Mitigation:	Impacts need to be mitigated to minimise the effect on the environment.

Please refer to **Appendix E** (specialist studies) a more in-depth assessment of the potential environmental impacts.

Table 6.2: Matrix analysis

For ease of reference the significance of the impacts is colour-coded as follow:

Low significance	Medium significance	High significance	Positive impact

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY		POTENTIAL IMPACTS		SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS							MITIGATION OF POTENTIAL IMPACTS			SPECIALIST STUDIES / INFORMATION
			Receptors	Impact description / consequence	Minor	Major	Extent	Duration	Probability	Reversibility	Irreplaceable loss of resources	Possible Mitigation	Possible mitigation measures	Level of residual risk	
CONSTRUCTION PHASE															
• Activity 9(i) (GN.R 327): "The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water—(i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more." • Activity 11 (i) (GN.R. 327): "The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts." • Activity 12(ii)(a)(b) (GN.R. 327): "The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more (a) within a watercourse or (b) within 32 meters of a watercourse,	Site clearing and preparation Certain areas of the site will need to be cleared of vegetation and some areas may need to be levelled. Civil works The main civil works are: • Terrain levelling if necessary– Levelling will be minimal as the potential site chosen is relatively flat. • Laying foundation- The structures will be connected to the ground through cement pillars, cement slabs or metal screws. The exact method will depend on the detailed geotechnical analysis. • Construction of access and inside roads/paths – existing paths will be used were reasonably possible. Additionally, the turning circle for trucks will also be taken into consideration. Transportation and installation of PV panels into an Array	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	• Loss of shrubland habitat including flora species • Degradation of habitats in general • Encroachment of invasive alien species in disturbed areas. • Direct mortality of fauna • Emigration of fauna		-	S	L	D	PR	ML	Yes	- See Table 6.3	L	Terrestrial Biodiversity SSV (Appendix E1)
			Avifauna	• Displacement of priority avian species from important habitats. • Displacement of resident avifauna through increased disturbance. • Direct loss of important avian habitats.		-	S	M	Pr	PR	ML	Yes	- See Table 6.3	L	Avifauna SSV (Appendix E3)
			Air	• Air pollution due to the increase of traffic of construction vehicles and the undertaking of construction activities.	-		S	S	D	CR	NL	Yes	- Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.	L	-

measured from the edge of a watercourse." • Activity 19 (GN.R. 327): "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." • Activity 24 (ii) (GN.R 327): "The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters." • Activity 28 (ii) (GN.R. 327): "Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare." • Activity 56 (ii) (GN.R 327): "The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres..." • Activity 1 (GN.R. 325): "The development of facilities or infrastructure for the generation of electricity	The panels are assembled at the supplier's premises and will be transported from the factory to the site on trucks. The panels will be mounted on metal structures which are fixed into the ground either through a concrete foundation or a deep-seated screw. Wiring to the Central Inverters Sections of the PV array would be wired to central inverters which have a maximum rated power of 2000kW each. The inverter is a pulse width mode inverter that converts DC electricity to alternating electricity (AC) at grid frequency.		Soil	• Loss of agricultural potential by occupation of land. • Loss of agricultural potential by soil degradation. • Soil degradation, including erosion. • Disturbance of soils and existing land use (soil compaction). • Physical and chemical degradation of the soils by construction vehicles (hydrocarbon spills). • Loss of topsoil.	-		S	S	Pr	PR	ML	Yes	- See Table 6.3	L	Soil and Agricultural SSV (Appendix E5)
			Geology	• Collapsible soil. • Seepage. • Active soil (high soil heave). • Erodible soil. • Hard/compact geology. If the bedrock occurs close to surface it may present problems when driving solar panel columns. • The presence of undermined ground. • Instability due to soluble rock. • Steep slopes or areas of unstable natural slopes. • Areas subject to seismic activity.	-	-	S	S	Pr	CR	NL	Yes	- The most effective mitigation will be the minimisation of the project footprint by using the existing roads in the area and not create new roads to prevent other areas also getting compacted. - Retention of vegetation where possible to avoid soil erosion.	L	-
			Existing services infrastructure	• Generation of waste that need to be accommodated at a licensed landfill site. • Generation of sewage that need to be accommodated by the local sewage plant. • Increase in construction vehicles on existing roads.	-		L	S	D	PR	ML	Yes	-	L	Confirmation from the Local Municipality
			Groundwater	• Pollution due to construction vehicles and the storage and handling of dangerous goods.	-		S	S	Pr	CR	ML	Yes	- A groundwater monitoring programme (quality and groundwater levels) should be designed and installed for the site. - Monitoring boreholes should be securely capped, and must be fitted with a suitable sanitary seal to prevent surface water flowing	L	-

from a renewable resource where the electricity output is 20 megawatts or more…" • Activity 15 (GN.R. 325): "The clearance of an area of 20 hectares or more of indigenous vegetation…" • Activity 4 (e)(i)(gg) (GNR. 324): "The development of a road wider than 4 metres with a reserve less than 13,5 metres within (e) the Limpopo province, (i) outside urban areas, (gg) areas within… 5 kilometres from any other protected area identified in terms of NEMPAA…." • Activity 10 (e)(i) (GNR. 324): "The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres, (e) in the Limpopo province, (i) all areas." • Activity 14(ii)(a)(c)(e)(i)(ff)(hh) (GNR. 324): "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; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; in the (e)												down the outside of the casing. - Full construction details of monitoring boreholes must be recorded when they are drilled. - Sampling of monitoring boreholes should be done according to recognised standards.		
		Surface water	• Direct disturbance / degradation / loss to the drainage features due to the construction of the solar facility. • Increased erosion and sedimentation • Potential contamination of the drainage feature with machine oils and construction materials.		-	L	S	Pr	PR	ML	Yes	- See Table 6.3	L	Wetland Baseline and Risk Assessment (Appendix E2)
		General Environment (risks associated with BESS)	• Mechanical breakdown / Exposure to high temperatures • Fires, electrocutions and spillage • Spillage of hazardous substances • Soil contamination • Water Pollution • Health impacts • Generation of hazardous waste		-	S	M	Pr	PR	ML	Yes	- See Table 6.6	L	-
	SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	• Job creation. • Business opportunities. • Skills development.		+	P	S	D	I	N/A	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E8)
		Visual landscape	• Potential visual impact on residents of farmsteads and motorists in close proximity to proposed facility. • Lighting impacts. • Solar glint and glare impacts. • Visual sense of place impacts.		-	L	S	D	CR	NL	Yes	- See Table 6.3	M	Visual Impact Assessment (Appendix E4)
		Traffic volumes	• Increase in construction vehicles.	-		L	S	Pr	CR	NL	Yes	- Delivery and construction trips will be insignificant when compared to the Average Daily Traffic	L	Traffic Impact Assessment (Appendix E9)

Limpopo Province, (i) outside urban areas, within (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans and (hh) Areas within 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve." • Activity 18 (e)(i)(gg) (GNR. 324): "The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (e) in the Limpopo province, (i) outside urban areas, (gg) areas within… 5 kilometres from any other protected area identified in terms of NEMPAA…."												(ADT) and will not affect the existing Level of Service (LOS). It can therefore be concluded that, on both routes, no mitigation measures will be necessary.		
			Health & Safety	• Air/dust pollution. • Road safety. • Impacts associated with the presence of construction workers on site and in the area. • Influx of job seekers to the area. • Increased safety risk to farmers, risk of stock theft and damage to farm infrastructure associated with presence of construction workers on the site. • Increased risk of veld fires.		-	L	L	Pr	PR	ML	Yes	- See Table 6.3	M	Social Impact Assessment (Appendix E8)
			Noise levels	• The generation of noise as a result of construction vehicles, the use of machinery such as drills and people working on the site.	-		L	S	D	CR	NL	Yes	- During construction care should be taken to ensure that noise from construction vehicles and plant equipment does not intrude on the surrounding residential areas. Plant equipment such as generators, compressors, concrete mixers as well as vehicles should be kept in good operating order and where appropriate have effective exhaust mufflers.	L	Social Impact Assessment (Appendix E8)
			Tourism industry	• Since there are no sensitive tourism facilities in close proximity to the site, the proposed activities will not have an impact on tourism in the area.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Heritage resources	• Loss or damage to sites, features or objects of cultural heritage significance	-		S	S	U	PR	ML	Yes	- See Table 6.3	L	Heritage Impact Assessment (Appendix E6)

			Paleontological Heritage	• Disturbance, damage or destruction of legally-protected fossil heritage* within the development footprint during the construction phase		-	S	P	U	IR	ML	Yes	N/A	L	Palaeontological Impact Assessment (Appendix E7)
OPERATIONAL PHASE																
Activity 11(i) (GN.R. 327): *"The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."* Activity 1 (GN.R 325): *"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more."* Activity 28 (ii) (GN.R. 327): *"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."*	The key components of the proposed project are described below: • PV Panel Array - To produce 250 MW, the proposed facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple panels will be required to form the Solar Power Plant arrays which will comprise the PV facility. The PV panels will be tilted at a northern angle in order to capture the most sun. • Wiring to Central Inverters - Sections of the PV array will be wired to central inverters. The inverter is a pulse width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency. • Connection to the grid - Connecting the array to the electrical grid requires transformation of the voltage from 480V to 33kV to 132kV. The normal components and dimensions of a distribution rated electrical substation will be required. Output voltage from the inverter is 480V and this is fed into step up transformers to 132kV. An onsite substation will be required on the site to step the voltage up to 132kV, after which the power will be evacuated into the national	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	• Loss of shrubland habitat including flora species • Degradation of habitats in general • Encroachment of invasive alien species in disturbed areas. • Direct mortality of fauna • Emigration of fauna		-	L	L	Po	PR	ML	Yes	- See Table 6.4	L	Terrestrial Biodiversity SSV (Appendix E1)
			Avifauna	• Displacement of priority avian species from important habitats. • Displacement of resident avifauna through increased disturbance. • Collisions with PV panels leading to injury or loss of avian life. • Insignificant impacts expected to be associated with the power line as the line is proposed to be of a very short length.		-	S	L	Pr	PR	ML	Yes	- See Table 6.4	M	Avifaunal SSV (Appendix E3)
			Air quality	• The proposed development will not result in any air pollution during the operational phase.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Soil	• Soil degradation, including erosion. • Disturbance of soils and existing land use (soil compaction). • Loss of agricultural potential (low significance relative to agricultural potential of the site).	-		L	L	D	PR	SL	Yes	- See Table 6.4	L	Soil and Agricultural SSV (Appendix E5)
			Geology	• Collapsible soil. • Active soil (high soil heave). • Erodible soil. • Hard/compact geology. If the bedrock occurs close to surface it may present problems when driving power line columns.	-		S	S	Po	PR	ML	Yes	- Surface drainage should be provided to prevent water ponding. - Mitigation measures proposed by the detailed engineering geological investigation should be implemented.	L	-

	grid. Generation from the facility will tie in with the existing Eskom Juno 275/132/66kV MTS Substation. The connection power line will be constructed within the limits of the grid connection corridor. • Supporting Infrastructure – Auxiliary buildings with basic services such as water and electricity will be constructed on the site and will have an approximate footprint 820m². Other supporting infrastructure includes voltage and current regulators and protection circuitry. • Roads – Access will be obtained via gravel road off the D1235. An internal site road network will also be required to provide access to the solar field and associated infrastructure. All site roads will require a width of approximately 6 m – 12 m. • Fencing - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm.			• The presence of undermined ground. • Instability due to soluble rock. • Steep slopes or areas of unstable natural slopes. • Areas subject to seismic activity. • Areas subject to flooding.										
			Groundwater	• Leakage of hazardous materials. The development will comprise of a distribution substation and will include transformer bays which will contain transformer oils. Leakage of these oils can contaminate water supplies.	-		L	L	Po	PR	ML	Yes	- All areas in which substances potentially hazardous to groundwater are stored, loaded, worked with or disposed of should be securely bunded (impermeable floor and sides) to prevent accidental discharge to groundwater.	L	-
			Surface water	• Potential for increased stormwater runoff leading to Increased erosion and sedimentation. • Potential for increased contaminants entering the wetland systems	-		L	L	Pr	PR	ML	Yes	- See Table 6.4	L	Wetland Baseline and Risk Assessment (Appendix E2)
		SOCIAL/ECONOMIC	Visual landscape	• Visual impact on observers travelling along the roads and residents at homesteads within a 5km radius of the SPP. • Visual impact on observers travelling along the roads and residents at homesteads within a 5-10km radius of the SPP. • Visual impacts of lighting at night on sensitive visual receptors in close proximity to the proposed facility. • Visual impacts of glint and glare on sensitive visual receptors in close proximity to the proposed facility. • Visual impacts on observers travelling along the roads and residents at homesteads in close proximity to the power line structures. • Visual impacts and sense of place impacts associated		-	L	L	D	PR	ML	Yes	- See Table 6.4	L	Visual Impact Assessment (Appendix E4)

				with the operation phase of SPP.											
			Traffic volumes	• The proposed development will not result in any traffic impacts during the operational phase.	-		L	L	Po	CR	NL	Yes	-	L	Traffic Impact Assessment (Appendix E9)
			Health & Safety	• The proposed development will not result in any health and safety impacts during the operational phase.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	N/A	N/A
			Noise levels	• The proposed development will not result in any noise pollution during the operational phase.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Heritage resources	• Loss or damage to sites, features or objects of cultural heritage significance	-		S	S	U	PR	ML	Yes	- See Table 6.4	L	Heritage Impact Assessment (Appendix E6)
			Electricity supply	• Generation of additional electricity. The power line will transport generated electricity into the grid.	+		I	L	D	I	N/A	Yes	-	N/A	-
			Electrical infrastructure	• Additional electrical infrastructure. The proposed solar facility will add to the existing electrical infrastructure and aid to lessen the reliance of electricity generation from coal-fired power stations.	+		I	L	D	I	N/A	Yes	-	N/A	-
DECOMMISSIONING PHASE															
-	<u>Dismantlement of infrastructure</u> During the decommissioning phase the Solar Power Plant Energy facility and its associated infrastructure will be dismantled. <u>Rehabilitation of biophysical environment</u> The biophysical environment will be rehabilitated.	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	• Improvement of habitat through revegetation / succession over time • Soil erosion and sedimentation. • Spreading and establishment of alien invasive species • Habitat degradation due to dust • Spillages of harmful substances • Road mortalities of fauna / impact of human activities on site.		-	S	L	Po	N/A	N/A	Yes	- See Table 6.5	L	Terrestrial Biodiversity SSV (Appendix E1)
			Air quality	• Air pollution due to the increase of traffic of construction vehicles.	-		S	S	D	CR	NL	Yes	- Regular maintenance of equipment to ensure reduced exhaust emissions.	L	-

			Soil	• Soil degradation, including erosion. • Disturbance of soils and existing land use (soil compaction). • Physical and chemical degradation of the soils by construction vehicles (hydrocarbon spills).	-		S	S	Pr	PR	M	Yes	- See Table 6.3	L	Soil and Agricultural SSV (Appendix E5)
			Geology	• It is not foreseen that the decommissioning phase will impact on the geology of the site or vice versa.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Existing services infrastructure	• Generation of waste that needs to be accommodated at a licensed landfill site. • Generation of sewage that needs to be accommodated by the municipal sewerage system and the local sewage plant. • Increase in construction vehicles.	-		L	S	D	I	NL	Yes	-	L	-
			Groundwater	• Pollution due to construction vehicles.	-		S	S	Pr	CR	ML	Yes	-	L	-
			Surface water	• Potential loss or degradation of nearby wetlands through inappropriate closure	-		L	S	Pr	PR	ML	Yes	- Develop and implement a rehabilitation and closure plan. - Appropriately rehabilitate the project area by ripping, landscaping and re-vegetating with locally indigenous species	L	-
			Visual landscape	• Potential visual impact on visual receptors in close proximity to proposed facility.	-		L	S	D	CR	NL	Yes	- See Table 6.3	L	Visual Impact Assessment (Appendix E4)
			Traffic volumes	• Increase in construction vehicles.	-		L	S	Pr	CR	NL	Yes	- Movement of heavy construction vehicles through residential areas should be timed to avoid peak morning and evening traffic periods. In addition, movement of heavy construction vehicles through residential areas should	L	Traffic Impact Assessment (Appendix E9)

														not take place over weekends.		
			Health & Safety	• Air/dust pollution. • Road safety. • Increased crime levels. The presence of construction workers on the site may increase security risks associated with an increase in crime levels as a result of influx of people in the rural area.	-		L	S	Pr	PR	ML	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E8)
			Noise levels	• The generation of noise as a result of construction vehicles, the use of machinery and people working on the site.	-		L	S	D	CR	NL	Yes	- See Table 6.3	L	Social Impact Assessment (Appendix E8)
			Tourism industry	• Since there are no tourism facilities in close proximity to the site, the decommissioning activities will not have an impact on tourism in the area.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Heritage resources	• It is not foreseen that the decommissioning phase will impact on any heritage resources.	-		S	S	U	PR	ML	Yes	- See Table 6.3	L	Heritage Impact Assessment (Appendix E6)

6.2 KEY ISSUES IDENTIFIED

From the above it is evident that mitigation measures should be available for potential impacts associated with the proposed activity and development phases. The scoping methodology identified the following key issues which should be addressed in more detail in the EIA report.

6.2.1 Impacts during the construction phase

During the construction phase the following activities will have various potential impacts on the biophysical and socio-economic environment:

- Activity 9(i) (GN.R 327): "The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water—(i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more."

- Activity 11 (i) (GN.R. 327): "The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."

- Activity 12(ii)(a)(b) (GN.R. 327): "The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more (a) within a watercourse or (b) within 32 meters of a watercourse, measured from the edge of a watercourse."

- Activity 19 (GN.R. 327): "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."

- Activity 24 (ii) (GN.R 327): "The development of a road (ii) with reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters."

- Activity 28 (ii) (GN.R. 327): "Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."

- Activity 56 (ii) (GN.R 327): "The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres…"

- Activity 1 (GN.R. 325): "The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more…"

- Activity 15 (GN.R. 325): "The clearance of an area of 20 hectares or more of indigenous vegetation…"

- Activity 4 (e)(i)(gg) (GNR. 324): "The development of a road wider than 4 metres with a reserve less than 13,5 metres within (e) the Limpopo province, (i) outside urban areas, (gg) areas within… 5 kilometres from any other protected area identified in terms of NEMPAA…."

- Activity 10 (e)(i) (GNR. 324): "The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres, (e) in the Limpopo province, (i) all areas."

- Activity 14(ii)(a)(c)(e)(i)(ff)(hh) (GNR. 324): "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; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; in the (e) Limpopo Province, (i) outside urban areas, within (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans and (hh) Areas within 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve."

- Activity 18 (e)(i)(gg) (GNR. 324): "The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (e) in the Limpopo province, (i) outside urban areas, (gg) areas within… 5 kilometres from any other protected area identified in terms of NEMPAA…."

During the construction phase temporary negative impacts are foreseen over the short term. Table 6.3 summarises the potentially most significant impacts and the mitigation measures that are proposed during the construction phase.

Table 6.3: Impacts and the mitigation measures during the construction phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Terrestrial Biodiversity SSV (Appendix E1)	Degradation of habitats in general.	Negative High	Negative Medium	• Avoidance (High SEI Areas): Only limited development activities should be considered for High SEI habitat units. • Minimisation (High SEI Areas): Any development in these areas will lead to the direct destruction and loss of portions of functional habitat. Guidelines for development in high sensitivity areas require avoidance mitigation as much as possible. This must include concerted efforts to avoid these sensitive areas where feasible, and disturbances must be kept to an absolute minimum. Changes must be made to project infrastructure design to limit the amount of area/habitat impacted in relation to the title deed area (for example 10% reduction in footprint size). The minimisation of the disturbance footprint is also considered to be avoidance, this will include brush cutting beneath panels as opposed to the complete clearance of vegetation. Limited development activities of low-medium impact acceptable, followed by appropriate restoration activities. The infrastructure layout should consider habitat connectivity to avoid fragmentation, and technology alternatives should opt to retain vegetation under the PV. Offset mitigation may be required for high impact activities. • Minimisation and restoration mitigation (Medium SEI Areas): Any development activities of medium impact acceptable followed by appropriate restoration activities. • Minimisation and restoration mitigation (Low SEI Areas): Any development activities of medium-high impact acceptable followed by appropriate restoration activities.
Avifauna SSV (Appendix E3)	Habitat Loss	Negative High	Negative Medium	• Indigenous herbaceous and graminoid vegetation should be maintained under the solar panels to ensure biodiversity and to prevent soil erosion.

	Displacement of avifaunal species Noise and dust generation			Environmental Officer (EO) to provide supervision and oversight of vegetation clearing activities. • Avoidance of 'Very High' SEI water resources, including appropriate buffers, once confirmed. • Compile and implement a Rehabilitation Plan from the onset of the project. • Consult a fire expert and compile and implement a Fire Management Plan to minimise the risk of veld fires around the project site. • A Solid Waste Management Plan must be developed and implemented to avoid impacts to surrounding habitats. • Bird Flappers and diverters must be placed along the entire length of powerlines and must be placed at 5 m intervals. Recommended bird diverters such as flapping devices (dynamic devices) and thickened wire spirals (static devices) that increase the visibility of the lines should be fitted along the entire length of overhead lines. In addition, surrounding Eskom lines needs to mitigate as the cumulative impact is high. • Applying covers on phases or grounds where adequate separation is not feasible. Examples of covers include insulator/conductor covers, bushing covers, arrester covers, cut-out covers, and jumper wire covers. • Fencing mitigations: o Top 2 strands must be smooth wire. o Routinely retention loose wires. o Minimum 30 cm between wires. • Environmental Awareness Training for all staff and contractors. Hunting of species must be made a punishable offence. This is especially pertinent to avifauna SCC. • Specific mitigation measures will be provided during the EIR phase
Wetland Baseline and Risk	Disturbance and degradation of wetland vegetation	Negative Medium	Negative Low	• Restrict the disturbance and clearance footprint to within 5 m on either side of the proposed linear structures route (10 m disturbance corridor). • Avoid wetlands and buffers where feasible.

Assessment (Appendix E2)				• Implement a rehabilitation plan for any disturbed wetlands. Cleared areas must be rehabilitated and stabilised to avoid impacts to adjacent wetland and buffer areas. • Although the prescribed post-mitigation buffer as per the national buffer determination tool is 15 m attempt wherever possible to maintain a 33 m buffer on the delineated wetlands to lower the potential for bird collisions which are highest near water resources. • Reduce the disturbance footprint and the unnecessary clearing of vegetation when traversing the identified drainage lines. • Make use of existing access routes as much as possible, before new routes are considered. Any selected "new" route must not encroach into the wetland areas.
	Increased bare surfaces, runoff and potential for erosion	Negative Medium	Negative Low	• Keep excavation and soil heaps neat and tidy. • Limit construction activities in proximity (< 50 m) to wetlands to the dry season when storms are least likely to wash concrete and sand into wetlands. • Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash. • Mixing of concrete must under no circumstances take place in any wetland or their buffers. Scrape the area where mixing and storage of sand and concrete occurred to clean once finished. • Limit the placement of towers within wetlands and buffer areas where feasible. • Do not situate any of the construction material laydown areas within any wetland or buffer area. Try adhere to a 30 m buffer in these instances. • No machinery should be allowed to parked in any wetlands or buffer areas.
	Introduction and spread of alien and invasive vegetation	Negative Medium	Negative Low	• Promptly remove all alien and invasive plant species that may emerge during construction (i.e. weedy annuals and other alien forbs) must be removed. • Limit soil disturbance

				• The use of herbicides is not recommended in or near wetlands (opt for mechanical removal). • Appropriately stockpile topsoil cleared from the powerline footprint. • Clearly demarcate powerline construction footprint, and limit all activities to within this area. • Minimize unnecessary clearing of vegetation beyond the tower footprints and powerline corridors. • Lightly till any disturbed soil around the tower footprint to avoid compaction.
	Increased sediment loads to downstream reaches	Negative Medium	Negative Low	• See mitigation for increased bare surfaces, runoff and potential for erosion • Re-instate topsoil and lightly till transmission tower disturbance footprint.
	Contamination of wetlands with hydrocarbons due to leaks and spillages from machinery, equipment & vehicles as well as Contamination and eutrophication of wetland systems with human sewerage and litter.			• Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility. • Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete) in such a way as to prevent them leaking and entering wetland or buffer areas. • Mixing of concrete must under no circumstances take place within the wetland or buffer areas. • Check for oil leaks, keep a tidy operation, and promptly clean up any spills or litter. • Provide appropriate sanitation facilities for workers during construction and service them regularly. • The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected must be disposed of at a licensed disposal facility;

				• The Contractor must be in possession of an emergency spill kit that must be complete and available at all times on site; • Any possible contamination of topsoil by hydrocarbons must be avoided. Any contaminated soil must be treated in situ or be placed in containers and removed from the site for disposal in a licensed facility;
Visual Impact Assessment (Appendix E4)	Visual impact of construction activities on sensitive visual receptors in close proximity to the SPP.	Negative Medium	Negative Low	Planning • Retain and maintain natural vegetation immediately adjacent to the development footprint. Construction • Ensure that vegetation is not unnecessarily removed during the construction phase. • Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e., in already disturbed areas) where possible. • Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. • Ensure that rubble, litter, etc. are appropriately stored (if it can't be removed daily) and then disposed of regularly at a licenced waste site. • Reduce and control dust during construction by utilising dust suppression measures. • Limit construction activities to between 07:00 and 18:00, where possible, in order to reduce the impacts of construction lighting. • Rehabilitate all disturbed areas immediately after the completion of construction work and maintain good housekeeping.
	Visual impact of construction activities on sensitive visual receptors in close proximity to the grid connection	Negative Medium	Negative Low	
Soil and Agricultural SSV (Appendix E5)	Loss of Land Capability	Negative Low	Negative Low	• Avoidance of all high agricultural production land and other actively cultivated areas, where avoidance is not feasible stakeholder engagement should occur to compensate affected landowners. • Make use of existing roads or upgrades tracks before new roads are constructed. The number and width of internal access routes must be kept to a minimum.

				• A stormwater management plan must be implemented for the development. The plan must provide input into the road network and management measures. • Substations foundation and pylons placement must be (preferably) located in already disturbed areas that are not actively cultivated. • Rehabilitation of the area must be initiated from the onset of the project. Soil stripped from infrastructure placement can be used for rehabilitation efforts. • Vegetate or cover all stockpiles after stripping/removing soils • Storage of potential contaminants should be undertaken in bunded areas • All contractors must have spill kits available and be trained in the correct use thereof. • All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping". • No cleaning or servicing of vehicles, machines and equipment may be undertaken in water resources. • Have action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems.
Heritage Impact Assessment (Appendix E6)	Loss or damage to sites, features or objects of cultural heritage significance.	Negative Low	Negative Low	• The contractors and workers should be notified that archaeological sites might be exposed during the construction activities; • Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer (ECO) shall be notified as soon as possible; • All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the ECO will advise the necessary actions to be taken;

				• Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and • Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the NHRA, Section 51(1).A person or entity, e.g. the ECO, should be tasked to take responsibility for the heritage sites and held accountable for any damage.
Palaeontological Impact Assessment (Appendix E7)	Destroy or permanently seal-in fossils at or below the surface that are then no longer available for scientific study	Negative Medium	Negative Low	• The ECO for this project must be informed that the Timeball Hill Formation (Pretoria Group, Transvaal Supergroup has a High Palaeontological Sensitivity. • If Palaeontological Heritage is uncovered during surface clearing and excavations, the Chance find Protocol attached should be implemented immediately. Fossil discoveries ought to be protected and the ECO/site manager must report to South African Heritage Resources Agency (SAHRA) (Contact details: Heritage Western Cape, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. 3rd floor Protea Assurance Building, 142 Longmarket St, Cape Town City Centre, Cape Town, 8000; Private Bag X9067, Cape Town, 8000 Tel: 021 483 9598. Fax: +27 (0) 21 483 9845. Web: www.hwc.org.za) so that mitigation (recording and collection) can be carried out. • Before any fossil material can be collected from the development site, the specialist involved would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university), while all reports and fieldwork should meet the minimum standards for palaeontological impact studies proposed by SAHRA (2012).
Social Impact Assessment (Appendix E8)	Direct and indirect employment opportunities and skills development	Positive Low	Positive Medium	• A local employment policy should be adopted to maximise opportunities made available to the local labour force. • Labour should be sourced from the local labour pool, and only if the necessary skills are unavailable should labour be sourced from (in order of

				preference) the greater Waterberg DM, Limpopo Province, South Africa, or elsewhere. • Where feasible, training and skills development programmes should be initiated prior to the commencement of the construction phase. • As with the labour force, suppliers should also as far as possible be sourced locally. • As far as possible local contractors that are compliant with Broad-Based Black Economic Empowerment (B-BBEE) criteria should be used. • The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.
	Economic multiplier effects from the use of local goods and services.	Positive Low	Positive Medium	• It is recommended that a local procurement policy is adopted to maximise the benefit to the local economy. • A database of local companies, specifically Historically Disadvantaged Individuals (HDIs) which qualify as potential service providers (e.g., construction companies, security companies, catering companies, waste collection companies, transportation companies etc.) should be created and companies listed thereon should be invited to bid for project-related work where applicable. • Local procurement is encouraged along with engagement with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods and products from local suppliers where feasible.
	Potential loss in productive farmland.	Negative Medium	Negative Low	• The proposed site for the Copper SPP needs to be fenced off prior to the construction phase and all construction related activities should be confined in this fenced off area. • Livestock grazing on the proposed site need to be relocated. • All affected areas, which are disturbed during the construction phase, need to be rehabilitated prior to the operational phase and should be continuously monitored by the Environmental Control Officer (ECO).

				• Implement, manage and monitor a grievance mechanism for the recording and management of social issues and complaints.
	Influx of jobseekers and change in population in the study area.	Negative Medium	Negative Medium	• Develop and implement a local procurement policy which prioritises "locals first" to prevent the movement of people into the area in search of work. • Engage with local community representatives prior to construction to facilitate the adoption of the locals first procurement policy. • Provide transportation for workers (from Northam and surrounds) to ensure workers can easily access their place of employment and do not need to move closer to the project site. • Working hours should be kept between daylight hours during the construction phase, and / or as any deviation that is approved by the relevant authorities. • Compile and implement a grievance mechanism. • Appoint a Community Liaison Officer (CLO) to assist with the procurement of local labour. • Prevent the recruitment of workers at the site. • Implement a method of communication whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process. • Establish clear rules and regulations for access to the proposed site. • Appoint a security company and implement appropriate security procedures to ensure that workers do not remain onsite after working hours. • Inform local community organisations and policing forums of construction times and the duration of the construction phase. • Establish procedures for the control and removal of loiterers from the construction site.
	Temporary increase in safety and security	Negative Medium	Negative Low	• Working hours should be kept within daylight hours during the construction phase, and / or as any deviation that is approved by the relevant authorities.

	concerns associated with the influx of people			• Provide transportation for workers to prevent loitering within or near the project site outside of working hours. • The perimeter of the construction site should be appropriately secured to prevent any unauthorised access to the site. The fencing of the site should be maintained throughout the construction period. • The appointed EPC Contractor must appoint a security company to ensure appropriate security procedures and measures are implemented. • Access in and out of the construction site should be strictly controlled by a security company appointed to the project. • A CLO should be appointed as a grievance mechanism. A method of communication should be implemented whereby procedures to lodge complaints are set out for the local community to express any complaints or grievances with the construction process. • The EPC Contractor should implement a stakeholder management plan to address neighbouring farmer concerns regarding safety and security. • The project proposed must prepare and implement a Fire Management Plan; this must be done in conjunction with surrounding landowners. • The EPC Contractor must prepare a Method Statement which deals with fire prevention and management.
	Temporary increase in traffic disruptions and movement patterns.	Negative Medium	Negative Low	• All vehicles must be road worthy, and drivers must be qualified, obey traffic rules, follow speed limits and be made aware of the potential road safety issues. • Heavy vehicles should be inspected regularly to ensure their road worthiness. • Provision of adequate and strategically placed traffic warning signs and control measures along the R709, R703 and gravel road to warn road users of the construction activities taking place for the duration of the construction phase. Warning signs must be always visible, especially at night.

				• Implement penalties for reckless driving to enforce compliance to traffic rules. • Avoid heavy vehicle activity during “peak” hours (when children are taken to school, or people are driving to work). • The developer and EPC Contractor must ensure that all fencing along access roads is maintained in the present condition or repaired if disturbed due to construction activities. • The developer and EPC Contractor must ensure that the roads utilised for construction activities are either maintained in the present condition or upgraded if disturbed due to construction activities. • The EPC Contractor must ensure that damage / wear and tear caused by construction related traffic to the access roads is repaired before the completion of the construction phase. • A method of communication must be implemented whereby procedures to lodge complaints are set out for the local community to express any complaints or grievances with the construction process.
	Nuisance impact (noise and dust)	Negative Medium	Negative Low	• The movement of heavy vehicles associated with the construction phase should be timed to avoid weekends, public holidays, and holiday periods where feasible. • Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. • Ensure all vehicles are road worthy, drivers are qualified and are made aware of the potential noise and dust issues. • A CLO should be appointed, and a grievance mechanism implemented.
	Increased risk of potential veld fires.	Negative Medium	Negative Low	• A firebreak should be implemented before the construction phase. The firebreak should be controlled and constructed around the perimeters of the project site.

				• Adequate fire-fighting equipment should be provided and readily available on site and all staff should be trained in firefighting and how to use the fire-fighting equipment. • No staff (except security) should be accommodated overnight on site and the contractor should ensure that no open fires are allowed on site. The use of cooking or heating implements should only be used in designated areas. • Contractors need to ensure that any construction related activities that might pose potential fire risks, are done in the designated areas where it is also managed properly. • Precautionary measures need to be taken during high wind conditions or during the winter months when the fields are dry. • The project will adhere to the National Forest and Veld Fires act and the fire management plan. It is recommended that the project proponent join the local fire association.
	Impacts on the sense of place	Negative Medium	Negative Low	• Implement mitigation measures identified in the Visual Impact Assessment (VIA) prepared for the project. • Limit noise generating activities to normal daylight working hours and avoid weekends and public holidays. • The movement of heavy vehicles associated with the construction phase should be timed to avoid weekends, public holidays, and holiday periods where feasible. • Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. • All vehicles must be road-worthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.

				• Communication, complaints, and grievance channels must be implemented and contact details of the CLO must be provided to the local community in the site.
Transportation Impact Assessment (Appendix E6)	Increase in development trips for the duration of the construction Phase / Associated noise, dust and exhaust pollution	Negative Medium	Negative Low	• Stagger component delivery to site. • Reduce the construction period where possible. • Stagger the construction Phase. • The use of mobile batch plants and quarries in close proximity to the site would decrease the impact on the surrounding road network • Staff and general trips should occur outside of peak traffic periods as much as possible. • Maintenance of haulage routes. • Design and maintenance of internal roads.

6.2.2 Impacts during the operational phase

During the operational phase the site will serve as a solar plant. The potential impacts will take place over a period of 20 – 25 years. During the operational phase the following activities will have various potential impacts on the biophysical and socio-economic environment:

- Activity 11(i) (GN.R. 327): "The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."

- Activity 1 (GN.R 325): "The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more."

- Activity 28 (ii) (GN.R. 327): "Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."

During the operational phase minor negative impacts are foreseen over the long term. The latter refers to at least a 20-year period. Table 6.4 summarizes the potentially most significant impacts and the mitigation measures that are proposed during the operational phase.

Table 6.4: Impacts and the mitigation measures during the operational phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Terrestrial Biodiversity SSV (Appendix E1)	Continued fragmentation and degradation of natural habitats and ecosystems.	Negative Medium	Negative Low	• Refer to construction phase mitigation measures in Table 6.3.
Avifauna SSV (Appendix E3)	Electrocution, collisions, fencing, chemical pollution due to chemical for the cleaning of the PV panels and habitat loss	Negative Medium	Negative Low	• Avoidance mitigation (Very High SEI Areas) – no destructive development activities should be considered. Offset mitigation is not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages)—destructive impacts for species/ecosystems where persistence target remains. • Minimisation and restoration mitigation (Medium SEI Areas) – Any development activities of medium impact acceptable, followed by appropriate restoration be activities. • Minimisation mitigation (Very Low SEI Habitats) – medium to high-impact development activities are acceptable and restoration activities may not be required. • Additional mitigation measures will be provided in the EIR phase
Wetland Baseline and Risk Assessment (Appendix E2)	Degradation of wetland vegetation wetland vegetation.	Negative Medium	Negative Low	• Clear vegetation in line with the 2010 Eskom Environmental Procedure Document entitled "Procedure for vegetation clearance and maintenance within overhead powerline servitudes". • Avoid the use of herbicides and diesel to treat stumps within the wetland and buffer areas. • Make use of existing access routes as much as possible, before new routes are considered. Any selected “new” route must not encroach into the wetland areas.

	Proliferation of alien and invasive species	Negative Medium	Negative Low	• In line with the 2010 Eskom Environmental Procedure Document entitled "Procedure for vegetation clearance and maintenance within overhead powerline servitudes" all alien vegetation along the transmission servitude should be managed in terms of the Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983. By this Eskom is obliged to control category 1, 2 and 3 plants to the extent necessary to prevent or to contain the occurrence, establishment, growth, multiplication, propagation, regeneration and spreading such plants within servitude areas.
Visual Impact Assessment (Appendix E4)	Visual impacts of operation of SPP	Negative Medium	Negative Low	Planning • Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint. • Where insufficient natural vegetation exists next to the property, a 'screen' can be planted using endemic, fast growers that are water efficient. Operations • Maintain general appearance of the facility as a whole.
	Visual impacts of operation of grid connection infrastructure	Negative Medium	Negative Low	
	Visual impacts of lighting at night on sensitive visual receptors and the effect of sky glow on a rural landscape.	Negative Medium	Negative Low	• Shield the source of light by physical barriers (walls, vegetation etc.) • Limit mounting heights of lighting fixtures, or alternatively use footlights or bollard level lights. • Make use of minimum lumen or wattage in fixtures. • Make use of down-lighters, or shield fixtures. • Make use of low-pressure sodium lighting or other types of low impact lighting. • Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.

				• The use of night vision or thermal security cameras are very effective and can replace security lighting entirely, except for lighting as per the SACAA regulations.
Soil and Agricultural SSV (Appendix E5)	Loss of Land Capability, Soil erosion and compaction effects	Negative Medium	Negative Low	• Continuously monitor erosion and compaction on site. • Monitor surface water runoff on site.
Social Impact Assessment (Appendix E5)	Creation of employment opportunities and skills development.	Positive Low	Positive Medium	• It is recommended that local employment policy is adopted to maximise the opportunities made available to the local community. • The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. • Vocational training programs should be established to promote the development of skills.
	Development of non-polluting, renewable energy infrastructure.	Positive Medium	Positive Medium	• No mitigation measures are proposed.
	Loss of agricultural land and overall productivity.	Negative Low	Negative Low	• The proposed mitigation measures for the construction phase should have been implemented at this stage. • Mitigation measures from the Agricultural and Soil Compliance Statement, should also be implemented.
	Contribution to Local Economic Development (LED) and social upliftment.	Positive Medium	Positive High	• A Community Needs Analysis (CNA) must be conducted to ensure that the LED and social upliftment programmes proposed by the project are meaningful. • Ongoing communication and reporting are required to ensure that maximum benefit is obtained from the programmes identified, and to prevent the possibility for such programmes to be misused. • The programmes should be reviewed on an ongoing basis to ensure that they are best suited to the needs of the community at the time (bearing in mind that these are likely to change over time).

	Potential impacts related to the impact on tourism.	Positive Low	Positive Low	• Due to the extent of the project no viable mitigation measures can be implemented to eliminate the visual impact of the PV panels, but the subjectivity towards the PV panels can be influenced by creating a "Green Energy" awareness campaign, educating the local community and tourists on the benefits of renewable energy. Tourists visiting the area should be made aware of South Africa's movement towards renewable energy. This might create a positive feeling of a country moving forward in terms of environmental sustainability. This could be implemented by constructing a visitor's centre on the property allocated to the proposed solar farm which should be open to school fieldtrips, the local community, and tourists.
		Negative Low	Negative Low	
	Visual impact and impacts on sense of place.	Negative Medium	Negative Low	• To effectively mitigate the visual impact and the impact on sense of place during the operational phase of the proposed Copper SPP, it is suggested that the recommendations made in the Visual Impact Assessment (specialist study) should be followed in this regard.
Transportation Impact Assessment (Appendix E9)	Increased traffic on local routes.	Negative Low	Negative Low	• Source on-site water supply if possible. • Utilise cleaning systems for the panels needing less vehicle trips. • Schedule trips for the provision of water for the cleaning of panels outside peak traffic times as much as possible.

6.2.3 Impacts during the decommissioning phase

The physical environment will benefit from the closure of the solar facility since the site will be restored to its natural state. Table 6.5 provides a summary of the impacts during the decommissioning phase. The decommissioning phase will however potentially result in impact on soils, pressure on existing service infrastructure, surface water and the loss of permanent employment. Skilled staff will be eminently employable, and a number of temporary jobs will also be created in the process. Decommissioning of a PV facility will leave a positive impact on the habitat and biodiversity in the area as the area will be rehabilitated to its natural state.

Table 6.5: Impacts and the mitigation measures during the decommissioning phase

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
Wetland Baseline and Risk Assessment (Appendix E2)	Degradation of wetland vegetation and proliferation of alien and invasive species	Negative Low	Negative Low	• See mitigation for the impacts on direct loss, disturbance and degradation of wetlands and spread of alien and invasive plants. • Control should continue for a minimum of three years following decommissioning.
	Increased bare surfaces, runoff and potential for erosion	Negative Medium	Negative Low	• See mitigation for increased bare surfaces, runoff and potential for erosion and increased sediment loads during construction
Soil and Agricultural SSV (Appendix E5)	Erosion	Negative Low	Negative Low	• Implement an effective system of stormwater run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion. • Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion.
	Top Soil	Negative Low	Negative Low	• If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.
Transportation Impact	Increase in development trips for the duration of the construction	Negative Medium	Negative Low	• Stagger component delivery to site. • Reduce the construction period where possible. • Stagger the construction Phase.

Assessment (Appendix E9)	Phase / Associated noise, dust and exhaust pollution			• The use of mobile batch plants and quarries in close proximity to the site would decrease the impact on the surrounding road network • Staff and general trips should occur outside of peak traffic periods as much as possible. • Maintenance of haulage routes. • Design and maintenance of internal roads.

6.3 Impacts Associated with the Battery Energy Storage System (BESS)

Table 6.6: Impacts associated with the BESS.

IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING	SUMMARY OF MITIGATION MEASURES
• Mechanical breakdown / Exposure to high temperatures • Fires, electrocutions and spillage of toxic substances into the surrounding environment. • Spillage of hazardous substances into the surrounding environment. • Soil contamination – leachate from spillages which could	Negative Medium	Negative Low	• Operators are trained and competent to operate the BESS. Training should include the discussion of the following: • Potential impact of electrolyte spills on groundwater; • Suitable disposal of waste and effluent; • Key measures in the EMPr relevant to worker's activities; • How incidents and suggestions for improvement can be reported. • raining records should be kept on file and be made available during audits. • Battery supplier user manuals safety specifications and Material Safety Data Sheets (MSDS) are filed on site at all times. • Compile method statements for approval by the Technical/SHEQ Manager for the operation and management and replacement of the battery units / electrolyte for the duration of the project life cycle. Method statements should be kept on site at all times. • Provide signage on site specifying the types of batteries in use and the risk of exposure to hazardous material and electric shock. Signage should also specify

lead to an impact of the productivity of soil forms in affected areas. • Water Pollution – spillages into surrounding watercourses as well as groundwater. • Health impacts – on the surrounding communities, particularly those relying on watercourses (i.e. rivers, streams, etc) as a primary source of water. • Generation of hazardous waste			how electrical and chemical fires should be dealt with by first responders, and the potential risks to first responders (e.g. the inhalation of toxic fumes, etc.). • Firefighting equipment should readily be available at the BESS area and within the site. • Maintain strict access control to the BESS area. • Ensure all maintenance contractors / staff are familiar with the supplier's specifications. • Undertake daily risk assessment prior to the commencement of daily tasks at the BESS. This should consider any aspects which could result in fire or spillage, and appropriate actions should be taken to prevent these. • Standard Operating Procedures (SOPs) should be made available by the Supplier to ensure that the batteries are handled in accordance with required best practices. • Spill kits must be made available to address any incidents associated with the flow of chemicals from the batteries into the surrounding environment. • The assembly of the batteries on-site should be avoided as far as possible. Activities on-site for the BESS should only be limited to the placement of the container wherein the batteries are placed. • Undertake periodic inspections on the BESS to ensure issues are identified timeously and addressed with the supplier where relevant. • The applicant in consultation with the supplier must compile and implement a Leak and Detection Monitoring Programme during the project life cycle of the BESS. • Batteries must be strictly maintained by the supplier or suitably qualified persons for the duration of the project life cycle. No unauthorised personnel should be allowed to maintain the BESS. • Damaged and used batteries must be removed from site by the supplier or any other suitably qualified professional for recycling or appropriate disposal. • The applicant should obtain a cradle to grave battery management plan from the supplier during the planning and design phase of the system. The plan must be kept on site and adhered to.

7 CUMULATIVE EFFECTS ASSESSMENT

This section aims to address the requirements of Section 2 of the NEMA to consider cumulative impacts as part of any environmental assessment process.

7.1 Introduction

The EIA Regulations (2017) determine that cumulative impacts, "in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities." Cumulative impacts can be incremental, interactive, sequential or synergistic. EIAs have traditionally failed to come to terms with such impacts, largely as a result of the following considerations:

- Cumulative effects may be local, regional or global in scale and dealing with such impacts requires coordinated institutional arrangements;
- Complexity - dependent on numerous fluctuating influencing factors which may be completely independent of the controllable actions of the proponent or communities; and
- Project level investigations are ill-equipped to deal with broader biophysical, social and economic considerations.

Despite these challenges, cumulative impacts have been afforded increased attention in this Scoping Report and for each impact a separate section has been added which discusses any cumulative issues, and where applicable, draws attention to other issues that may contextualise or add value to the interpretation of the impact (refer to Appendix E). This chapter analyses the proposed project's potential cumulative impacts in more detail by: (1) defining the geographic area considered for the cumulative effects analysis; (2) providing an overview of relevant past and present actions in the project vicinity that may affect cumulative impacts; (3) presenting the reasonably foreseeable actions in the geographic area of consideration; and (4) determining whether there are adverse cumulative effects associated with the resource areas analysed.

The term "Cumulative Effect" has for the purpose of this report been defined as: the summation of effects over time which can be attributed to the operation of the project itself, and the overall effects on the ecosystem of the project area that can be attributed to the project and other existing and planned future projects.

7.2 Geographic Area of Evaluation

The geographic area of evaluation is the spatial boundary in which the cumulative effects analysis was undertaken. The spatial boundary evaluated in these cumulative effects analysis' generally includes an area of a 30km radius surrounding the proposed development (refer to Figure 7.1 below).

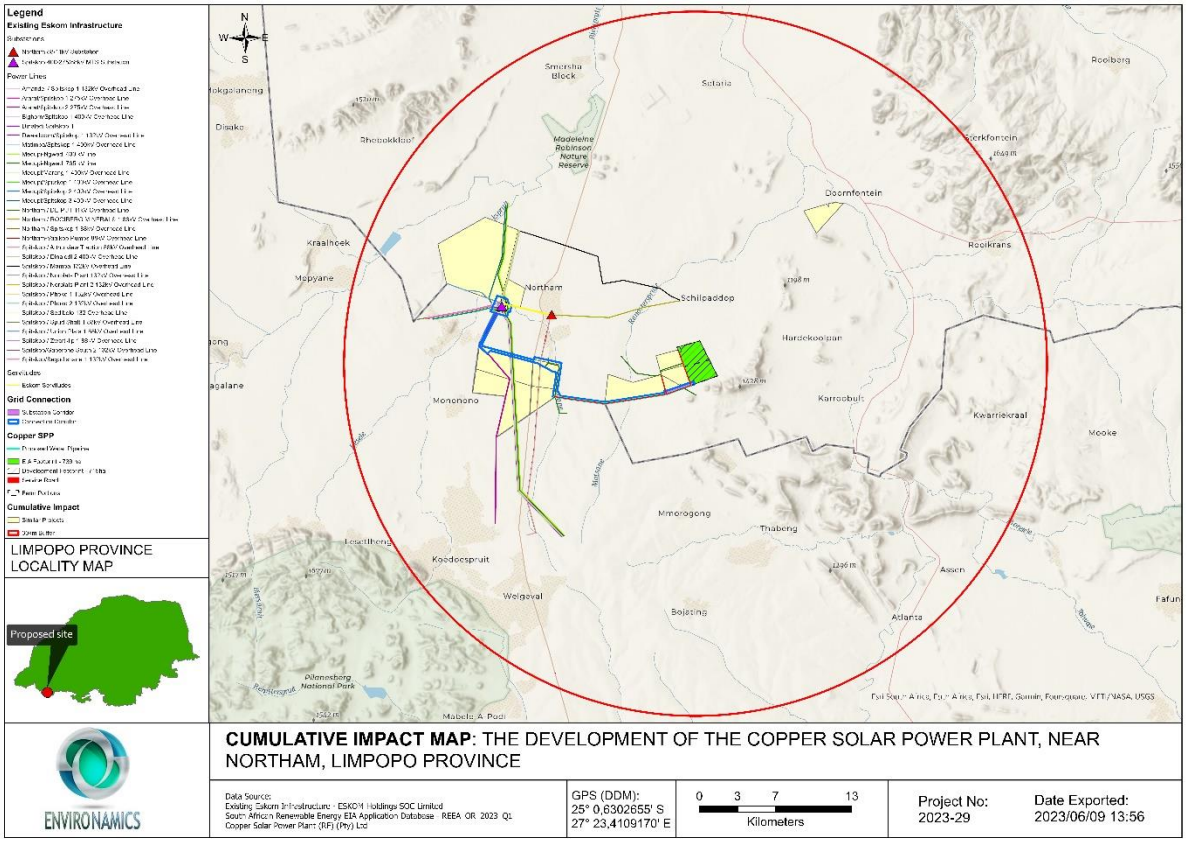


Figure 7.1: Geographic area of evaluation with utility-scale renewable energy generation sites and power lines

The geographic spread of PV solar projects, administrative boundaries and any environmental features (the nature of the landscape) were considered when determining the geographic area of investigation. It was argued that a radius of 30km would generally confine the potential for cumulative effects within this particular environmental landscape. The geographic area includes projects located within the Limpopo Province. A larger geographic area may be used to analyse cumulative impacts based on the specific temporal or spatial impacts of a resource. For example, the socio-economic cumulative analysis may include a larger area, as the construction workforce may draw from a much wider area. The geographic area of analysis is specified in the discussion of the cumulative impacts for that resource where it differs from the general area of evaluation described above.

7.3 Temporal Boundary of Evaluation

A temporal boundary is the timeframe during which the cumulative effects are reasonably expected to occur. The temporal parameters for these cumulative effects analysis are the anticipated lifespan of the proposed project, beginning in 2025 and extending out at least 20 years, which is the minimum expected project life of the proposed project. Where appropriate, particular focus is on near-term cumulative impacts of overlapping construction schedules for proposed projects in the area of evaluation.

7.4 OTHER PROJECTS IN THE AREA

7.4.1 Existing projects in the area

According to the DFFE's database, ten (10) Renewable Energy applications has been submitted to the Department within the geographic area of investigation (refer to Table 7.1).

Table 7.1: A summary of related projects that may have a cumulative impact, in a 30 km radius of the study area.

Site	Distance from Study Area	Proposed generating capacity	DEFF Reference	EIA Process	Project status
Portion 10 of the farm Wildebeestlaagte 411 KQ, Thabazimbi (Spitskop solar park)	15km	40 MW	12/12/20/2129	Scoping and EIA	Approved
Portion 5 of the farm Grootkuil 409 K.Q	17km	30 MW	12/12/20/2526	Scoping and EIA	In process
Farm Liverpool 543 KQ Portion 2	14,8km	10 MW	14/12/16/3/1/969	BAR	Approved
Farm Liverpool 543 KQ Portion 2	14,8km	10 MW	14/12/16/3/3/1/969	BAR	Approved
Spitskp Solar Park	15km	0 MW	14/12/16/3/3/2/702	Scoping and EIA	In process
Portion 1 of the farm Makayskraal No. 18 and Portion 2 of the farm Zwartdoorns No. 421, Limpopo Province	1km	250 MW	To be confirmed	Scoping and EIA	In process
Portion 3 and 4 of the farm Zwartdoorns No. 421	0km	250 MW	To be confirmed	Scoping and EIA	In process
Portion 1 and RE of farm Nooitgedacht No. 11, Limpopo Province situated within the Thabazimbi Local Municipality area of jurisdiction.	11km	500 MW	To be confirmed	Scoping and EIA	In process

It is unclear whether other projects not related to renewable energy is or has been or will be constructed in this area. In general, development activity in the area include residential areas,

crop fields and farming activities. The next section of this report will aim to evaluate the potential for solar projects for this area in the foreseeable future.

7.5 SPECIALIST INFORMATION ON CUMULATIVE EFFECTS

In line with the Terms of Reference (ToR) provided as part of the scoping report, specialists were asked to, where possible, take into consideration the cumulative effects associated with the proposed development and other projects which are either developed or in the process of being developed in the local area (refer to Figure 7.2 for process flow). The following sections present their findings.

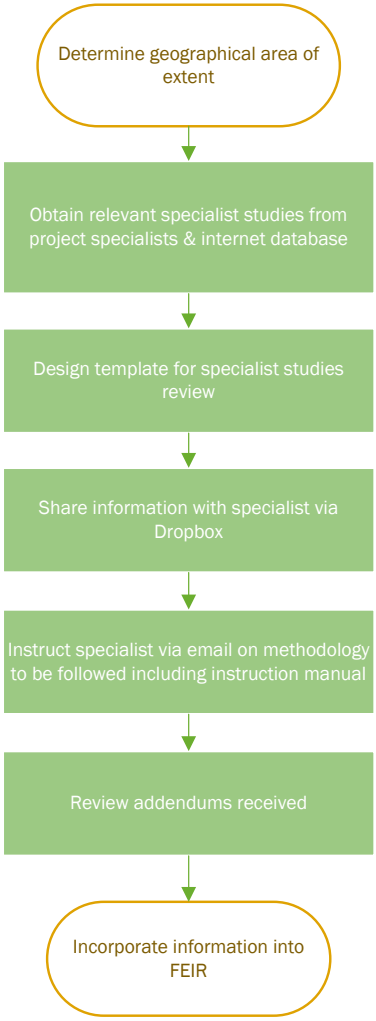


Figure 7.2: Process flow diagram for determining cumulative effects

7.5.1 Soil and Agricultural Potential

The cumulative impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present or reasonably foreseeable future activities that will affect the same environment. It is important to note that the cumulative impact assessment for a particular project, like what is being done here, is not the same as an

assessment of the impact of all surrounding projects. The cumulative assessment for this project is an assessment only of the impacts associated with this project but seen in the context of all surrounding impacts. It is concerned with this project's contribution to the overall impact, within the context of the overall impact. But it is not simply the overall impact itself.

The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all developments causing an acceptable level of change to be exceeded in the surrounding area. If the impact of the development being assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

The potential cumulative agricultural impact of importance is a regional loss (including by degradation) of future agricultural production potential. The defining question for assessing the cumulative agricultural impact is this: What level of loss of future agricultural production potential is acceptable in the area, and will the loss associated with the proposed development, when considered in the context of all past, present or reasonably foreseeable future impacts, cause that level in the area to be exceeded?

In quantifying the cumulative impact, the area of land taken out of agricultural production (grazing) as a result of the proposed Copper Solar Power Plant development (total generation capacity of up to 250 MW) will amount to a total of approximately 750 hectares. This is calculated using the industry standards of 2.5 and 0.3 hectares per megawatt for solar and wind energy generation respectively, as per the Department of Environmental Affairs (DEA) Phase 1 Wind and Solar Strategic Environmental Assessment (SEA) (2015). As a proportion of the total area within a 30km radius (approximately 282,700 ha), this amounts to only 0.002% of the surface area. That is within an acceptable limit in terms of loss of land which is largely suitable for grazing, of which there is no particular scarcity in the country. As previously indicated, the proposed development poses a low risk in terms of causing soil degradation because it can be fairly easily and effectively prevented by standard best practice soil degradation control measures, as recommended and included in the EMPr of the EIA Report. If the risk for each individual development is low, then the cumulative risk is also low.

Due to all of the considerations discussed above, the cumulative impact of loss of agricultural land use will not have an unacceptable negative impact on the agricultural production capability of the area. According to the Soil and Agriculture Potential Study (Appendix E5), the cumulative impacts have been scored “Low”, indicating that the potential incremental, interactive, sequential, and synergistic cumulative impacts are of low significance.

7.5.2 Ecology

The Terrestrial Biodiversity SSV (refer to Appendix E1) states that cumulative impacts are assessed within the context of the extent of the proposed project area, other similar developments and activities in the area (existing and in-process), and general habitat loss and transformation resulting from any other activities in the area. Localised cumulative impacts include those from operations that are close enough (within 30 km) to potentially cause additive effects on the local environment or any sensitive receptors (relevant operations include nearby large road networks, other Solar Power Plant facilities, and power infrastructure). Relevant impacts include the overall reduction of foraging and nesting/burrowing habitat, dust deposition,

noise and vibration, disruption of functional corridors of habitat important for movement and migration, disruption of waterways, groundwater drawdown, and groundwater and surface water quality depletion.

Long-term cumulative impacts associated with the site development activities can lead to the loss of endemic and threatened species, including natural habitat and vegetation types, and these impacts can even lead to the degradation of conserved areas such as the adjacent game parks and reserves.

In order to spatially quantify the cumulative effects of the proposed development, the project in isolation is compared with the overall effects of surrounding development (including total transformation and transformation as a result of new and proposed developments of a similar type, i.e., solar). Note that this spatial assessment is only conducted for the proposed solar development footprint area, the powerline area is omitted.

The total area within the 30 km buffer around the PV development area amounts to 326658,72 ha, but when considering the transformation (113793.9 ha) that has taken place within this radius, 212864.8 ha of intact habitat remains according to the 2018 National Biodiversity Assessment. Therefore, the area within 30 km of the project has experienced approximately 34.8% loss in natural habitat.

The PV project footprint is 750 ha, and the other existing or approved PV projects that lie within the 30 km region that will remove intact habitat take up an area of 3750 (as per the latest South African Renewable Energy EIA Application Database).

This means that the total amount of remaining habitat lost as a result of all existing and/or approved solar projects in the region, including the proposed PV development, amounts to 1.87% (the sum of all related developments as a percentage of the total remaining habitat).

7.5.3 Avifauna

The cumulative impacts, when considering the existing transformation of the threatened habitats to croplands, in addition to the prevalence of planned solar developments, that increase the cumulative risks and, therefore, warrant mitigations. The mitigations to reduce cumulative impacts involve limiting the disturbance footprint (overall size), limiting human activity and noise throughout the project life, disturbing as little natural vegetation as possible, retaining the natural vegetation beneath the panels and around infrastructure, limiting the extent and width of roadways, reducing the speeds that vehicles travel, and then thoroughly rehabilitating the entire footprint back to natural grassland after decommissioning.

Despite some residual and cumulative impacts, there is no objection, from an avifaunal perspective to the development of the proposed SPP development.

7.5.4 Social Impact Assessment

The Social Impact Assessment (refer to Appendix E8) indicate that from a social impact point of view the project represents an important development opportunity for the communities surrounding Copper SPP. Should it be approved, it will not only supply the national grid with much needed clean power but will also provide a number of opportunities for social upliftment. The cumulative impacts for each of the potential social impacts were assessed throughout the

report. The most significant cumulative social impacts are both positive and negative: the community will have an opportunity to better their social and economic well-being, since they will have the opportunity to upgrade and improve skills levels in the area, but impacts on family and community relations may, in some cases, persist for a long period of time. Also, in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.

7.5.5 Visual

The Visual Impact Assessment (refer to Appendix E4) confirmed that the construction and operation of the PV facility may increase the cumulative visual impact together with farming activities, dust on gravel roads, existing Eskom power line infrastructure and new projects in the area and other proposed solar power facilities in the area. The significance of the visual impacts can only be determined once projects have been awarded preferred bidder status. However, taking into account the already disturbed visual surrounds in the area and all the positive factors of such a development including economic factors, social factors and sustainability factors, the visual impact of this proposed development will be insignificant and is suggested that the development commence, from a visual impact point of view.

7.5.6 Heritage

The Heritage Impact Assessment (Refer to Appendix E6) concluded that from a review of available databases, publications, as well as available heritage impact assessments done for the purpose of developments in the region, it was determined that the Copper SPP is located in an area with a very low presence of heritage sites and features.

The cultural heritage profile of the larger region is very low. Most frequently found are farmsteads, formal and informal burial sites. For this review, heritage sites located in urban areas have been excluded.

Heritage resources are sparsely distributed on the wider landscape with highly significant (Grade 1) sites being rare. Because of the low likelihood of finding further significant heritage resources in the area of the proposed for development and the generally low density of sites in the wider landscape the overall cumulative impacts to heritage are expected to be of generally low significance before mitigation.

7.5.7 Palaeontology

According to the Palaeontological Impact Assessment (refer to Appendix E7), based on the SAHRIS website, the only palaeontological heritage assessments (PIAs) available for this region (Almond 2015, Brink undated, Groenewald 2013b, Millsteed 2013b) are all at desktop level with no field data. The cumulative Impacts of the area will include approved electrical facilities within a 30 km radius of the project site. As the mentioned MTS and Powerlines and corridors are all underlain by similar geology the Impact on these developments will be similar. The Palaeontological Significance of the proposed Copper SPP is rated as Low and the cumulative Impacts will thus also be Low Negative.

7.5.8 Traffic

According to the Traffic Impact Assessment (refer to Appendix E9) depending on the timing of the other nearby renewable energy projects, where construction in particular could overlap, traffic impact will increase accordingly. It should be noted that the volume of traffic is related to the specific development stage, logistics planning and development size.

The construction period for other renewable energy projects is relatively short (between 12 and 18 months), where traffic flow will vary during the construction period. It is assumed that 50% of these projects' construction periods would likely coincide with the Copper SPP construction period. This additional traffic, however, will be widely dispersed and easily accommodated on the surrounding road network. In addition, the traffic impact of the operational and maintenance periods will be low/ negligible and it is also unlikely that the decommissioning of these projects will coincide with each other.

In conclusion, the cumulative impact and significance of the various nearby renewable energy projects is considered to have a low/ negligible impact and therefore no corrective measures will be required.

7.6 IMPACT ASSESSMENT

Following the definitions of the term, the "residual effects on the environment", i.e. effects after mitigation measures have been put in place, combined with the environmental effects of past, present and future projects and activities will be considered in this assessment. Also, a "combination of different individual environmental effects of the project acting on the same environmental component" can result in cumulative effects.

7.6.1 Potential Cumulative Effects

The receptors (hereafter referred to as Valued Ecosystem Components (VECs) presented in Section 6 (refer to the matrix analysis) have been examined alongside other past, present and future projects for potential adverse cumulative effects. A summary of the cumulative effects discussed are summarized in Table 7.2. There have been specific VECs identified with reference to the Solar Project (Table 6.2), which relates to the biophysical and socio-economic environments. Table 7.2 indicates the potential cumulative effects VECs and the rationale for inclusion/exclusion.

Table 7.2: Potential Cumulative Effects for the proposed project

	Valued Ecosystem Components (VECs)	Rationale for Inclusion / Exclusion	Level of Cumulative Effect
Construction Phase			
Terrestrial Biodiversity Impact Assessment	Degradation of habitats in general. Encroachment of invasive alien species in disturbed areas. Direct	The construction phase of the development and associated infrastructure will result in loss of and damage to natural habitats if the vegetation is cleared for the development of the solar plant. Rehabilitation of some areas would be possible but there is likely to be long-term damage in large	- Medium

	mortality of fauna. Emigration of fauna	areas. Most habitat destruction will be caused during the construction phase.	
Wetland Assessment	Disturbance and degradation of wetland vegetation	The construction activities associated with the proposed SPP will potentially have an impact on the wetland areas and water levels, whether it is through direct or indirect impacts. The clearance of vegetation for the SPP will either have a direct or indirect impact on the wetlands and smaller drainage channels. Loss of the riparian and in stream habitat will also result in permanent loss or displacement of the invertebrates, birds and small mammals' dependant on the wetland vegetation for feeding, shelter and breeding purposes. All functions associated with the wetland zones and the surrounding landscape will be compromised if mitigation measures are not applied correctly. Other indirect impacts of the construction of the SPP on the characteristics of the water course include impacts on water quality and changes to the geomorphology should the development cause impacts on downstream areas. The impact is considered to be cumulative due to proposed development impacting on the characteristics of the watercourse.	- Medium
	Increased bare surfaces, runoff and potential for erosion	The use of heavy machinery during the construction and decommissioning phases of the development will result in the compaction of soil, resulting in decreased infiltration of rainwater and increased surface run-off volumes and velocities leading to a greater erosion risk. The hardened surfaces of the road and compacted soils of the proposed development area will also lead to an increase in surface run-off during storm events which will likely be discharged via stormwater outlet points, concentrating flows leaving the exposed areas. This can lead to erosion in the cleared areas and channel forming where culverts concentrate water on the side of the road where the river and riverine area are located. It can lead to sedimentation, in the river. The impact is considered to be cumulative due to proposed development contributing to the risk of sediment transport and erosion in the area.	-Medium
	Introduction and spread of alien and invasive vegetation	Construction work will also carry a risk of soil and water pollution, with large construction vehicles contributing substantially due to oil and fuel spillages. If not promptly dealt with, spillages or accumulation of waste matter can contaminate the soil and surface- or groundwater, leading to	- Medium

		potential medium/long-term impacts on fauna and flora. The impact is considered to be cumulative due to proposed development contributing to the risk of soil and water pollution in the area.	
	Increased sediment loads to downstream reaches Soil disturbance, sedimentation	The construction almost certainly carries by far the greatest risk of alien invasive species being imported to the site, and the high levels of habitat disturbance also provide the greatest opportunities for such species to establish themselves, since most indigenous species are less tolerant of disturbance. The biggest risk is that seeds of noxious plants may be carried onto the site along with materials that have been stockpiled elsewhere at already invaded sites. Continued movement of personnel and vehicles on and off the site, as well as occasional delivery of materials required for maintenance, will result in a risk of importation of alien species throughout the life of the project. Furthermore, the spread of the alien invasive species through the area will be accelerated when seeds are carried by stormwater into the drainage features on the site that will cause environmental degradation and indigenous species to be displaced. The wider area is already impacted by the spread of alien invasive species due to agricultural and mining activities. Therefore, the development will contribute towards the cumulative impact of spread of alien invasive species. The impact will be low as the mitigation measures proposed will reduce the overall impact of the development.	- Low
Avifaunal Impact Assessment	Displacement of priority avian species from important habitats	The displacement of resident avifauna through increased disturbance and possible collisions with PV panels leading to injury or loss of avian life are considered as a cumulative impact due to the large number of planned solar development in a 30 km radius.	- Medium
	Displacement of resident avifauna	The displacement of resident avifauna through increased disturbance and possible collisions with PV panels leading to injury or loss of avian life are considered as a cumulative impact due to the large	- Low

		number of planned solar development in a 30 km radius.	
	Loss of important avian habitats	The loss of important avian habitats through increased disturbance are considered as a cumulative impact due to the large number of planned solar development in a 30 km radius.	- Medium
Agricultural and Soils Compliance Statement	Loss of agricultural land	The cumulative impact of loss of agricultural land use will not have an unacceptable negative impact on the agricultural production capability of the area. The proposed development is therefore acceptable in terms of cumulative impact, and it is therefore recommended that it is approved. Because of the negligible agricultural impact of grid connection infrastructure, its cumulative impact is also assessed as negligible.	- Low
Heritage Impact Assessment	Loss or damage to sites, features or objects of cultural heritage significance	The cultural heritage profile of the larger region is very limited. Most frequently found are stone artefacts, mostly dating to the Middle Stone Age. Sites containing such material are usually located along the margins of water features (pans, drainage lines), small hills and rocky outcrops. Such surface scatters or 'background scatter' is usually viewed to be of limited significance. The colonial period manifests largely as individual farmsteads, in all its complexity, infrastructure features such as roads, railways and power lines. For the purpose of this review, heritage sites located in urban areas have been excluded. Because of the low likelihood of finding significant heritage resources in the relevant area proposed for development and the generally low density of sites in the wider landscape the cumulative impacts to the heritage are expected to be of low significance.	- Low
Palaeontological Impact Assessment	Disturbance, damage or destruction of legally-protected fossil heritage within the development footprints during the construction phase (impacts on well-preserved and / or rare fossils of scientific and conservation value)	A low palaeontological significance has been allocated to the proposed development. It is therefore considered that the development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area.	-Low
Socia l – Impa	Impacts of employment opportunities, business	Copper SPP and the establishment of other solar power projects within the area has the potential to result in significant positive cumulative impacts,	+ Medium

	opportunities and skills development	specifically with regards to the creation of a number of socio-economic opportunities for the region, which in turn, can result in positive social benefits. The positive cumulative impacts include creation of employment, skills development and training opportunities, and downstream business opportunities. The cumulative benefits to the local, regional, and national economy through employment and procurement of services are more considerable than that of Copper SPP alone.	
	Impact with large-scale in-migration of people	While the development of a single solar power project may not result in a major influx of people into an area, the development of several projects may have a cumulative impact on the in-migration and movement of people. In addition, the fact that the project is proposed within an area characterised by good levels of solar irradiation suitable for the development of commercial solar energy facilities implies that the surrounding area is likely to be subject to considerable future applications for PV energy facilities. Levels of unemployment, and the low level of earning potential may attract individuals to the area in search of better employment opportunities and higher standards of living. It is exceedingly difficult to control an influx of people into an area, especially in a country where unemployment rates are high. It is therefore important that the project proponent implement and maintain strict adherence with a local employment policy in order to reduce the potential of such an impact occurring.	-Low
Traffic Impact Study	Increase in construction vehicles	The construction and decommissioning phases are the only significant traffic generators for renewable energy projects. The duration of these phases is short term (i.e. the impact of the generated traffic on the surrounding road network is temporary and renewable energy facilities, when operational, do not add any significant traffic to the road network). Even if all renewable energy projects within the area are constructed at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable.	- Low

Operational Phase			
Terrestrial Biodiversity Impact Assessment	Loss habitat including flora species within	The development and associated infrastructure will result in loss of and damage to natural habitats if the vegetation is cleared for the development of the solar plant. Rehabilitation of some areas would be possible but there is likely to be long-term damage in large areas. Most habitat destruction will be caused during the construction phase.	- Medium
	Degradation of habitats in general.	The development may result in widespread soil disturbance and is usually associated with accelerated soil erosion. Soil erosion promotes a variety of terrestrial ecological changes associated with disturbed areas, including the establishment of alien invasive plant species, altered plant community species composition and loss of habitat for indigenous flora. The impact is considered as cumulative as it will influence the vegetation communities in the area.	- Low
	Dust pollution	The environmental impacts of wind-borne dust, gases and particulates from the operation and maintenance activities associated with the proposed development are primarily related to human health and ecosystem damage. Poor air quality results in deterioration of visibility and aesthetic landscape quality of the region, particularly in winter due to atmospheric inversions. The impact is considered to be cumulative as dust pollution has an impact on the surrounding environment and as the surrounding area is already impacted by mining and agricultural activities.	- Low
	Encroachment of invasive alien species in disturbed areas	Continued movement of vehicles on and off the site will result in a risk of importation of alien species. The biggest risk is that seeds of noxious plants may be carried onto the site along with materials that have been stockpiled elsewhere at already invaded sites. Movement of vehicles will however be reduced during operation and maintenance of the facility.	- Low
	Direct mortality of fauna and Emigration of fauna.	Continued movement of vehicles on and off the site will result in a risk of importation of alien species. The biggest risk is that seeds of noxious plants may be carried onto the site along with materials that have been stockpiled elsewhere at already invaded sites. The wider area is already impacted by the spread of alien invasive species due to agricultural and mining activities. Therefore,	- Low

		the development will contribute towards the cumulative impact of spread of alien invasive species. The impact will be low as the mitigation measures proposed will reduce the overall impact of the development.	
Wetland/Riparian Assessment	Disturbance and degradation of wetland vegetation	The operation and maintenance activities associated with the proposed SPP will potentially have an impact on the wetland areas and water levels, whether it is through direct or indirect impacts. All functions associated with the wetland zones and the surrounding landscape will be compromised if mitigation measures are not applied correctly. Other indirect impacts o include impacts on water quality and changes to the geomorphology should the development cause impacts on downstream areas. The impact is considered to be cumulative due to proposed development impacting on the characteristics of the watercourse.	-Low
	Proliferation of alien and invasive species	Continued movement of personnel and vehicles on and off the site, as well as occasional delivery of materials required for maintenance, will result in a risk of importation of alien species throughout the life of the project. Furthermore, the spread of the alien invasive species through the area will be accelerated when seeds are carried by stormwater into the drainage features on the site that will cause environmental degradation and indigenous species to be displaced. The wider area is already impacted by the spread of alien invasive species due to agricultural and mining activities. Therefore, the development will contribute towards the cumulative impact of spread of alien invasive species. The impact will be low as the mitigation measures proposed will reduce the overall impact of the development.	- Medium
Visual Impact Assessment	Visual intrusion of the development on observers within the area	The operation and maintenance of the facility will create visual instruction on observers that utilise and travel through the area, including travellers using the local roads	- Medium
Decommissioning Phase			
General	Generation of waste	During the decommissioning of the facility waste will be generated that will need to be disposed of where recycling and re-use is not available. This	- Medium

		may lead to pressure on waste disposal facilities in the area.	

7.7 CONCLUSION

This chapter of the Scoping Report addressed the cumulative environmental effects of the construction, operation and decommissioning project phases to be further assessed as part of the EIA Phase. The information to date has shown that no significant adverse residual impacts are likely. However, cumulative impacts could arise as other similar projects are constructed in the area.

The potential most significant cumulative impacts relate to:

- Cumulative effects during construction phase:
  - Loss of habitat as well as invasive alien species and mortality of fauna (- Medium)
  - Disturbance and degradation of wetland vegetation (- Medium)
  - Displacement of priority avian species from important habitats (- Medium)
  - Loss of important avian habitats (- Medium)
  - Disturbance, damage or destruction of legally-protected fossil heritage within the development footprints during the construction phase (impacts on well-preserved and / or rare fossils of scientific and conservation value) (- Low)
  - Impacts of employment opportunities, business opportunities and skills development (+ Medium)
  - Impact with large-scale in-migration of people (- Low)
- Cumulative effects during the operational phase:
  - Habitat destruction and fragmentation (- Medium)
  - Impacts on the characteristics of the watercourse (- Medium)
  - Visual intrusion (- Medium)
- Cumulative effects during the decommissioning phase:
  - Generation of waste (- Medium)

The cumulative impact for the proposed development is medium to low and no high, unacceptable impacts related to the project are expected. Considering the extent of the project and information presented in section 7 of this report, it can be concluded that the cumulative impacts will not result in large scale changes and impacts on the environment.

Photovoltaic solar energy technology is a clean technology which contributes toward a better-quality environment. The proposed project will contribute to local economic growth by supporting industry development in line with provincial and regional goals and ensuring

advanced skills are drawn to the Limpopo Province. No cumulative impacts with a high residual risk have been identified.

In terms of the desirability of the development of sources of renewable energy therefore, it may be preferable to incur a higher cumulative loss in such a region as this one (where the landscape has already experienced degradation), than to lose land with a higher environmental value elsewhere in the country.

8 PLAN OF STUDY FOR EIA

This section aims to address the following requirements of the regulations:

Appendix 2. (2) A scoping report (...) must include -

(i) 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;

(ii) a description of the aspects to be assessed as part of the EIA process;

(iii) aspects to be assessed by specialists;

(iv) a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;

(v) a description of the proposed method of assessing duration and significance;

(vi) an indication of the stages at which the competent authority will be consulted;

(vii) particulars of the public participation process that will be conducted during the EIA process; and

(viii) a description of the tasks that will be undertaken as part of the EIA 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.

8.1 INTRODUCTION

This section gives a brief outline of the Plan of Study for EIA (PoSEIA) and the tasks that will be undertaken and the anticipated process to meet the objectives for the EIA phase. The approach to the EIA is to focus on those key issues identified for the preferred alternative. This will ensure that the EIA focuses on the most significant impacts and in the process save time and resources.

8.2 ANTICIPATED OUTCOMES OF THE IMPACT ASSESSMENT PHASE

The purpose of the EIA phase is to assess issues identified in the scoping phase and will include an environmental management program (EMPr). The EMPr will provide information on the proposed activity and the manner in which potential impacts will be minimized or mitigated. The EIA report will comply with Appendix 3 and will:

- 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 preferred location;

- Identify the location of the development footprint within the preferred site 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 preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- Identify, assess, and rank the impacts the activity will impose on the preferred location 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.

8.3 TASKS TO BE UNDERTAKEN

The following sections describe the tasks that will be undertaken as part of the EIA Phase of the process.

8.3.1 Project Description

Further technical and supporting information will be gathered to provide a more detailed project description. This will include a detailed and finalised site layout plan that will be compiled once the areas of sensitivity identified in this Scoping Report have been confirmed by the specialists.

8.3.2 Consideration of alternatives

The following project alternatives will be investigated in the EIR:

- Design/Layout alternatives: In terms of the actual layout of the proposed PV plant which will only be assessed for the preferred site alternative. A facility layout will be included in the EIR, which considers the environmental sensitive features identified during the Scoping phase

8.3.3 Compilation of Environmental Impact Report (EIR)

A Draft EIR will be compiled to meet the content requirements as per Appendix 3 of GNR. 326 of the EIA Regulations (as amended) and will also include a draft Environmental Management

Programme containing the aspects contemplated in Appendix 4 of GNR326. The Generic EMPr for overhead electricity transmission and distribution infrastructure and the Generic EMPr for the development of the associated substation infrastructure for transmission and distribution of electricity as per Government Notice 435, which were published in Government Gazette 42323 on 22 March 2019, will also be included in the Draft EIR.

8.3.4 Public participation

All registered I&APs and relevant State Departments will be given the opportunity to review the Draft Environmental Impact Report in accordance with Regulation R326. A minimum of 30 days commenting period will be allowed and all stakeholders and I&APs will be given an opportunity to forward their written comments within that period. All issues identified during this 30-day review and comment period will be documented and compiled into a Comments and Response Report to be included as part of the Final EIR to be submitted to the DFFE for decision-making on the Application for Environmental Authorisation.

8.4 ASPECTS ASSESSED

Table 8.1 below provides a summary of the aspects that have been assessed. The aspects are also linked to specialist information obtained.

Table 8.1: Aspects assessed

Aspects	Potential impacts	Specialist studies / technical information
Construction of the PV Solar facility	• Impacts on the fauna and flora	Terrestrial Biodiversity Survey and Avifauna Impact Assessment
	• Wetlands and riparian areas	Wetland Baseline and Risk Assessment
	• Impacts on agricultural potential (soils)	Soil and Agricultural Compliance Statement
	• Impacts on existing services infrastructure	Confirmation from the Local Municipality
	• Temporary employment, impacts on health and safety	Social Impact Assessment
	• Traffic impacts	Traffic Impact Assessment
	• Impacts on heritage resources	Heritage Impact Assessment and Palaeontological Impact Assessment
Operation of the PV Solar facility	• Impacts on the fauna and flora	Terrestrial Biodiversity Survey and Avifauna Impact Assessment
	• Wetlands and riparian areas	Wetlands and riparian areas

	• Impacts on agricultural potential (soils)	Soil and Agricultural Compliance Statement
	• Increased consumption of water	Confirmed volumes to be provided by the Applicant
	• Visual Impact	Visual Impact Assessment
	• Provision of employment and generation of income for the local community	Social Impact Assessment
Decommissioning of the PV Solar facility	• Wetlands and riparian areas	Wetland Baseline and Risk Assessment
	• Socio-economic impacts (loss of employment)	Social Impact Assessment
Cumulative Impacts	• Cumulative biophysical impacts resulting from similar developments in close proximity to the proposed activity.	All independent specialist studies results to be considered and analyzed by the EAP

8.4.1 Specialist studies

Based on the initial descriptions of potential environmental impacts or aspects (refer to Table 6.2), specialists have been subcontracted to assess the potential impacts that may be significant. The specialist studies assess impacts on both the social and the biophysical environment and also help in identifying ways that can help to mitigate the envisaged impacts. The following specialist studies have been included to address the potentially most significant impact as identified during the scoping phase – refer to Table 6.2:

- Heritage Impact Assessment: To determine whether the proposed activity will impact on any heritage or archeological artifacts.
- Terrestrial Biodiversity, Plant and Animal Species Impact Assessment: To determine what the impact of the proposed activity will be on the ecology (fauna and flora) in the area.
- Wetland Baseline and Risk Assessment: To determine the impact of the proposed activity on the wetlands present on the Remaining Extent of Portion and Portion 5 of the Farm Zwartdoorns no. 421.
- Avifauna Impact Assessment: To determine what the impacts of the proposed activity will have on the birds (avifauna) in the area.
- Visual Impact Assessment: To determine to what extent the proposed activity will be visually intrusive to the surrounding communities or other receptors.
- Soil and Agricultural Potential Study: To determine how the proposed activity will impact on soil and agricultural resources.

- Social Impact Assessment: To determine how the proposed activity will impact on the socio-economic environment.
- Palaeontological Impact Assessment: To determine the impacts on palaeontological resources.
- Traffic Impact Assessment: To determine the impacts on road users on long haul routes and roads around the project area.

8.4.2 Terms of reference for specialist studies

Specialists in their field of expertise will consider baseline data and identify and assess impacts according to predefined rating scales (section 8.5). Specialists will also suggest optional or essential ways in which to mitigate negative impacts and enhance positive impacts. Further, specialists will, where possible, take into consideration the cumulative effects associated with this and other projects which are either developed or in the process of being developed in the local area. The specialist is reminded to follow the latest DFFE protocols.

The results of these specialist studies have been integrated into the draft Scoping Report. The general requirements proposed for the inputs are presented below and specialists are encouraged to comment and provide input on these. The Terms of Reference (ToR) for each specialist study are included as Appendix E10 to the report.

8.4.2.1 General Requirements

Specialists' reports must comply with Appendix 6 of GNR. 326 published under sections 24(5), and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and whereby the following are to be included:

- The details of-
    - the specialist who prepared the report; and
    - the expertise of that specialist to compile a specialist report including a curriculum vitae;
- A declaration that the specialist is independent in a form as may be specified by the competent authority;
- An indication of the scope of, and the purpose for which, the report was prepared;
    - An indication of the quality and age of base data used for the specialist report;
    - A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;
- The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;
- A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;

- Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;
- An identification of any areas to be avoided, including buffers;
- A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;
- A description of any assumptions made and any uncertainties or gaps in knowledge;
- A description of the findings and potential implications of such findings on the impact of the proposed activity, or activities;
- Any mitigation measures for inclusion in the EMPr;
- Any conditions for inclusion in the environmental authorisation;
- Any monitoring requirements for inclusion in the EMPr or environmental authorisation;
- A reasoned opinion-
    - whether the proposed activity, activities or portions thereof should be authorised;
        - regarding the acceptability of the proposed activity or activities; and
    - if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;
- A description of any consultation process that was undertaken during the course of preparing the specialist report;
- A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and
- Any other information requested by the competent authority.

In addition to the above, specialists are expected to:

- Review the Scoping Report, with specific reference to the Comments and Response Report to familiarize with all relevant issues or concerns relevant to their field of expertise;
- In addition to the impacts listed in the Scoping Report, identify any issue or aspect that needs to be assessed and provide expert opinion on any issue in their field of expertise that they deem necessary in order to avoid potential detrimental impacts;
- Assess the degree and extent of all identified impacts (including cumulative impacts) that the preferred project activity and its proposed alternatives, including that of the no-go alternative, may have;
- Identify and list all legislation and permit requirements that are relevant to the development proposal in context of the study;

- Reference all sources of information and literature consulted; and
- Include an executive summary to the report.

8.5 METHOD OF ENVIRONMENTAL ASSESSMENT

The environmental assessment aims to identify the various possible environmental impacts that could results from the proposed activity. Different impacts need to be evaluated in terms of its significance and in doing so highlight the most critical issues to be addressed.

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in Table 8.2.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

8.5.1 Impact Rating System

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the project phases:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact the following criteria is used:

Table 8.2: The rating system

NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.

2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		

1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/ component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.

3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects
SIGNIFICANCE		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity. The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.

51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

8.6 CONSULTATION WITH THE COMPETENT AUTHORITY

Consultation with the competent and commenting authorities will continue throughout the duration of impact assessment phase. The authorities will also comment on whether they deem it necessary to conduct additional specialist studies other than what is proposed already in this PoSEIA. On-going consultation will include:

- Submission of the Final EIR following a 30-day public review period (and consideration of comments received).
- Arrangements will be made to discuss the report with the Environmental Officer responsible for the project during the review period, where required.

9 CONCLUSION

This Draft Scoping Report is aimed at identifying the 'scope' of the EIA that will be conducted in respect of the activity for which authorization is being applied for. It can be concluded that:

The scoping phase complied with the specifications set out in Regulations 21 and Appendix 2 of GNR326.

All key consultees have been consulted as required by the Regulations 39 to 44.

Based on the contents of the report the following key environmental issues were identified which need to be addressed in the EIA report. Note that significance indicated is prior to mitigation.

Impacts during construction phase:

- Impacts on fauna and flora including 1) destruction, loss and fragmentation of habitats, ecosystems and the vegetation community (- High), 2) introduction of Invasive Alien Plant (IAP) species and invasive fauna (- Medium), 3) displacement of the indigenous faunal community (- Medium)
- Direct disturbance / degradation / loss to wetland soils or vegetation (- Medium) and increased erosion and sedimentation (- Medium)
- Visual impact of construction activities on sensitive visual receptors in close proximity to the SPP (- Medium)
- Destroy or permanently seal-in fossils at or below the surface that are then no longer available for scientific study (- Medium)
- Social impacts including 1) creation of direct and indirect employment opportunities (+ Medium), 2) economic multiplier effects from the use of local goods and services (+ Medium), 3) potential loss in productive farmland (- Medium), 4) influx of jobseekers and change in population in the study area (- High), 5) temporary increase in safety and security concerns associated with the influx of people (- Medium), 6) temporary increase in traffic disruptions and movement patterns (- Medium), 7) nuisance impact (noise and dust) (- Medium), 8) increased risk of potential veld fires (- Medium), and (9) impacts on the sense of place (- Medium).

Impacts during the operational phase:

- Impacts on fauna and flora including 1) continued fragmentation and degradation of natural habitats and ecosystems (- High), 2) continuing spread of IAP and weed species (- High) and 3) ongoing displacement and direct mortalities of the faunal community (- Medium)
- Potential for increased stormwater runoff leading to Increased erosion and sedimentation (- Medium) and potential for increased contaminants entering the wetland systems (- Medium)

- Visual impacts including 1) visual impacts on sensitive visual receptors within a 1km radius from the SPP (- Medium), (2) visual impacts on sensitive visual receptors between a 1km and 3km radius from the SPP (- Medium), (3) visual impacts of lighting at night on visual receptors in close proximity to the SPP, and (4) visual impact and impacts on sense of place.

- Loss of Land Capability, soil erosion and compaction effects (- Medium)

- Social impacts including 1) creation of employment opportunities and skills development (+ Medium), 2) development of non-polluting, renewable energy infrastructure (+ Medium), and 3) contribution to Local Economic Development (LED) and social upliftment (+ High)

Impacts during the decommissioning phase:

- Potential loss or degradation of nearby wetlands through inappropriate closure (- Medium)

Cumulative biophysical impacts resulting from similar development in close proximity to the proposed activity.

No fatal flaws or impacts of a high significance will remain after the implementation of the proposed mitigation measures. The issues identified will be addressed in more detail in the EIA report as part of the EIA Phase.

Considering the environmental sensitive features present within the development footprint, as identified in this Scoping Report, the Applicant has proposed a draft facility layout which considers these features, and thereby aim to avoid any direct impact on these features. As part of this optimisation process associated infrastructure has been shifted outside of these sensitive environmental features and areas. The draft layout will be further assessed and optimised as part of the EIA Phase of the project to ensure that the development footprint within the affected property is appropriate from an environmental perspective, and thereby avoids the present sensitive environmental features and areas as identified by the independent specialists.

The EAP therefore recommends that:
The scoping report be approved after which the EIA process, as required by Regulations 23 to 24 may commence.

We trust that the Department of Forestry, Fisheries and the Environment find the report in order and we eagerly await your comments in this regard.

Mr. Herman Alberts

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